

**HEALTH CARE FINANCING ADMINISTRATION
FIVE YEAR INFORMATION
RESOURCES MANAGEMENT PLAN
(FY 2001 - FY 2005)**

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I. EXECUTIVE SUMMARY

Having successfully survived the larger part of millennium Y2K transition, the Health Care Financing Administration's (HCFA) information technology (IT) focus now shifts to addressing a twofold challenge: preparing HCFA to successfully implement HCFA's "information-centric" IT Architecture Model, and supporting the ever-increasing demand for IT solutions to carry out HCFA's strategic and business objectives.

HCFA has made substantial progress in developing its IT vision for the future and the architecture to support this vision. While the Y2K transition was a major and complex challenge for the Agency, it highlighted the central role IT plays in supporting our business operations. The Y2K experience, among other things, reinforced the importance of integrating IT capital planning and investment activities with our Agency strategic business objectives to ensure that limited IT resources are aligned with business priorities. Achieving Y2K compliance forced HCFA to delve into parts of our business at a level of detail not previously done. This expanded knowledge has provided an essential base for the IT architecture.

This Five Year Plan reflects HCFA's commitment to be a mature IT organization, based on the lessons learned from the Y2K experience and prior systems development initiatives. These lessons have shown us the need for a strategic IT vision and an IT architecture that support this vision and the value of having a strong IT investment planning and management process. We need to make sound IT investment decisions based on delivered value and return-on-investment and effectively manage IT investments using integrated project planning, requirements management, change control, independent testing and validation of solutions. We need an enterprise-wide systems security program to address the vulnerabilities and risks of our data and systems.

We discuss both our accomplishments to date in implementing these lessons learned (selecting investments through our capital planning and investment review process; planning and managing these investments more effectively), as well as our plans for future improvements (integrating planning activities and performance metrics, requirements analysis and change management, independent testing and validation and security requirements).

This Plan also reflects the critical role IT plays in supporting HCFA's accomplishment of business objectives and responding to legislative mandates. A central theme of HCFA's Strategic Plan is moving the Agency toward becoming a "beneficiary-centered purchaser" of health care services. Fulfilling this role requires that HCFA successfully integrate not only its more traditional role of regulator with that of payor, but it also requires us to place greater emphasis on assuring that expenditures on behalf of beneficiaries are warranted, prudent, and supportive of the providing quality care for beneficiaries at a reasonable cost. Implementation of the Balanced Budget Act (BBA) of 1997 (particularly the Medicare+Choice program and the National Medicare Education Program) and the Health Insurance Portability and Accountability Act of 1996 place new oversight and administration demands on us, primarily making information more readily available to beneficiaries for informed health care choices. Reducing fraud, abuse, and waste; improving oversight of Medicare contractors; strengthening oversight of health facility quality and safety -

each of these major initiatives relies extensively on IT solutions. Integrating data and making it useful supports multiple levels of decision-making, HCFA's management of its programs, beneficiary health care choices, and research, to name a few.

The "information-centric" IT Architecture Model, outlined in the Strategic Plan chapter of this Plan, is the conceptual framework for managing our development of essential, core databases and their interfaces with business applications that will support these and other major initiatives. It remains the central vision for HCFA's IT program and IT architecture. We discuss this model and a number of the major projects and initiatives that help us move in the direction outlined in the model.

We also recognize the need for increased emphasis on ensuring that our data and systems are secure from unwarranted access and disclosure. HCFA's databases and systems are information-rich. As we re-engineer our central databases, our challenge is to ensure compliance with Presidential Decision Directive 63; that data is made accessible to only authorized users and that systems, networks, processes, data, and websites are secure from tampering, disruption, or unauthorized access or use. We discuss our plans for strengthening our systems security program (security planning, oversight, and assessment).

This Plan remains a living document, designed to outline our general direction for the next five years, but flexible enough to permit mid-course corrections as events and circumstances warrant. We hope this Plan provides our partners and stakeholders with a clear sense of where we expect our energies to be focused in the future, and challenges them to help us in accomplishing these strategic business and IT objectives.

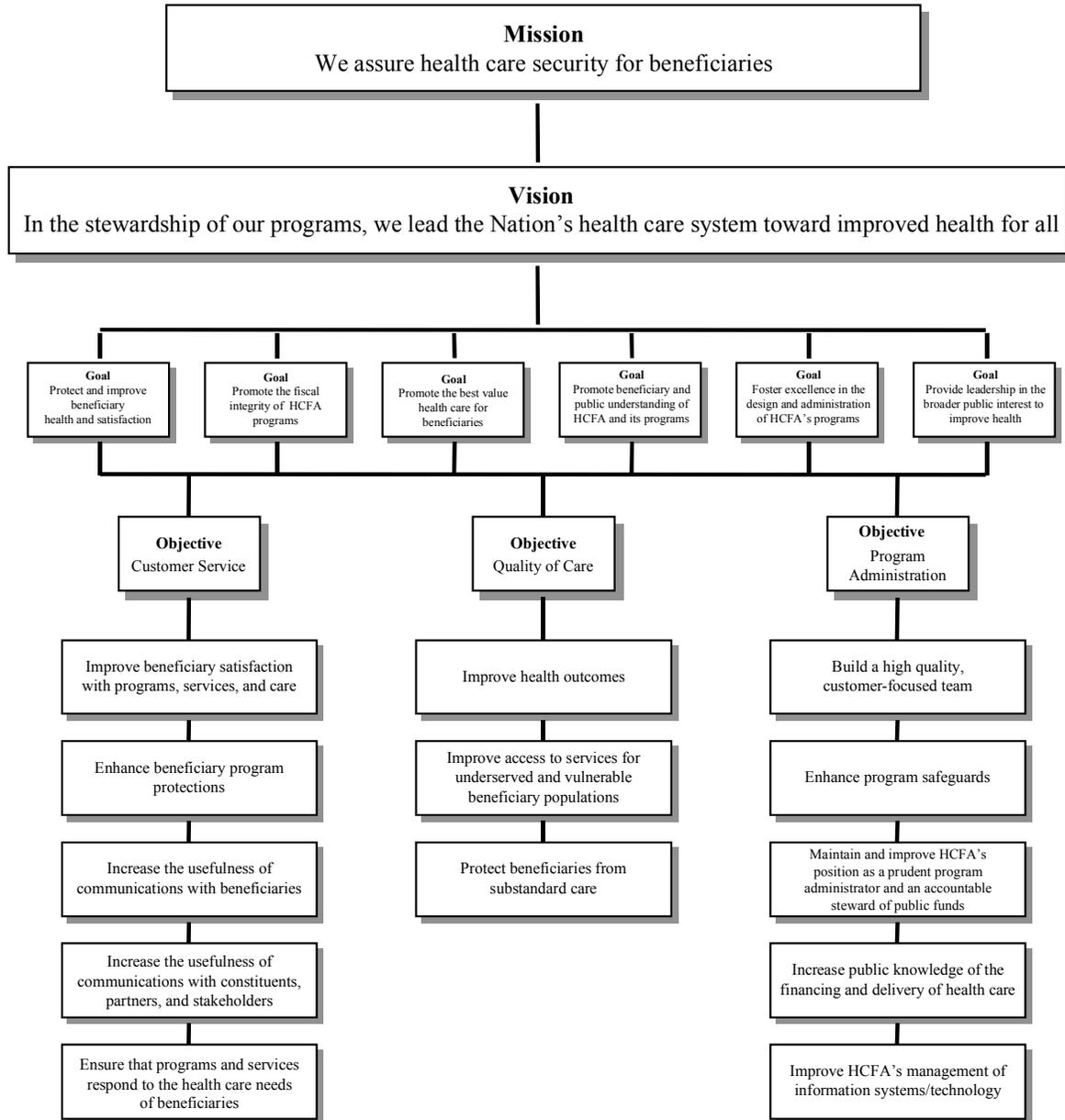
II. STRATEGIC PLAN

HCFA's formal strategic planning process began several years prior to the publication of the Agency's first formal Strategic Plan in 1994. However, with increasing workloads and declining resources, we realized that our mission and future work needed to be further refined. As a result, HCFA embarked on a comprehensive self-study and consultation process in 1996 that resulted in a restructuring of the Agency in mid-1997. The restructuring entailed a reorganization of the Agency around its major "audiences" and a new, sharper statement of the Agency core work and future roles.

This process also formed the basis for the review of the Agency's Strategic Plan. The plan was revised in 1998 and the central theme is to move HCFA forward in becoming a "beneficiary-centered purchaser" of health care. The Agency is committed to expanding its role from a regulator and payor of claims to also be a prudent purchaser of health care services. HCFA will strive to use its market presence to obtain high value (quality at a reasonable cost) health care on behalf of Medicare and Medicaid beneficiaries. Another important theme is a heightened awareness of change in the larger health care environment in which HCFA operates and the need for flexible responses to those changes, especially those related to persons with disabilities and low-income populations.

The current Strategic Plan consists of six strategic goals and 13 objectives. Achievement of our strategic goals and objectives is assessed through our performance goals. Some goals will take several years to achieve and others will be a single year effort. Specific details about HCFA's performance goals can be found in the *HCFA FY 2001 Annual Performance Plan*. The Strategic Plan goals and the objectives that support those goals are illustrated in the chart on the following page. HCFA's IT planning processes are designed to identify IT investments that support the strategic goals and three major business drivers described in this plan: Customer Service, Quality of Care, and Program Administration.

HCFA's Strategic Plan Goals & Objectives



A. STRATEGIC PLANNING ASSUMPTIONS

1. Customer Service

One of HCFA's assumptions about the future health care environment is that consumers will take a greater role in making decisions affecting their health care. This is especially true with the enactment of the BBA, under which beneficiaries have increasing options for tailoring their own health care system. HCFA will be exploring ways to better reach out to beneficiaries to ensure they understand their health care options and can make informed choices. Beneficiary satisfaction with the health care they receive is a driving force for change in the health care market. It is important that beneficiaries are aware of their treatment options, appeal rights, health plan choices, and health care benefits coverage. HCFA must also be positioned to better service our customers, both beneficiaries and providers, by providing access to timely and accurate information about beneficiary enrollment status, coverage of services, and payment for services. Implementation of HCFA's "information-centric" IT architecture model, outlined below, will allow HCFA to better support these goals.

2. Quality of Care

HCFA is reinventing the way it monitors Medicare and Medicaid quality in both fee-for-service and managed care arenas. HCFA's role as an overseer of the care offered to its beneficiaries and as a leader for national quality standards and research demands world class quality of care information. A coordinated series of projects to establish national clinical information databases is underway to support the development of quality indicators and the oversight of the quality of care delivered to our beneficiaries.

3. Program Administration

HCFA must be increasingly vigilant in its efforts to preserve the fiscal integrity of the Medicare program and to safeguard the Medicare Trust Fund. Accurate and consistent national data will allow us to monitor program expenditures and services rendered to prevent and to detect fraud and abuse. Through the use of the latest technology, such as electronic fraud detection software, Medicare bills and billing data are coming under much greater scrutiny; and systems planned for future use will increasingly include prepayment anti-fraud features. National databases will enable HCFA to apply new technology, including the new fraud and abuse algorithms and adapted COTS software. Over the longer term, the Medicare and Medicaid programs will expand application of these techniques. The Medicare Integrity Program IT investments will continue to enhance HCFA's program safeguard activities by allowing us to focus our resources more efficiently and effectively, improving our data/information dissemination capabilities, and increasing our ability to identify potential program vulnerabilities at an early stage.

Our challenge is to create an information-centric IT environment that supports these business drivers by meeting the information needs of HCFA's customers and partners using subject-matter databases, user-friendly access structures, and efficient transaction processing systems.

B. HCFA MISSION AND ORGANIZATION

As mentioned earlier, as a result of the comprehensive self-study and consultation process in 1996, HCFA was restructured in mid-1997 to support service to its major customer groups. Three centers focus on each of HCFA's primary audiences or customer groups -- beneficiaries, health plans and providers, and States. The centers provide "one stop shopping" for individuals and organizations interacting with HCFA. Other units with specialized expertise such as clinical knowledge, communications, and legislation, support the centers. Four field executives (Consortium Administrators) bring a local perspective to compelling issues. This structure allows us to fulfill our mission of assuring health care security for beneficiaries.

The Office of Information Services (OIS) is the organizational home of HCFA's Chief Information Officer (CIO), who is responsible for managing HCFA's IT assets including enterprise databases and operational systems. HCFA's 1997 reorganization provided the impetus to not only establish an Agency CIO, but just as importantly to restructure HCFA's IT components to meet the challenges of HCFA's evolving business environment. HCFA looks to the CIO to serve as an enabler for bringing the power of IT solutions to HCFA's business process to permit these business processes to be done in new, innovative, more efficient, and more effective ways. This means that the CIO must be fully conversant with the organizational needs and business drivers of HCFA's components and utilize that understanding to develop effective and efficient solutions within a strategic context of an enterprise information technology architecture.

The focus for the CIO cannot, however, be strictly internal. Not only must the CIO have an extensive and current understanding of technological capabilities, but that knowledge needs to be anchored in the larger context of HCFA's relationships with the public and key industries which help shape the HCFA business environment. HCFA must operate within and adapt itself to the realities of life in the industries of health care, insurance, banking, telecommunications, and information technology.

To support the CIO's role of developing an IT vision and carrying it out, HCFA's components are organized to provide both structure and discipline to IT processes. This organization:

- ▶ Enables an enterprise-wide view of IT, a crucial prerequisite to the creation of an integrated information technology architecture;

- ▶ Brings mission-critical field payment systems, the source of most of HCFA's data, under CIO control;
- ▶ Establishes an organizational home for enterprise databases;
- ▶ Facilitates the process of strategic information management;
- ▶ Institutionalizes the function of establishing Electronic Data Interchange (EDI) standards for HCFA and nationally as required by HIPAA;
- ▶ Establishes an organizational home for essential systems quality and change management activities; and
- ▶ Provides for planning and management of IT investments as Agency assets, as required by the Clinger-Cohen Act and within the context of HCFA's Strategic Plan.

These changes position OIS not only to provide better support to the HCFA business units, but to participate actively in the formulation of strategic business plans.

C. PROGRAM GOALS AND INFORMATION NEEDS

A central theme of HCFA's Strategic Plan is moving the Agency toward becoming a "beneficiary-centered purchaser" of health care services. This movement expands HCFA's role beyond its traditional regulatory and claims payment focus into one which places greater emphasis on assuring that its expenditures on behalf of its beneficiaries are warranted, prudent, and supportive of the overarching goal of providing quality care for beneficiaries at reasonable and proper cost.

HCFA needs to aggressively respond and adapt to the restructuring of traditional health care delivery systems and the organizations that support and control them. Increased emphasis on profitability in these structures drives the need for improved measures of quality of care and increased attention to health care outcomes to ensure that reduction in service costs do not imperil the delivered quality of care or the overall health of the beneficiary population.

Most succinctly, HCFA's mission is to pay for health care services to its beneficiaries. It is mandated to do this in two major programs, Medicaid and Medicare. Medicare is itself composed of three major parts, which differ from each other largely in the way that they pay for the services delivered to the beneficiaries.

Medicaid is a program that is operated by the individual States. HCFA has an oversight role in ensuring that the States follow certain guidelines, but has by law little direct business involvement in the claims process. HCFA's role is to provide a conduit for Medicaid trust fund dollars to flow to the States, which directly manage the processing and payment of claims. States are also required to submit claims data to HCFA.

The Medicare program is managed directly by HCFA and through its contractors. The three major components in Medicare are largely structured parallel to the way the health care industry is organized. Medicare Part A encompasses payment for services provided by

hospitals and other such centralized organizations. Medicare Part B encompasses payment for services from traditional fee-for-service providers, which include individual physician practices and suppliers of various specialized services and medical equipment. The third program is Managed Care, which contracts with managed care organizations and makes capitated prepayments to them for care to be provided to their enrolled beneficiaries.

Largely, these four programs (Medicaid, Medicare Parts A and B, and Medicare Managed Care) arose through separate legislation, and historically developed as separate business functions. However, the programs all use fundamentally similar processes, namely, eligibility is validated, a health care (or health care related) service is provided to a beneficiary, the service is validated, payment is made for the service, and statistics are collected. The chief differences in the programs lay in how the payment is calculated and in the timing of the payments relative to the time the service is delivered. In Medicaid, HCFA distributes money to the States. In Medicare Part A, bulk payments are made to providers (largely hospitals) prospectively, based upon historical patterns of service, and an annual reconciliation adjusts for any over- or under-payment. In Medicare Part A, hospital payments are made after discharge based on prospectively determined amounts. In Medicare Part B, payments are made directly to individual provider entities following the delivery of service or products. In the Medicare Managed Care program (now Medicare+Choice), providers are pre-paid, and they are expected to provide appropriate care to their enrollees on an as-needed basis. In each case records supporting the delivered instance of care are collected and are used to justify the cost of the individual or collective service. These records are archived and the information used in the development of policy which determines what kinds and amounts of service are allowed.

HCFA is not directly involved with health care delivery, but is wholly concerned with the policies that govern what services or products are covered, the management of the delivery, and ultimately the payment for the delivered products and services. Thus HCFA is centrally concerned with the management of flow of information (e.g., claims data, service statistics, service charges), and, using that information, with the development of policy to determine what services are covered. Thus, HCFA is a very information dependent organization; its primary business role is the collection, distribution, and analysis of information, and policy decision-making based upon the data analyses.

Our focus in this document is in how the business role of information management can best be performed by HCFA, remembering always that the ultimate goal of HCFA's programs is the efficient delivery of effective health care services to our beneficiaries. Before examining the three main business drivers in detail, we will briefly enumerate some high-level characteristics.

Program Management:

HCFA's business operations need to perform at or better than current industry standard. In particular, the following are critical areas where information technology plays a role:

- ▶ Efficiency - Business operations, such as claims processing, claims payment, contract management, encounter data collection, data analysis, and audit functions, all need to focus on optimizing value for expenditures.
- ▶ Effectiveness - Program effectiveness is a measure of outcomes. The goal of HCFA programs is effective health care for its beneficiaries.
- ▶ Security - Program operations must ensure that privacy information entrusted to HCFA is properly protected and managed against loss or corruption, and that processes and corporate assets are protected against damage or unauthorized use.
- ▶ Continuity of Service - Business service needs to be protected from interruption. This implies mediation of risk through careful planning and prudent program and project management.

Customer Service:

HCFA's customers need timely access to accurate information about their benefits and eligibility, and they need accurate, timely, and complete responses to requests for service and information.

Quality of Care:

HCFA must maintain and, if possible, improve the quality of beneficiary medical care while ensuring that costs remain reasonable.

D. IRM VISION, GOALS, AND STRATEGIES

1. Information Technology Strategic Vision

Organizations employ IT to enable the management and flow of information in support of business needs. IT provides the tools for storage, access, movement, manipulation, and display of information, so that appropriate decisions can be made promptly and accurately. Some, but not all, decision-making can be automated, so one focus of the IT effort is to automate those rote and routine processes, reserving human effort for the most complex and demanding tasks. Simply, the goal of information technology is to leverage human activity.

Congress recognized the importance of taking a strategic approach to Government IT in the Clinger-Cohen Act. The Office of Management and Budget (OMB) has supplemented the statute with focussed guidance on a variety of IT-related topics. HCFA has responded to this environmental sea change by establishing a CIO position during its 1997 reorganization and implementing IT investment review procedures which internalize the so-called Raines' rules. Further HCFA established a Systems

Architect position reporting to the CIO and awarded a series of blanket purchase agreement contracts for professional systems integration services. These steps position HCFA to deal effectively with the challenges it faces in acquiring and deploying IT to support HCFA's complex and evolving mission.

To promote the health of our beneficiaries, we wish to minimize administrative barriers to the delivery of health care while maintaining adequate oversight and control to ensure that the dollars are well spent. This means that queries to stored information, namely, the determinations of eligibility of beneficiaries and of providers, determinations of the validity of claims, and decisions on payments need to be performed very rapidly to avoid delaying actual delivery of care. If health care providers do not promptly receive payment, for example, we induce providers to remove themselves from the program, potentially denying beneficiaries needed care.

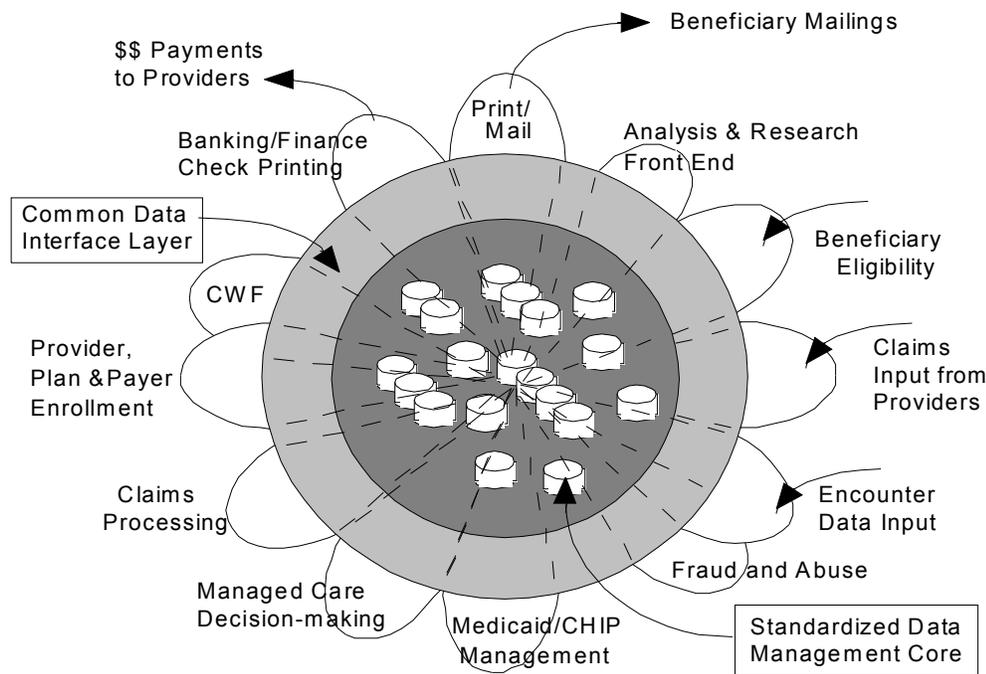
The highest volume business process that HCFA carries out involves the processing and payment of claims filed on behalf of beneficiaries by providers. A major IT challenge is to process and pay claims both rapidly and, more importantly, make the correct payment determination up front when the data volumes are immense. As there is substantial structure to the claim process, this function is identified in IT terms as an On-Line Transaction Processing (OLTP) function, which is fundamentally similar to, but far more complex than, processing credit card transactions.

Another significant function of HCFA relates to maintaining and providing health care information for decision-making. The advent of managed care and the structural changes in the health care industry away from traditional fee-for-service introduce new IT challenges, such as the collection of encounter data, assessment of quality of care outcomes, and direct information distribution to beneficiaries. As a Federal Agency, HCFA also has several other kinds of information customers, who have a need for and a right to information on HCFA's processes and procedures, and to access its data. These customers include oversight bodies such as Congress, the Office of Management and Budget, the General Accounting Office and the Office of the Inspector General; internal data customers and policy-makers in HCFA components; and external data customers including researchers and FOIA requesters. Although these information needs do not have the same time sensitivity or volume demands as claims processing, the information requests are more complex and less structured. This means that these data queries are more general, less easily automated, and require more resources per request. In IT terms, such query functions are termed On-Line Analytical Processing or OLAP.

Our IT vision must accommodate and address the needs of both these important functions. The IT architecture, namely the combination of software systems, hardware platforms, and communications linkages, must not only handle current business needs, but must also provide the inherent capability to smoothly expand to address future

volume needs, to seamlessly adopt new and more efficient technologies as they develop, and to readily support the administration of new programs.

Our IT vision thus starts with data management as the core process. All operational business functions can be seen as data operations, whether the function is claims processing, financial audits, or research queries. By optimizing information management we improve the efficiency of all processes dependent on information flow. This optimization depends upon structuring the data so that searches through the data are rapid, and upon structuring the interfaces to the data so that communication of data to and from business functions is efficient and well defined. This information-centric vision, visualized by a “sunflower” model, shown in Figure 1, encompasses the IT needs of all of HCFA's programs.



“Sunflower” Model for the Information-Centric IT Architecture

Figure 1. Information-Centric Vision of Future HCFA Information Architecture. Individual business functions are supported by specialized systems represented by the petals. Primary database management occurs in the core; all databases are readily accessible to all business functions through standard interfaces. The use of standard interfaces allows functions to be easily altered, added, or removed without affecting other operations. Compare this model to the Business System-Oriented Architecture of Figure 2. Note that this picture is a logical functional model and does not presuppose physical co-location of functional elements. The specialized business systems shown in this picture are a subset of the many programmatic and administrative systems extant at HCFA. Many more petals would be needed to make this a comprehensive model of the enterprise.

2. Business Needs

The “information-centric” vision addresses HCFA's current and future needs as follows:

a. Customer Service Needs

Accuracy of Responses to Information Requests:

Integrating data used by all business processes does the following:

- ▶ Improved synchronization of data enhances the accuracy of data responses.
- ▶ Where data queries are filled promptly, outdated information is significantly minimized.
- ▶ Eliminating replication improves data consistency and accuracy.

Timeliness of Responses to Information Requests:

Integrating data used by all business processes does the following:

- ▶ Responses are more timely when the data is all accessible in one logical location.

Using standardized interfaces does the following:

- ▶ Standardized interfaces allow staff to build ad hoc queries from their desktops, instead of requesting programmers to develop specialized reports; response times drop dramatically.

Completeness of Responses to Information Requests:

Integrating data used by all business processes does the following:

- ▶ Responses requiring data from multiple sources tend to be incomplete when the data is not all accessible simultaneously; an integrated data store provides completeness by definition.
- ▶ Data collated from separate sources often contain inconsistencies that cannot be reconciled by the requester; such inconsistencies are eliminated by data integration, making responses more reliably complete.

b. Quality of Care Needs

Maintenance of Quality of Care Levels:

Integrating data used by all business processes does the following:

- ▶ Historic data can be effectively mined for outcomes and quality assessments when the data is integrated and readily accessible to program managers and policy-makers. Such baseline outcomes information is critical in determining whether levels of care are

maintained at current levels by new service providers (e.g., managed care).

- ▶ Integrated data makes possible comparative studies of the value of outcome indicators, e.g., encounter data, relative to prior collected data, in time frames short enough to affect policy decisions and allow proactive program management to prevent degradation of beneficiary health.

Improvement of Beneficiary Health:

Integrating data used by all business processes does the following:

- ▶ Integrated data makes possible new policies, based upon statistical outcomes and epidemiological studies not previously practical, that can improve health outcomes.
- ▶ More efficient operations yield programmatic savings that can be spent profitably on outreach and educational programs that can lead to better use of health care benefits by beneficiaries.

c. Program Management Needs

Increased Efficiency:

Integrating data used by all business processes does the following:

- ▶ Replicate database management structures are consolidated and require less staff support.
- ▶ Elimination of replicate data reduces overall storage needs and costs.
- ▶ Synchronization problems between different copies of the same data in different business functions disappear, eliminating costly exception handling due to data discrepancies.
- ▶ Consolidation of similar data input/output functions from different business systems reduces system maintenance costs and provides greater system stability and reliability.
- ▶ Economies of scale result from use of common platforms as database servers.
- ▶ Reduction in size of business function systems results in decreased testing and maintenance costs as complexity decreases.

Using standardized interfaces does the following:

- ▶ Subsystems that perform different business functions become smaller, more modular, and easier to maintain and modify, which translates into decreased life-cycle costs.
- ▶ Addition of new business functions is simplified because the functions build upon existing services; new subsystems are smaller and thus faster and cheaper to build, test, and maintain.

Increased Effectiveness:

Integrating existing data used by all business processes does the following:

- ▶ Pre-payment detection of fraud, waste, and abuse is facilitated.
- ▶ Costly investigations are focussed due to more accurate targeting of suspicious claim behavior.
- ▶ Data integration improves post-payment analysis of health care outcomes leading to enhanced policy development.
- ▶ Financial data can be more readily analyzed to support program management, detect operational inefficiencies, and perform reliable cost-benefit analysis.
- ▶ As data becomes more readily accessible, and more used, the quality of the data is improved, leading in the long term to more accurate decisions and more effective programs.

Using standardized interfaces does the following:

- ▶ Electronic data exchanges in support of claims adjudication permit, for example, resolution of suspended claims by automated requests for structured supplemental data directly from providers' information systems. This substantially leverages the efforts of medical reviewers.

Increased Security:

Integrating data used by all business processes does the following:

- ▶ Risks of disclosure or corruption of privacy information can be more effectively addressed when data is under centralized control, and when there are fewer copies of the data to protect.
- ▶ Security policies are easier and cheaper to enforce.
- ▶ Risks to processes and resources are more readily addressed in an integrated environment.

Using standardized interfaces does the following:

- ▶ More structured interfaces vastly simplify detection of illicit and illegal behavior.

Continuity of Service:

Integrating data used by all business processes does the following:

- ▶ Contingency and disaster planning are vastly simplified.
- ▶ Increased security lessens threats of disruption of processing by illicit activity.
- ▶ Operational stability is enhanced and system reliability is increased whenever systems are made less complex.

Using standardized interfaces does the following:

- ▶ Risks and problems in transitioning workloads between contractors decrease with increased standardization.

In summary, by creating centralized, standardized data stores, HCFA can ensure reliable and consistent results each time the data are accessed. This structure allows for increased understanding of the data by its users since there is a single source of the data elements as well as a comprehensive definition of the origin, meaning and uses of each data element. Additionally, a single store will allow for quick problem recognition, quick resolution of data errors, and for identification and explication of data anomalies.

While for simplicity the discussion in the following sections is focussed primarily on the Medicare business processes and systems, similar cases can be made for HCFA's other program and administrative systems.

3. Business Origins of HCFA's Legacy Architecture

HCFA's current IT architecture is a classic legacy operation, or worse, a collection of more than a hundred legacy operations, some of which are depicted by the “stovepipes” of Figure 2. By “legacy,” we mean that the information systems, both software and hardware, still clearly reflect business and system design philosophies of an era when, for example, claims processing was largely a paper-handling function. At the time these systems were designed, automation was seen as a means of doing the same manual tasks, just more efficiently. To understand why HCFA's IT infrastructure has remained legacy, one must understand the historical forces that shaped it, and these are the forces which still impede modernization.

When the Medicare program was being defined, Congress saw it both as expedient and efficient to build the program around the capabilities of commercial medical insurance companies, which already possessed the skillsets for reviewing and paying medical service claims, at the time mainly a paper-based activity. Thus, Medicare's claims processing infrastructure was early institutionalized as a collection of many independent and local claims processing centers. It was simply cheaper to make use of the contractors' already-developed individual claims handling processes and mechanisms rather than invent and require the use of “Federal” processes.

As automation became more available, each claims processor was essentially free to develop its own IT implementation to support and execute HCFA policy. From the beginning HCFA itself focussed on policy analysis and contract management, leaving business operations, and thus most IT investment and planning, to the industry. The accepted model of the IT environment was of distributed and isolated systems that were not required to interact or intercommunicate, and that were allowed to develop independently of each other. Being derived from many different commercial systems

and claims processing models, the only common IT design thread was one of enforcing a common policy.

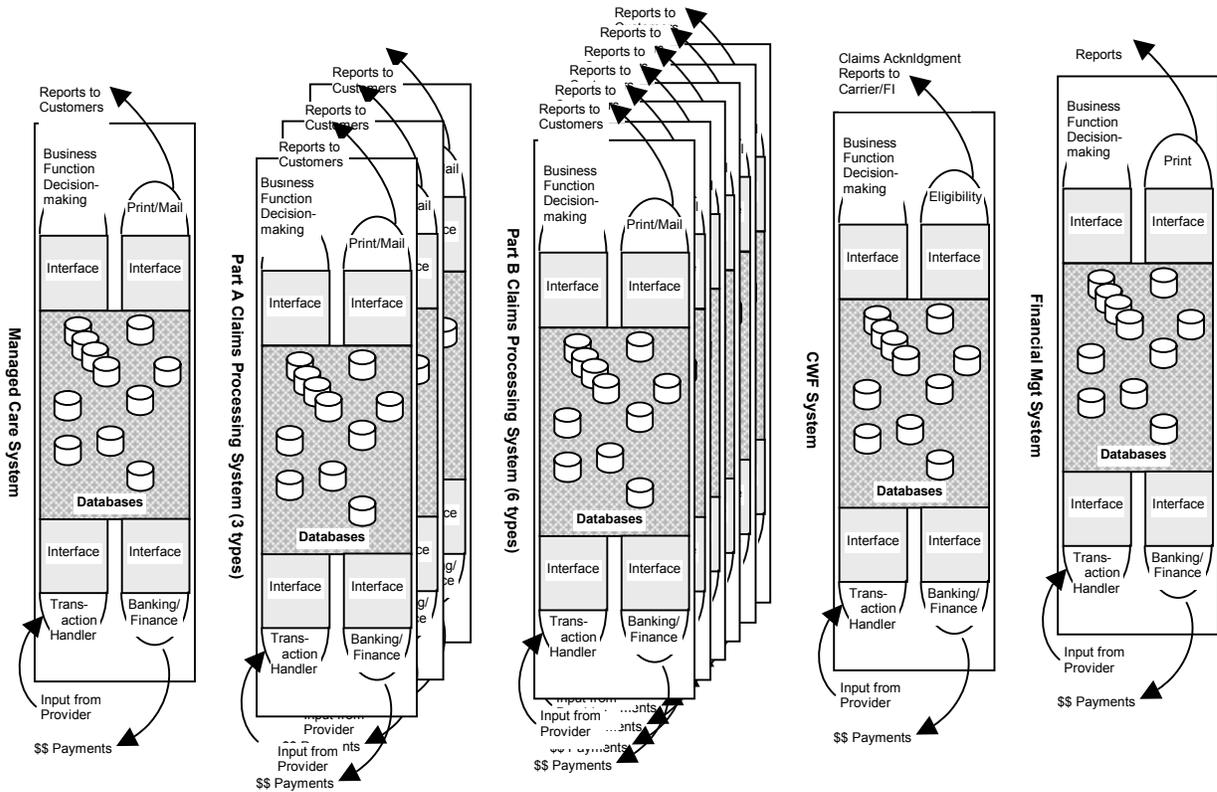


Figure 2. Business System-Oriented Architecture for Larger Medicare Programs. In this architecture each business function is represented by a separate monolithic (stovepipe) system. Databases are not shared, although much of the data accessed is identical to data used by other business systems. While each system is stand-alone, there is much replication of functions. Yet, as each system is managed independently by different business units, common system functions will diverge over time and the systems will be unable to communicate with each other despite their common origin. Nevertheless, systems are not truly separate because of interdependencies of replicated operational data.

Unlike government, the motivators for businesses to embrace new technology are simple: reduce costs by deploying cheaper or more efficient means of production, and gain new capabilities that permit new profit-making activities. Driven by the possibilities of increased profitability, business willingly accepts the risks of promptly investing in new technology and invests in detailed project planning and monitoring to control risk. In contrast, governments have been extraordinarily conservative (risk averse) in the short term, relying upon rote compliance with detailed contract terms to control risk, and remaining relatively insensitive to the business possibilities of new capabilities. Government agencies often have difficulty changing course because of

broad impacts they have on the economy and because of the risk of adverse public reaction. Continuing on the current path, however ill-suited to the business needs, is often perceived as representing the least risk. Change is at best incremental and but a small deviation from the current path, as the status quo is most easily defensible. Thus, current Medicare processing systems and HCFA central office IT infrastructure remain substantially similar to the technology implemented 10 to 15 years ago, despite operating on newer equipment.

Government legacy systems are large, monolithic, single-purpose software systems designed around “stovepipe” business functions. The software programs generally consist of millions of lines of aging COBOL code, (COBOL is a business programming language first developed in the fifties and sixties), were designed using decades-old hardware capabilities and software design concepts prevalent at the time, do not intercommunicate with other systems, run as batch (as opposed to interactive) processes, and are increasingly expensive and difficult to maintain because of the lack of adequate documentation and personnel skilled in the older language methods and programming styles. At HCFA Central Office, most of the systems are written in COBOL, but a significant fraction of the 17.6 million lines of systems code are written in the Model 204 database language, a language that is now largely abandoned in the United States.

4. Current Capabilities, Future Needs, and the “Gap”

There are significant gaps between HCFA's current and future business needs and the performance of its current IT infrastructure. We will now briefly describe five categories of gaps, namely in the areas of Flexibility and Adaptability, Performance, Security, Maintenance, and Service.

a. Flexibility and Adaptability

The current software infrastructure is increasingly difficult and expensive to maintain, much less expand to add new functionality to address new business needs. These systems were developed many years ago in languages in vogue at the time, to serve business needs strongly limited by the available technology. They have been incrementally modified over time, not to change the fundamental structure of the systems, but to add marginal capabilities and capacity. Further, the systems are inadequately documented. Even small changes are difficult, requiring substantial reexamination of the code and extensive testing to ensure that the changes do not propagate in unknown ways with unknown effects.

For life-cycle cost effectiveness the current HCFA software infrastructure needs to be more readily modifiable and adaptable. In its current legacy form, a major rebuild of a monolith may require five years or more. Because of short deadlines of mandated changes, as in those of the BBA, and the short cycles of technological

evolution, a response time on the scale of one year is necessary. Otherwise the enterprise is denied the benefits and potential savings of using improved technology and beneficiaries do not promptly receive the services of newly mandated programmatic changes.

b. Performance

The goal of deploying IT must be to leverage intellectual activity. Productivity gains permit more staff to be devoted to tasks that cannot be automated and that require more creative activity. HCFA's current business operations include many operations that rely excessively upon manual activity.

Program Integrity:

Program Integrity seeks to ensure that only claims that provide health care value to the beneficiary are paid, and paid at proper rates. Current Medicare systems focus on correctness of individual claims, deferring most review for medical necessity and fraud, waste, and abuse (FWA) detection for more human intensive, and thus very expensive, post-payment analysis. FWA that occurs at higher levels of aggregation, such as collusion, "ping-ponging," or bulk claim fabrication, is not readily detected by existing pre-payment processing mechanisms. The lack of significant pre-payment FWA detection forces HCFA to put undue reliance upon "pay-and-chase" methods. However, implementing the desired pre-payment FWA decision tools in the current environment requires that the data to support the decision tools be accessible interactively to those tools and that proven FWA detection algorithms be available.

The data to support such program integrity decision tools need to be global and timely. Currently, the National Claims History (NCH) database, HCFA's only global claims history database, does not contain all of the data needed for credible FWA detection, nor is the data it does contain readily accessible. More relevant information resides at contractor sites, in their local legacy environments; however, much of this information is lost when claim information is forwarded to the NCH. Most pertinently, claims were, until very recently, recorded as having been either paid or denied, but information as to whether the claim was determined to be FWA was not saved. Another failing is that "developed" or supporting information from review or investigations are not saved with the NCH claim record. Supporting record information, primarily in paper form, is kept only at the local contractor sites, and is accessible only for a short period before being archived in paper or microfilm.

By timely availability of information, we mean that all of the information relevant to the correctness of a claim be promptly available at its time of processing. In Medicare, a claim may be submitted as long as 27 months after the service was rendered. Closely related claims, as for a hospital stay and doctor visits to the

patient while in the hospital, may be received months apart, creating an environment ripe for abuse and fraud. Were this information available electronically and immediately upon the suspension of a questioned service claim, the claim might then be quickly adjudicated, perhaps in an automated or semi-automated way.

The data in the NCH is not readily accessible. A complex query against the NCH can require several months to process. This is because the database is a “flat file,” consisting of many “one-line” claim records (all the information pertinent to one claim exists in one “line” in the file, requiring a linear read of every full record in the file to extract just the information of interest).

Although we have focussed here on the NCH as HCFA’s main repository of historical Medicare claim data, the situation with other HCFA program data are similar; data stores are not readily accessible to queries, the data may be incomplete or contain inconsistencies, and may not be up-to-date, hampering decision-making. Further, cross-correlation of information across different legacy systems is time-consuming and difficult.

Policy and Decision Support

The goal of Policy and Decision Support is to provide timely answers to such questions as: What is the projectable cost of extending coverage to include acupuncture pain management for outpatient surgery? What health implications result from changing the allowed frequency of ESRD (End State Renal Disease) patient dialysis treatments to no more than once every four calendar days? Such questions are often asked during Medicare and Medicaid policy development, whether by HCFA policy staff, Congressional staff, State agencies, or university health care delivery researchers. As noted above, retrieval of raw data to generate statistics in order to answer such questions may take months. By the time the data is assembled, the interest and motivation that drove the question may have long ago faded. Worse still, delays in gathering the proper information result in delayed policy decisions that may negatively impact beneficiary health. Proper IT tools, such as those that model outcomes can reduce the time it takes to perform demonstrations.

Customer Service

Beneficiary requests for information or decision are handled both by Medicare contractors and at HCFA Central Office (CO) and Regional Offices (ROs). Queries range from what benefits are available to a particular beneficiary to requests from Congressional oversight committees for program statistical information. Response time to such inquiries is constrained by the difficult access to stored information. ROs rely upon interactive data query support of CO databases. Simple queries, such as of an individual beneficiary's eligibility status, may have sub-minute response times, while more complex queries; e.g., to support policy decisions

requiring legislative action, may require up to several months. Because consumers are now accustomed to immediate response to their queries of the telephone company or airline reservation clerks, they reasonably expect similar responsiveness from government agencies.

A second “gap” is in the amount and type of data securely accessible by beneficiaries using convenient kiosk, web, and Internet tools, an area where HCFA lags far behind commercial entities.

Annually, HCFA CO receives more than thirty thousand data requests. These range from requests for a single summary statistic, such as the frequency of a particular psychiatric procedure in a given metropolitan area to a fraud investigation request for all Medicare claims for a given specialty across a dozen States. Given legacy structures of current HCFA databases and their access control software, such requests may require weeks of expensive programmer time and consume significant data processing resources to satisfy. This programming effort is often committed to satisfying a one-time request; the software will never be used again. If adequate security controls were in place to ensure the protection of privacy and were the data accessible by standard database query languages, the requests could be made directly by the requester, and responded to automatically by the HCFA database infrastructure, without the necessity of time-consuming, complex, one-time programming efforts.

We can summarize the above discussion into four database performance gaps:

- 1) critical claim data is currently not all in one place but is physically widely distributed, hindering and delaying access,
- 2) data already in HCFA databases is not, in general, organized to be readily available in a timely way,
- 3) data that is available is not necessarily the correct data to support FWA, medical necessity, and policy making decisions, and
- 4) data is not readily or efficiently accessible from the databases that do exist.

c. Security

The health care environment in which HCFA operates is changing rapidly and significantly. To meet the challenges in this new environment, HCFA has increased its reliance on networked systems which in turn have posed new security and other risks. HCFA has also increased the number of health care partners with which it works. At the same time, the complexity of the technology HCFA must use to function successfully in the new environment has increased. Given this rapidly-changing environment, HCFA leadership has increased its expectations for the level of acceptable security protection of HCFA data. This has led to a number of assessments of the state of HCFA’s systems security program over the past

several years, both as a result of audits performed under the auspices of the Office of the Inspector General (as required under the Chief Financial Officers (CFO) Act of 1990) and from self-assessments by the Office of Information Services (OIS).

As a result of the various security assessments of HCFA's protection measures, a number of security vulnerabilities have been identified. Left uncorrected, they could result in:

- ▶ The disclosure of beneficiary health information;
- ▶ The disclosure of proprietary cost information of competing health plans and contract information;
- ▶ Loss of integrity (correctness) of eligibility and payment information;
- ▶ Denial of availability of IT resources to conduct the Agency's business; and
- ▶ Loss of the Citizenry's trust in HCFA.

While it is difficult to completely eliminate all vulnerabilities or risks associated with unauthorized access or use of HCFA's data systems, the assessments highlight the importance for HCFA to further bolster its enterprise systems security program. As HCFA moves further into on-line activities, the protection of confidential information held in trust for the public becomes increasingly at risk. While there are no known instances where denial of services or compromise from disclosure of sensitive data has occurred, one instance of such an event would be unacceptable and could erode public confidence in HCFA's ability to properly fulfill its operational and stewardship responsibilities.

In identifying its security vulnerabilities, HCFA has learned that there are no quick fixes. Efforts have been made to remove the immediate known risks, to identify the root causes of the problems, and to conduct broad assessments to learn in depth HCFA's security shortcomings. HCFA has also taken steps to build an enterprise-wide capability for providing adequate long-term security safeguards that will allow HCFA to use technology to meet its business goals with confidence.

d. Maintenance

A significant HCFA expense is the maintenance of its current software. Largely, the system programs are written in older computer languages, are structured for a batch-processing environment, are poorly documented or undocumented, and have been so patched that the original program coding design is no longer recognizable. Such applications are seldom as efficient as originally designed. When originally written, coding and data standards were probably nonexistent. For example, a HCFA software system, such as the 1.3 million line Managed Care system, can have hundreds of data references to dates. Because such a large system has dozens of smaller program modules, written at various times by different staff, many of the date references may be, for example, to the same "date-of-first-eligibility" of a

managed care plan, which are stored under a variety of different variable names, and in different formats. This creates a maintenance nightmare, as any changes to the system require that the specialist programming the change be knowledgeable about the details of the whole system in order that all references to a particular datum are updated. Much time is lost researching whether a single planned change might have undesired consequences. Modern programming methods and the adoption of data naming and reference standards can significantly reduce the life-cycle costs of software. Were such standard practices already in place, the resolution of the millennium problem would be simple and orders of magnitude less expensive.

5. Strategy for Closing the Gap

This IT Strategic Plan has two main thrusts: First, as Medicare and Medicaid today constitute some twenty per cent of the national expenditures for health care, it is vital that HCFA avoid any significant disruption in its processing and funding operations. Thus, a primary goal of the Agency must be on continuous, effective, and efficient operation. Recent legislation such as the BBA and Health Insurance Portability and Accountability Act (HIPAA) established new, time-sensitive expectations on HCFA, requiring it to add new services and products for its customers and to operate in more businesslike ways. Current operations must respond promptly to address urgent new and time-sensitive demands, even as HCFA works toward the target architecture.

Second, the very size and complexity of HCFA's IT enterprise demand a coherent long-range plan and vision if the enterprise is to evolve into a more efficient and capable operation. Computer, network, and communication technologies are evolving so rapidly that without careful long-range planning and implementation, the enterprise will not be able to take optimal advantage of new technologies, but rather will adopt technology haphazardly and in pieces that may not interoperate. This will likely expose the Agency to new security risks and threats. Given the size, distribution, and critical nature of HCFA's program management and payment operations, software and communications demands are very complex. Thus, development projects for such IT resources are complex, require external advanced technical efforts to develop, and will require significant, dedicated financial, personnel, and managerial resources for their success. Coherency of the products and the environment, consistency with business needs, both current and future, and successful implementation mandate long-range strategic IT planning and investment. The Clinger-Cohen Act reinforces this simple but fundamental business need to operate with rational IT investment processes by giving directive and force of law as additional impetus. The strategic vision outlined in this document is HCFA's first step in performing this long-range IT planning process.

6. Key Elements of the Vision

We have described above an Information Technology Vision that satisfies HCFA's business needs. Figure 1 is a picture that provides a high level, logical (as opposed to physical) architecture. The key elements of this picture are:

- 1) A central core of well-managed databases.
- 2) A structured interface that facilitates and modulates access to data in the core databases (this can be viewed as "middleware").
- 3) An assembly of modular application systems that manage infrastructure inputs and outputs, provide support for data operations (query, statistical analysis, data mining) and facilitate program operations.
- 4) A unified set of security services that safeguards the confidentiality, integrity, and availability of HCFA's assets.

As discussed in the gap analysis above, the legacy environment depicted in Figure 2 cannot satisfy many of HCFA's current business needs. Thus, perpetuating the status quo is not a viable option; the legacy IT environment is not sustainable.

There is a spectrum of options for replacement of the current environment. At one end of the spectrum of replacement strategies is wholesale system replacement, i.e., discarding the current IT environment and replacing it with a completely new one. This approach assumes that little of the current system has lasting value, that the ability and substantial resources are available to effect an en masse reconstruction and replacement, and that the risks involved both in the construction of the new system and the transition from the old to the new can be adequately managed. Introduction of cutting-edge technology also carries its own risk, which we term technical risk. A prime underlying assumption of this approach is that the quick availability of the entirely new functionality is worth the up front expense.

The other strategy extreme is a purely evolutionary and drawn-out piecemeal system replacement. This approach assumes that significant portions of the current structure have lasting value, that necessary resources will be available only over a long term, and that the cost of lost opportunity is not large. Because the pace of change is slower, the technical risk is small (by the time technology is fielded, it is no longer "new," but is well tested) and the capability requirements are lower. But if the infrastructure is already outdated, there is risk in being unable to quickly respond to changing business needs and to take prompt advantage of new and more efficient technologies. If the infrastructure is current and up-to-date, and is already modular with well-defined interfaces, evolutionary changes produce the most manageable risk profile. Testing is easier on smaller, less complex modules than on large, and using standard interfaces limits unpredictable ramifications.

The key elements in deciding upon an optimal approach from this spectrum are cost of the replacement, cost of perpetuating current system or system components while the replacement is in progress, time-value of new capabilities, complexity cost, technical risk, and program management risk (including political risk). In general, monolithic replacement is justified where the existing system is structurally limiting, as legacy systems generally are, because the existing foundations fail, sometimes catastrophically, under increasing operational demands. A purely evolutionary replacement approach functions well if the system is already modular and possesses highly defined interfaces; aging modules can be replaced without causing unexpected disturbances or ripple effects elsewhere in the structure, and modules can be relatively easily rearranged to form a new structure, allowing adaptability, because of the standard interfaces. Given HCFA's current legacy environment on the one hand, and its pressing business need to readily implement new programs on the other, neither extreme is viable.

7. Summary

Within the broad range of intermediate courses, we must pursue a course that balances return against resource cost and risk. The "sunflower" vision stresses central well-managed information management at the core with modular decision-making systems readily accessing any necessary data in the core. The vision design encompasses prompt as well as broad access to data, high reliability, and "maneuverability" to provide flexibility to quickly respond to future needs and to future technologies. A key element of the vision design is that multiple plausible paths for achieving the target architecture exist.

The vision and approach described in this document differ significantly from earlier HCFA IT investment efforts. The major difference is primarily one of approach and methodology. Instead of focussing upon a direct replacement of a major business function, the strategy we describe here is intended to address the business needs of the whole enterprise, and to chose IT investments that optimally move the IT infrastructure toward goals that support all of the enterprise business functions. The strategy follows an overall risk adverse approach, using incremental builds of highly structured code modules, standard interfaces, triage and object reuse where appropriate, and prudent project management processes. Frequent milestones and monitoring of project progress and deliverable quality with a variety of metrics are necessary to ensure successful development.

The sunflower vision represents a new IT goal for HCFA, that of an enterprise-wide evolutionary IT environment. The philosophy naturally embraces the structured IT investment strategy of the Clinger-Cohen Act and of Raines' Rules.

E. MAJOR STRATEGIC ISSUES

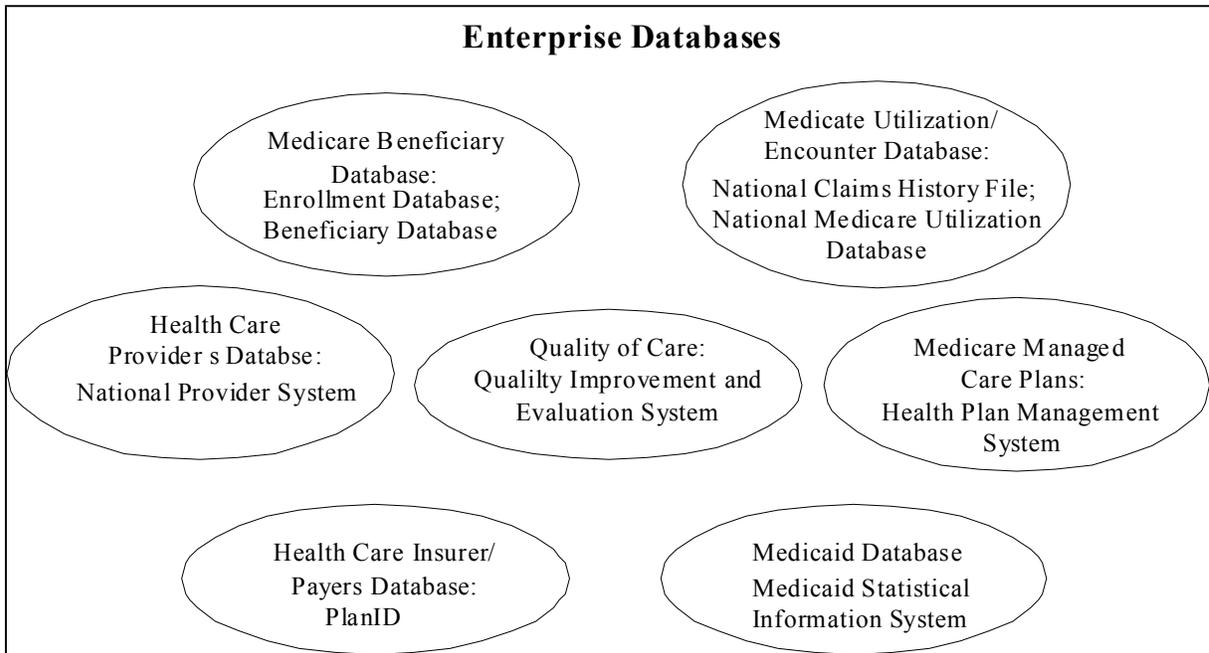
HCFA is faced with a number of strategic issues that affect its ability to carry out the Strategic Plan.

1. Realization of the Conceptual Model

As HCFA moves forward in developing responses to key business objectives, IT solutions play a critical role in supporting these objectives. The “information-centric” IT architecture model, outlined earlier, is the conceptual framework for managing our development of essential, core databases and their interfaces with business applications to support major business objectives. There are several parallel strategies that we are deploying to realize this conceptual model, including the development/refinement of our core enterprise databases, business application development/reengineering, migration toward our target architecture standards, and promoting effective management of our IT investments.

a. Development/Refinement of Core, Enterprise Databases

Effectively supporting HCFA’s major business operations (within its Business Function Model) requires that we maintain easily accessible, valid, and reliable data and information for a number of events/entities. While there are multiple levels from which to view these data and information needs, at a high level, one can depict HCFA’s enterprise data model as follows:



Note: The databases identified for these major categories are not intended to be a complete inventory of the data repositories for each category. Similarly, a number of these databases are under various stages of development/prototyping.

Therefore, one of our strategies will be to continue development and refinement of these core, enterprise databases designed to support major business operations.

b. Business Application Development/Reengineering

Many business applications were designed ten or more years ago, when program requirements and/or transaction volumes were significantly different. Many were developed using programming or database structures that no longer provide ease of functionality and maintenance; nor the ability to easily adapt to changing business needs or legislative requirements. Similarly, as program requirements changed over time, many of these applications have become a patchwork of modules, fixes, etc. that make ongoing maintenance difficult (and costly). This makes modifications to handle new functions or programs difficult, expensive, and time-consuming

Therefore, we are undertaking a number of reengineering efforts to ensure that our business processes are effectively designed to meet current and future business needs; as well as ensuring that we have IT solutions effectively supporting these re-engineered business processes. Examples of these reengineering efforts include: redesign of the Medicare Managed Care Systems; assessment and redesign of the Common Working File (CWF); and development and implementation of an

integrated general ledger accounting system (IGLAS) for our Medicare fiscal contractor systems and redesign of the central HCFA financial accounting system. These projects are discussed later in this Plan.

c. Migration toward Target Architecture Standards

With the continuing development and specification of HCFA's IT architecture standards, we will be undertaking planned migration efforts toward these standards. For example, HCFA had made the decision several years ago to move toward a modern relational database structure (and away from, for example M204). The migration of databases will continue, in a phased approach, based on business and budget considerations.

d. Promoting More Effective Management of IT Investments

This is a multifaceted strategy designed to ensure that (1) IT investment decisions comply with the Clinger-Cohen Act, OMB guidance (including "Raines' Rules"), and sound investment decision-making principles; (2) systems development projects are developed consistent with industry standards (i.e., Software Development Capability Mature Model); (3) IT investment projects are managed effectively (using such disciplines as integrated project planning, earned value management reporting from contractors, and performance-based service contracting strategies).

2. Security Posture Improvement

Both health care and IT environment in which HCFA operates changes constantly. HCFA is relying more and more on networked systems, we have expanded our number of external partners, technology changes rapidly and is increasingly more complex, and there is a higher expectation of HCFA leadership in security at a national level. Our challenge going forward is to provide greater access and flexibility, while guarding against the intensity of existing threats and new threats because of increased connectivity and greater numbers of data users.

Our strategy is to achieve a sustainable and effective system and network security posture. We would not be able to administer our programs if system security flaws cause failures in continuity of program operations, protection of the privacy of beneficiary data, or protection of business-sensitive financial data. HCFA will take a two-pronged course of action: 1) continual assessment and correction of vulnerabilities, and 2) development and implementation of user-transparent administrative, physical, and technical controls to adequately protect systems, networks, processes, and data.

This will be done with through the Systems Security Initiative, which will integrate security into our business and IT management processes. We will be both reactive in assessing and addressing known vulnerabilities and proactive by building security into new environments. Our systems security management program focused efforts in four areas: policy and procedures, training and awareness, security systems engineering, and management and oversight. These areas are discussed in detail in Section E of the Capital Plan, Automated Information Systems (AIS) Security.

3. Systems Quality

a. Capability Maturity Model (CMM) for Software

The analysis, renovation, and testing conducted for Y2K uncovered many issues and practices that revealed a need for software development process improvement (SPI). The Agency recognizes the need to standardize the method of software development in order to improve results. We are planning on implementing the Software Engineering Institute's (SEI) Capability Maturity Model (CMM) for Software. Specifically, HCFA's new software process improvement goal is to achieve the Capability Maturity Model (CMM) for Software Level 2 Maturity Rating within the next three years. The CMM for Software is a framework that describes key elements of an effective software process. It covers practices for planning, engineering, and managing software development and maintenance. When this organizational model is followed, these practices improve the ability of organizations to meet their goals for cost, schedule, functionality, and product quality.

CMM describes a set of processes that result in more efficient and effective software development efforts and is intended to help software organizations improve the maturity of their software processes.

The CMM guides software organizations that want to gain control of their processes for developing and maintaining software and to evolve toward a culture of software engineering and management excellence. It is a description of the stages through which software organizations evolve as they define, implement, measure, control, and improve software processes.

The CMM model is composed of five maturity levels that define an ordinal scale for measuring the maturity of an organization's software process and for evaluating its software process capability. CMM for Software also help organizations prioritize its improvement efforts. This model provides a guide for selecting process improvement strategies by facilitating the determination of current process capabilities and the identification of the issues most critical to software quality and process improvement. The CMM establishes a yardstick against which it is

possible to judge, in a repeatable way, the maturity of an organization's software process and compare it to the state of the practice of the industry.

The maturity framework provided by CMM establishes a context in which:

- ▶ Practices can be repeated. There are policies, procedures, and practices that commit the organization to implementing and performing consistently.
- ▶ Best practices are defined sufficiently to allow for transfer across project boundaries, providing standardization for the organization.
- ▶ Variations in performing best practices are reduced. Quantitative objectives are established for tasks; and measures are established, taken, and maintained to form a baseline from which an assessment is possible.
- ▶ Practices are continuously improved to enhance capability (optimizing).

The CMM is built upon a framework of five increasing maturity levels. As organizations establish and improve the software processes by which they develop and maintain their software work products, they progress through the levels of maturity. Each maturity level provides a layer in the foundation for continuous process improvement. Achieving each level of the maturity model institutionalizes a different component in the software process, resulting in an overall increase in the process capability of the organization. Organizing the CMM into five levels prioritizes improvement actions for increasing software process maturity. The five maturity levels of CMM for Software are:

Level 1: Initial Level - (This is HCFA's current level). At the Initial level, the software processes are characterized as ad hoc, and occasionally chaotic. Few stable processes are defined and success depends on individual effort and heroics.

Level 2: Repeatable Level - Basic project management processes are established. Cost, schedule, and functionality are tracked and reported. The necessary process discipline is in place to repeat earlier successes on projects with similar applications.

Level 3: Defined Level - The software processes for both engineering and management activities are documented, standardized, and integrated into a standard software process for the organization. All projects use an approved, tailored version of the organization's standard software process for developing and maintaining software.

- Level 4: Managed Level - Detailed measures of the software process and product quality are collected. Both the software process and products are quantitatively understood and controlled.
- Level 5: Optimizing Level - Continuous process improvement is enabled by quantitative feedback from the process and from piloting innovative ideas and technologies.

HCFA's immediate Software Process Improvement (SPI) goal is to achieve the Level 2 maturity rating. At Level 2 process capability is enhanced by establishing basic project management (tracking and reporting costs, schedule, and functionality) is established for each project. Processes are repeatable, so that planning and managing new projects is based on experience with previous projects. Projects implement effective processes that are defined, documented, practiced, trained, measured, and enforced.

With the exception of Level 1, each maturity level is composed of key process areas that indicate where an organization should focus to improve its software process. The key process areas may be considered the requirements for achieving a maturity level. To achieve a maturity level, the key process areas for that level (and lower levels), must be satisfied and the process must be institutionalized. The key process areas at Level 2 focus on the software project's concerns related to establishing basic project management controls. Level 2 key process areas are:

- ▶ Requirements Management
- ▶ Software Project Planning
- ▶ Software Project Tracking and Oversight
- ▶ Software Subcontract Management
- ▶ Software Quality Assurance
- ▶ Software Configuration Management

Achieving the CMM for Software Level 2 maturity rating will allow HCFA to provide a more rapid response to mandated changes; reduce project management errors and miscalculations; accurately track project status and expectations; decrease software turnaround times and development costs and provide management visibility into software processes.

Some of the specific Key Process Areas associated with achieving the CMM for Software Level 2 maturity rating are discussed in the following Quality Assurance section of this IRM Plan.

b. Quality Assurance

HCFA has a need to develop a robust Quality Assurance (QA) process for all HCFA enterprise-wide systems. The purpose of QA is to provide management with appropriate visibility into the process being used by the software project and of products being built. QA involves reviewing and auditing the software products and activities to verify that they comply with the applicable procedures and standards and providing the software project and other appropriate managers with the results of these reviews and audits.

The five important activities that support Quality Assurance are: Change Management, Requirements Management (RM), Configuration Management (CM), Independent Verification and Validation (IV&V), and Independent Testing.

Change Management

HCFA has a need to develop a robust and effective Change Management process for its systems in order to better support its application development (and business) components with the task of implementing systems changes. Managing change in an IT environment is critical to efficiently maximizing investment dollars. Change Management is the vehicle by which HCFA will take control over the evolution of its hardware and software by establishing and enforcing a predictable life cycle for change implementation. Currently, there exists no common methodology for HCFA to systematically manage changes to hardware or software. The opportunity exists for HCFA to improve the systems development process by establishing a methodology and a group responsible for change management of systems hardware and software. An automated change management process will help HCFA track changes as they are requested, approved, planned, developed, tested, and implemented.

Requirements Management

HCFA has a need to develop a robust and effective Requirements Management process for its enterprise-wide systems. A related need exists to support the business and application development components with the task of developing systems requirements. The opportunity exists for HCFA to improve the systems development process by establishing a group of trained systems requirements analysts and writers to fill a need that is not currently met by HCFA internal staff. Concurrent with requirements development, the management of systems requirements will help improve the quality of implemented systems by aiding the tracking of the requirements development and implementation process from beginning to end: (i.e., from business requirements, to systems requirements, to test plans, to validation and to software implementation).

Configuration Management

Configuration Management ensures that version control of system documentation and program code is institutionalized at HCFA in a central repository. A full configuration management environment will include: 1) version control during Development, Quality Assurance/Validation, Integration Testing and Production Implementation; 2) change tracking, so that developers and reviewers can identify changes made to the various software elements; and 3) sign-off by Development, Quality Assurance/Validation, Integration Testing and application owners during the various stages of the systems development life cycle. Although this activity was started in support of Y2K efforts, it is necessary to continue it into HCFA's future.

Independent Verification and Validation

The purpose of this effort is to provide HCFA with IV&V services necessary for the efficient and effective management of its business information systems, infrastructure, and related information systems projects including, but not limited to legacy system enhancements and new systems development. The Agency's experience during the millennium project has also shown the value of having an independent evaluation of proposed plans and technical strategies from conceptualization through implementation.

Independent Testing

The importance of effective testing has become evident in the Y2K initiatives. Pre-existing, non-Y2K related problems have been encountered during Y2K testing, more so than Y2K related problems themselves. It is impossible to calculate the cost of these error at this point in time, but this clearly demonstrates that HCFA needs a mechanism to ensure that systems have been fully exercised prior to implementation. It is equally important that HCFA be able to identify additional test requirements for those sections that have not been executed.

HCFA has lacked a means to measure testing quality prior to this initiative. For this reason, HCFA plans to implement Independent Testing practices beyond the Y2K efforts. Test coverage and verification will be utilized to measure and analyze the quality of testing for all Medicare and Medicaid related systems. Independent Testing can also be a means for HCFA to perform a technical analysis of current and future systems.

4. IT Training

Existing staff are skilled and knowledgeable in the current IT environment. However, with the use of new database management systems, new program languages, and new access facilities, the Agency will need to both hire new staff with these skills and provide extensive training programs for existing staff. This responsibility falls under the CIO and OIS. There are a number of crosscutting business drivers that will impact the future hiring and retraining in these functional areas. OIS is committed to providing HCFA the ability to fully leverage the benefits which sound IT investments can provide in better-enabling the accomplishment of business objectives and improved customer (including beneficiary, partner, and stakeholder) services.

In FY2000, HCFA will invest in retraining staffs who have been focused exclusively on Y2K activities for the last several years. Programmers and system analysts who have been evaluating and renovating the Agency's legacy systems will need to be brought up to date on the direction of the future architecture and the technical skills needed to work in the new environment. The following is a list of the specific areas where training will be focused:

a. Enterprise-wide IT Governance

We need staff who are professionally trained in both the logical approach to and the highly proceduralized methods for supporting technical and financial analyses of projects. Specific skills are required in risk analysis, return on investment analysis, performance metrics (including earned-value), project planning and management--factor analysis, business requirements documentation, dependencies analysis; configuration/change management and requirements management; risk assessment and contingency planning.

b. Infrastructure Operations

HCFA must effectively plan and manage the HCFA IT infrastructure in the mainframe, mid-tier, network environments. We are moving more applications onto the mid-tier platform to use web-based technologies, to use the more desirable features of client-server computing and to gain more flexible arrangements for data storage and access. We must have the skills to effectively implement and integrate mid-tier technologies into HCFA IT environment, and provide network integrity and computer security. To be effective as a mid-tier specialist requires knowledge of platforms (both servers and operating systems), inter-process and inter-platform communications (LANs, WANs, middleware) and the application environment (Web, 4th generation languages, objects, etc.). At the same time, a high-volume of our operations will reside on the mainframe and will continue to play a critical role. Critical skills needed are in communications operations to support both the networking (TCP/IP) and front-end protocols. Skills are needed to support internal

processes, including mid-tier and specialized servers (e.g., storage, e-mail, security, network management), mainframe as servers, Unix servers, and shared resources across platforms.

Specific skills are required in network architecture and management technology, network and server security systems integration, systems engineering, cost-benefit analysis, tuning and performance, UNIX, C, C++, TCP/IP, JAVA, NT, per, and Web, and client-server/mid-tier.

c. Database Development and Management

To achieve the objectives of our IT vision we need skilled staff in modern database management approaches to develop or migrate databases that provide utility in supporting the business operations and policy/decision-making processes of the Agency. We need applications developers (1) who are skilled in using modern computer-assisted engineering (CASE) tools and developer toolkits to write for target environments such as the Web and assure platform independence via use of middleware; and (2) who understand the use of object technology and can aid us in determining its future within our operations and who are comfortable designing and fielding applications which are both inter-operable with components developed elsewhere in HCFA and inter-dependent on data store and structures for which they cannot dictate either logical structures or physical accesses. Further, HCFA needs to invest in higher-level data analysis skills to support its construction of the data warehouse/data marts/databases required to empower analysts and managers throughout HCFA. Staff needs training in JAVA and Web, client-server/mid-tier, UNIX, C, C++; message-oriented middleware; modern database technology and administration/management, including DB2, ORACLE, SQL (structured query language); and data mining, including decision support systems and on-line analysis processing.

d. Data Quality, Integrity and Standards

We must ensure that data used for operational and policy/decision-making is of high quality (reliability and validity). Currently, we have minimal staff devoted to assuring the quality of HCFA's data, including protection of information at contractors and in transmission over networks. Since reliable and valid data is essential for both operational, research, and policy/decision-making, we must make a greater investment in staff resources devoted to the data quality area. Staff will be focused on EDI standards, HIPAA administrative simplification, and data quality and reliability.

e. Security

The movement to a more flexible and distributed, yet more integrated environment which includes Internet services substantially increases the risks to our systems operations and data. HCFA must ensure a sound and secure systems security environment, both for our internal and externally-maintained (contractor) systems. We must effectively plan the development of new IT solutions to business needs with security issues being considered as part of the development process and the development of network and operating systems. We need to acquire professional expertise in modern data security operations, including individuals with network and expertise in systems penetration and security auditing/testing, and awareness and security training/education. Our goal is to have a security posture wherein all resources are treated as virtual and risk assessment, auditing, automated intrusion detection, ethical hacking, and role-based access controls are standard tools. Specific systems security technical skills and training are needed in the following areas: technical vulnerability assessment; risk assessment, network security, Web/Internet security, intrusion detection, security auditing, security training.

III. CAPITAL PLANNING AND INVESTMENT

Business goals are best achieved through wise investment of resources. Recognizing this, the Clinger-Cohen Act requires the Federal government to use IT to improve mission performance and service to the public and to strengthen the quality of government IT decision-making by measuring performance. It requires the establishment of an enterprise-wide architecture that defines the Agency's information model, data standards, and data management procedures, describes the major kinds of technologies necessary to support the business applications and data sharing and ensures that HCFA systems are scalable, flexible, and inter-operable so as to better meet challenges in program growth and complexity. It also requires the establishment of portfolios that organize our IT activities around primary business drivers.

The Government Performance and Results Act (GPRA) requires each Federal Agency to define its mission and align its activities and resources to support mission-related outcomes. Further, GPRA requires agencies to measure their performance against program-driven criteria to ensure that they are meeting Agency goals. The Office of Management and Budget, through guidelines released in October 1996, established concise direction regarding investments in major information systems, and required enforcement of that direction through the budget process.

The confluence of this guidance and the need to manage Agency resources more effectively in a time of diminishing resources and increasing business demands necessitated HCFA's development of a new IT investment review process. This investment review process had to address the following criteria:

- ▶ IT investment decisions must be based on Agency business priorities, and the review process must be integrated with strategic/business planning and budget development/execution.
- ▶ IT investment decisions must be made through a structured decision-making process, using consistent criteria.
- ▶ IT investments must be managed over their life-cycle to achieve business priorities and to conform to the IT architecture: investment selection, investment control/oversight, and position-implementation evaluations.

A. INVESTMENT REVIEW PROCESS

HCFA's IT investment and review process provides a structured method for the development, approval, and implementation of investments that will advance the strategic and business goals of the Agency. Every IT project without exception is subject to the rigors of this process. Agency resources will be teamed together from the beginning to help a project owner design a plan with checks and balances that will encourage the greatest likelihood of success. It is designed so that each phase supports successive steps in the process.

The process was first implemented in 1998 and has been continually refined as improvements were identified. The process includes technical and financial reviews of each project; assistance from OIS, the Office of Internal Customer Support (OICS), and the Office of Financial Management (OFM) to ensure the successful implementation and performance tracking of the project; continuous feedback on the status and progress of the project; and a web-based database tool to track critical information on all IT projects.

1. IT Review Boards

HCFA has a two-tiered financial review and decision structure. The Financial Management and Investment Board (FMIB) is responsible for developing the Operating Plan for the fiscal year, which includes the IT Budget. The FMIB reviews all proposed investments, both IT and non-IT, against business priorities; determines which projects will be funded and at what level they will be funded. The FMIB forwards its budget recommendations to the Executive Council (EC), which is comprised of the Administrator; the CIO; the CFO; and Center, Office, and Consortia leadership. The EC approves the final Operating Plan and IT Budget.

2. IT Investment Process

HCFA's IT Investment Review Process ensures that IT projects are implemented at acceptable costs, within reasonable time frames, and are contributing to tangible, observable improvements in mission performance. The investment process focuses on the selection, control, and evaluation of a project, monitoring it throughout its entire life cycle, from concept design through post-implementation.

a. Selection

The IT-investment review/selection process is used to determine which proposed investments (hardware, software, telecommunications, etc.) should be included in the Agency's IT Portfolio. HCFA selects IT projects based on the following:

- ▶ A justification for the development of or major modification to a system that is based primarily on an analysis of the cost and proposed or known benefits of the proposed project. A cost benefit analysis is required for major IT projects. It should demonstrate how the IT resource will maximize return on investment (ROI) and minimize financial and operational risk.
- ▶ Benefits that are based on performance metrics that measure the impact of the proposed investment on HCFA's strategic goals and business objectives, and Agency mission performance measures
- ▶ A risk analysis performed to identify those conditions or events that have the potential for adversely or unexpectedly affecting a project, analyzing and quantifying the possible effects, and developing and

- ▶ implementing mitigation strategies.
- ▶ A detailed schedule for accomplishing all phases of the system development life cycle in accordance with HCFA system development guidelines.
- ▶ Established milestones that demonstrate modular success before committing additional funds.
- ▶ Planned hardware or software purchases that are consistent with HCFA's IT Architecture and systems security plan.

b. Control

Control of a project throughout its life cycle is accomplished primarily through periodic (usually annual) allocation of funding based upon actual performance toward goals. Performance is measured with established metrics, principally achievement of delivered value on schedule and meeting planned milestones within budget. The level of the review and reporting is directly related to the project cost and potential impact of the investments. The greater the cost or consequence of the investment, the greater the oversight. High-dollar, high-risk, cross-functional projects or projects of significant interest to HCFA, the Department of Health and Human Services, OMB, or Congress are all considered major IT investments and must endure greater scrutiny. Project owners must establish a target level of performance for each critical element or milestone of a project. This sets up review points at logical times throughout the project life cycle to assess the status or health of the project. The project owner can then adjust the schedule or cost, go forward or terminate, based on sound project management. It prevents inadequate performance or cost overruns from getting out of hand without notice or impact. The FMIB will consider performance in its deliberations for out year funding of projects.

HCFA classifies all projects into four reporting levels:

- Level A: Ongoing, baseline projects, usually related to the infrastructure, that support core business functions (e.g., hardware/software maintenance, data communications or and network operations);
- Level B: Projects that are single-year hardware or software purchases, leases and maintenance contracts, basic ongoing systems maintenance, and smaller development projects;
- Level C: Multi-year software development projects, complex or large purchases, and large hardware or network integration activities that can be broken down into phases; or

Level D: Major investments that exceed \$2.5M in one year or \$10M over five years, are of high visibility to important stakeholders, or drive forward a mission critical business function and warrant a focused review and detailed analysis and documentation.

Projects in each level have their own reporting requirements that are appropriate to the type of IT project. Level A projects are critical to the day-to-day operations but have fewer reporting requirements. Level D projects have the greatest requirements, including a Cost/Benefit Analysis, detailed Raines Rules, and 300B submission to OMB.

As part of improving the overall IT Investment Review Process, it has become increasingly evident that there needs to be another level of review established to ensure that proposed IT investments are designed to maximize the use of IT resources (hardware, software, and people) and the likelihood of the investment's success. To promote more effective management of IT investment and resources, HCFA has established a formal technical review process for IT investments. This process has three objectives:

- ▶ To ensure that IT projects are developed consistent with the Agency's IT architecture standards (business, applications, infrastructure, information, security, and the governing policies and procedures);
- ▶ To promote effective workload management (including enterprise scheduling and resource planning) for internal, external, and contractor resources required to deploy the IT application and/or system; and
- ▶ To provide project owners with a clearly-defined process and a central focal point for involving IT professionals in the development of the project technical solutions.

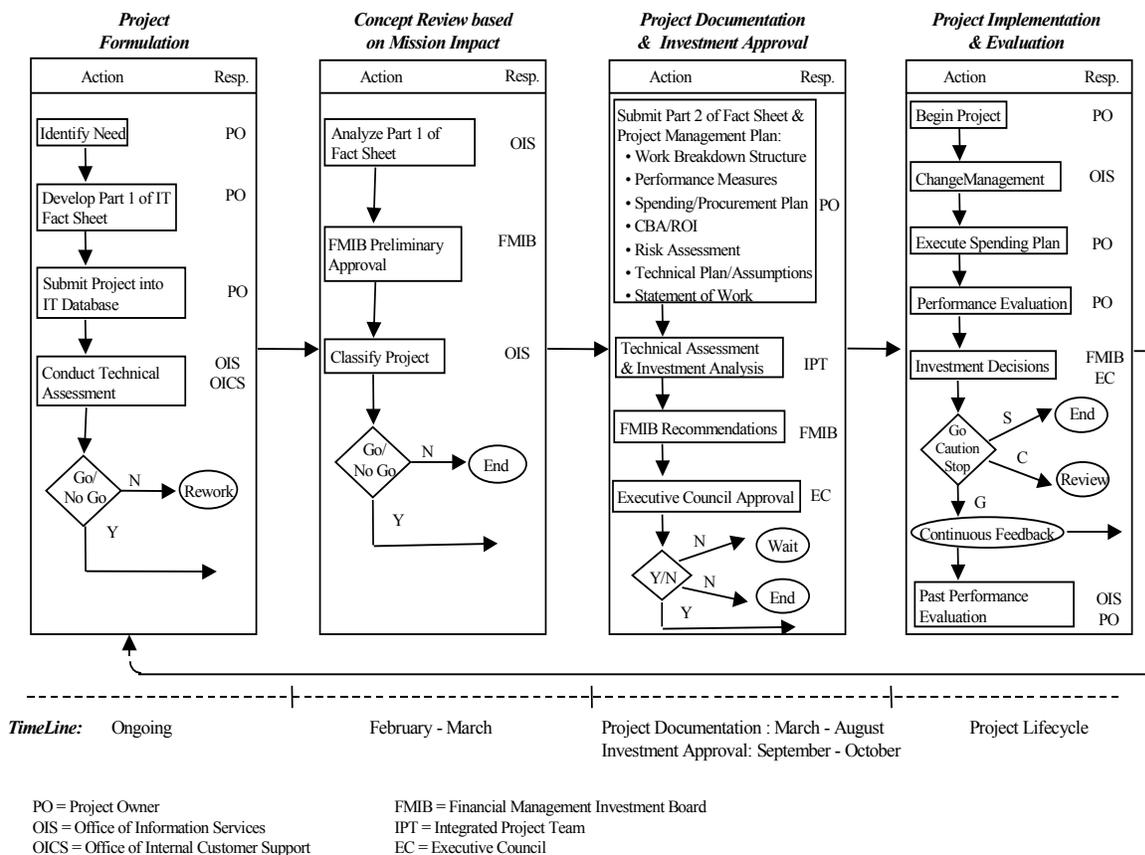
This process provides IT Project Owners a single point of contact to present their IT project concepts/technical designs and a management-level board to formally ratify the technical design proposed for a project. It also ensures that those parts of HCFA with responsibility for supporting and/or implementing the systems changes required by the project are identified early in the project life-cycle and are involved throughout the design, development, and implementation of the project to identify and address any technology, resource or scheduling issues associated with the project. Finally, it ensures that better funding decisions concerning IT projects are made by the FMIB and the EC because they have a higher level of confidence in the overall technical approach taken in support of individual projects and the three Agency-wide investment portfolios discussed in the next section.

c. Evaluation

The evaluation phase provides a mechanism for improving the organization's IT investment process. HCFA will conduct post-implementation reviews of all IT investments. Projects classified as major IT investments will have a more in-depth analysis than those projects classified as non-major. Evaluation will be based upon the proposed benefits and performance metrics identified in the cost benefit analysis to determine if the proposed benefits of the investments are being achieved. If the expected benefits are not being achieved, the results of these reviews will be used to recommend action be taken to modify the system. Best practices or lessons learned derived from these reviews will be shared with project managers to help refine project planning and management.

The following is a chart that depicts the major activities within the IT Investment Review

IT Investment Process



Process.

3. IT Database

OIS developed an interactive web-based database that supports the IT investment process. The database captures critical information on each IT project, including required funding levels for each phase of the project, performance measures, timelines and milestones. It includes an expert system where project owners answer questions about their project in relation to Raines's Rules. The database also compiles the information necessary to generate the Exhibit 300B reports required by OMB for the annual budget submission. The tool provides outputs required for ITIPS (Information Technology Investment Portfolio Systems) reports desired by OMB.

4. Acquisition Management

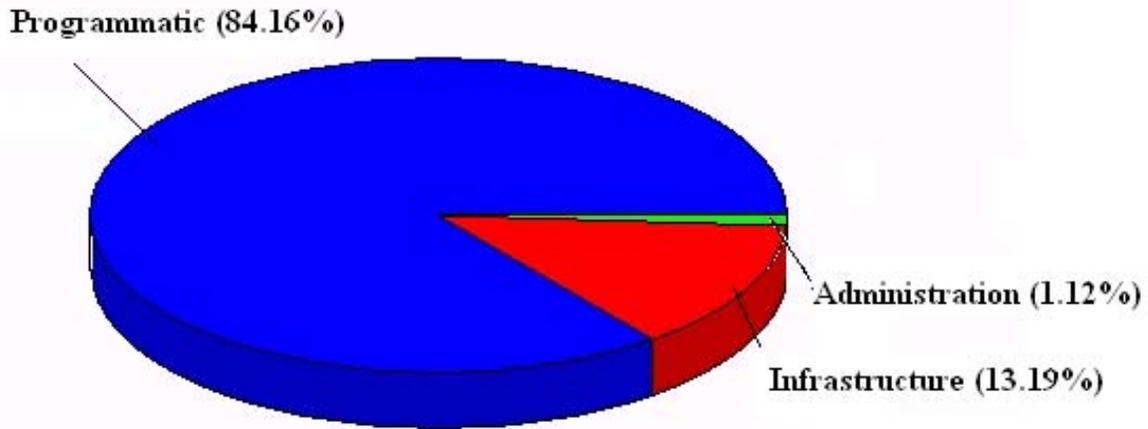
Another goal of our overall IT process is to use contracting strategies that require detailed reporting on cost, schedule and performance variances. HCFA has begun implementation of performance based contracting and earned value management reporting for major IT projects. Performance goals will be included in the statement of work and financial incentives will be available to the contractor for meeting or exceeding performance or schedule goals. Full implementation of this strategy will require contractors to use an earned value management technique that relates resource planning to schedules and to technical cost and schedule requirements. All work will be planned, budgeted, and scheduled in time-phased increments; constituting a cost and schedule measurement baseline. Contractors will be required to report on any variances to the plan. This strategy is described in detail in Section E, Performance Measurement and Evaluation Plan (PMEP).

B. INVESTMENT PORTFOLIOS

1. Current IT Portfolios

HCFA's IT funds provide the automation support for the Agency to carry out its responsibility to oversee and manage the Nation's major health care programs for elderly, disabled, and low-income Americans. Much of this funding is used to operate, maintain and keep current the basic systems with which we carry out our work, e.g., telephone service, Part A and Part B Medicare claims processing systems, financial accounting systems, databases, program integrity systems, and tracking systems which underlie our fiscal integrity and health care quality activities. Other activities supported can be considered new initiatives or major changes, such as the Enrollment Broker Demonstration mandated by the Balanced Budget Act or the PlanID and EDI activities required by the HIPAA. All projects selected in the IT investment process are classified in one of three Agency portfolios: Infrastructure, Programmatic, or Administrative.

Portfolio Budget Analysis



Note: This chart represents the breakout of HCFA's portfolios based upon projects approved for FY 1999.

The Programmatic Portfolio contains existing systems and system development projects that support HCFA-wide efforts other than administrative applications. This includes National Databases, Medicare Payment Operations (Fee-For-Service and Managed Care), Administrative Simplification and Standards/Electronic Data Interchange, Beneficiary Information and Education, Quality of Care, Program Integrity, Medicaid, Medicare, Survey and Certification, and Research.

The Infrastructure Portfolio contains enterprise configuration assets (hardware/software/network) and related support services. This includes Operating Platforms (mainframe/HDC, mid-tier, desk-top), Network Systems, Network Management, Data Management/Access Tools, Telecommunications, and Security.

The Administrative Portfolio includes the systems and/or system development projects pertaining to HCFA-wide administrative system applications. This includes Investment Planning and Management (project planning, requirements, change management), Financial/Accounting, Personnel, Payroll.

2. Presidential Decision Directive (PDD) 63

Highlights of HCFA's Investment Portfolio for FY2000/2001 are the Presidential Decision Directive (PDD) 63, aimed at systems security to prevent cyber-terrorism, and the best practices from our Y2K experience, which point to the need for more structured governance and management of the wide array of systems on which HCFA depends.

HCFA will spend \$18 million in FY2001 on our enterprise security initiative, which supports the goals of PDD 63 and that ultimately will give the Agency a thorough and effective program providing the systems security it needs enterprise-wide. This initiative arises from the need to strengthen HCFA's systems security program and to address the potential vulnerabilities and risks identified in recent audits by the Office of Inspector General and self-assessments by OIS. Over a 3-year phase-in period, HCFA will increase its efforts to assess areas of potential risk and implement effective and proactive corrections to ensure that its data and data systems are not comprised.

3. Best Practices

In FY2001, HCFA will spend approximately \$27 million on Portfolio investments relating to governance activities. As part of the Y2K initiative, HCFA implemented a number of governance processes to ensure that systems and applications were managed effectively, particularly as the Agency made necessary changes to its systems. These disciplines included requirements and change management, establishing a production control and validation/quality assurance environment, providing independent verification and validation and independent testing of systems changes prior to implementation. The value of this approach to systems management is clearly much broader than its application to Y2K compliance, and HCFA will continue to take advantage of these governance processes and integrate them into normal development and operation.

4. Other Major Highlights

Other highlights of our IT Portfolio selections for FY2001, some of which are also discussed under the Capital Plans Section below, include the following:

a. Conversion of M204 Databases to Relational Databases

This continues HCFA's effort to transition major enterprise databases from antiquated programming languages to a modern relational database (e.g., DB2) environment consistent with the IT Architecture.

b. Quality Improvement & Evaluation System (QIES)

QIES is an information system to collect data on provider and beneficiary-specific outcomes of care and performance across a multitude of delivery sites (such as nursing homes, HHAs, ESRD, ICF/MRs, rehabilitation and long-term care hospitals, etc). This information is used in improving the quality and cost effectiveness of services provided by the Medicare and Medicaid programs.

c. Medicare Managed Care Systems Redesign

This project covers the redesign of the Medicare managed care family of systems, three systems which are integrated in a monthly payment system that captures enrollment in managed care plans and calculates payments and adjustments. The project will design, benchmark, develop and implement new modules to replace current aging operations and to continue to support HCFA's managed care business needs until all functions are migrated to that new system.

d. National 800 Number Telephone Service

This project will allow HCFA to leverage existing telecommunications and technology to improve the level of toll-free customer service provided to its beneficiaries. Improvements to the toll-free services will be integrated with other beneficiary information/education activities into a single, telephone customer service strategy. Initiatives under this strategy designed to standardize call center operations across the Medicare contractor community include: uniform customer survey instruments; call monitoring protocols; centrally designed customer service representative training curriculums; and new national performance metrics. The desktop application developed under the former Medicare Customer Service Center pilot will be deployed and tie selected call centers into a national 1-800 network to facilitate proper call routing among our partners.

e. Medicare Contractor Integrated General Ledger Accounting System (IGLAS)

The CFO Act and GPRA require consistent reporting of information to Congress on the financial status of the Federal Government. The financial statement was chosen as the common reporting element. The CFO Act requires financial data to be reported on an accrual, rather than a cash basis of accounting. The accrual basis recognizes expenses when incurred and income when earned. The cash basis of accounting recognizes expenses when paid, and income when cash is received. Historically, Medicare contractors used the cash basis of accounting for financial reporting purposes. Contractor systems and financial reports were designed accordingly.

To sufficiently collect and validate standardized accounting data for benefit payments; improve Medicare contractor internal controls; and once attained, help facilitate the maintenance of an unqualified clean opinion on HCFA's financial statements, the Office of Financial Management (OFM) proposes to create a Medicare contractor Integrated General Ledger Accounting System (IGLAS). The project will standardize, for all of the selected claims processing systems, the accumulation, recording, and subsequent reporting of financial information by contractors applicable to its Medicare transactions. The system will replace the

cumbersome ad hoc spreadsheets, which are labor intensive, that are being used by contractors to accumulate and report financial information to HCFA. These spreadsheets are prone to error, because they are not prepared based on a dual entry (debit and credit) system of accounting. The IGLAS project will record a dual entry, recognizing a liability to the Medicare program upon the receipt of and adjudication of a claim. Providers submit approximately one billion original claims per annum. The system must have the capability to account for these initial claims, and also any adjustment bills that are submitted by providers, that affect the original claim. Therefore, the system must be scalable, namely have the ability to capture and manipulate accounting information for billions of transactions.

C. CAPITAL PLANS

In accord with HCFA's IT investment strategy and Raines' Rules requirements, we performed cost benefit analysis studies on the following major IT projects. We also prepared 300Bs for these projects as part of the FY 2001 budget submission. Included in this section is a brief description of each project, the Strategic Plan objective or GPRA goal the project supports, the costing approach for each of these projects and the final financial analysis results. For the Medicare Managed Care Systems Redesign, a project that has undergone specific review by OMB, we have included additional information in the form of a detailed Raines' Rules Analysis.

HCFA has identified the primary Strategic goals that, as stated in the Strategic Plan, represent not only HCFA's understanding of its statutory responsibilities, but its broader sense of purpose and direction. These primary Strategic goals are:

- ▶ Protect and improve beneficiary health and satisfaction
- ▶ Promote the fiscal integrity of HCFA programs
- ▶ Purchase the best value health care for beneficiaries
- ▶ Promote beneficiary and public understanding of HCFA and its programs
- ▶ Foster excellence in the design and administration of HCFA's programs
- ▶ Provide leadership in the broader public interest to improve health

Furthermore, HCFA has developed a set of more specific Strategic objectives that are necessary to achieve these primary Strategic goals. The objectives are not directly linked to individual goals; each objective may support multiple goals. Strategic objectives are grouped into three categories: Customer Service (CS), Quality of Care (QC), and Program Administration (PA). For each major project, we have identified the Strategic objectives the project supports.

The charts under Financial Analysis Summary for each of the following projects represent the summary of the Cost Benefit Analysis (CBA) Team's findings. The tables present the present value (PV) for costs and benefits, the net present value (NPV = benefits minus costs), and the benefit cost ratio that has been calculated to quantify the relative return on investment or percentage of benefits realized in relationship to costs. Where it was possible to quantify benefits for inclusion in the CBA calculations, we did so. Many projects also include intangible benefits (such as improved beneficiary service and satisfaction, strengthened public confidence) that can be considerable and are important motivations for undertaking a project.

1. OIS 300 HCFA Internal Systems Security Initiative

The state of HCFA's systems security program has been the focus of a number of assessments over the past several years. Both as a result of audits performed under the auspices of the Office of the Inspector General (as required under the Chief Financial Officers (CFO) Act of 1990) and self-assessments by the Office of Information Services (OIS). These assessments identified a number of security vulnerabilities for HCFA. Primarily, inadequate security behavior and supporting architecture may result in:

- ▶ The disclosure of beneficiary health information
- ▶ The disclosure of proprietary cost information of competing health plans and contract information
- ▶ Loss of integrity (correctness) of eligibility and payment information
- ▶ Denial of availability of IT resources to conduct the Agency's business
- ▶ Loss of citizens' trust in HCFA

While it is impossible to eliminate all or risks, the assessments highlight the importance for HCFA to bolster its enterprise systems security program. As HCFA moves further into on-line and Internet activities, the protection of confidential information held in trust for the citizenry becomes increasingly at risk. While there are no known instances where denial of services or compromise of disclosure of sensitive data has occurred, even one instance of such an event would be perceived as serious and could erode public confidence in HCFA's ability to properly fulfill its operational and stewardship responsibilities.

To improve HCFA's systems security program and address new and evolving vulnerabilities and risks, HCFA is implementing the HCFA Internal Systems Security Initiative. Over a 3-year phase-in period, HCFA will be increasing the intensity of its efforts to assess areas of potential risk and developing/implementing effective and proactive corrective actions to ensure that its data and data systems are not compromised. By the end of the phase-in period, our goal is to possess a credible and mature systems security program, providing the systems posture security HCFA needs.

Additional information regarding this initiative is discussed under Section E, Automated Information Systems Security.

The HCFA Internal Security Initiative will support a GPRA goal, and the following HCFA Strategic Plan objectives:

- ▶ GPRA Goal (HCFA Performance Plan) AC3-01: Improve HCFA's Information Systems Security

This project also will support the following Strategic objectives:

- ▶ PA-5: Improve HCFA's management of information systems/technology
- ▶ PA-2: Enhance program safeguards

The costs that the Project Owner outlined in the OIS 300 Project Fact Sheet were used as the basis for this CBA. Primarily, these costs are for contractor labor, where HCFA is not going to staff up beyond the status quo or incur additional overhead to accomplish these work efforts. To build this program, the front-end efforts prior to year 2000 are in the areas of vulnerability assessment and policy and architecture establishment. Implementation and enforcement of security policy and standards at the enterprise level require a significantly larger investment in out years, especially during FY01 through FY03. The program also ramps up significantly between FY00 and FY01 due to systems audits and changes that have had to be put off until later so as not to adversely impact HCFA's Y2K mission. FY04 and beyond are, for the most part, recurring costs for program maintenance.

Financial Analysis Summary

Results	
PV Costs	\$35,117,000
PV Benefits	\$49,121,000
NPV	\$14,004,000
Benefit Cost Ratio	1.40:1

Accordingly, a positive NPV and BCR indicate that HCFA will realize a positive return on investment because the quantifiable benefits realized are greater than the costs of the project.

2. OIS 414 Medicare Contractor Systems Security Initiative

The systems security management measures in the HCFA Enterprise Systems Security Initiative need to be applied to the Medicare contractor systems environment. This initiative serves to establish a reactive and proactive security posture toward 14

contractor sites, 38 intermediary sites, and 22 carriers sites. The current environment does not have the resources to ensure compliance with Federal security requirements and closure of security control weaknesses identified through CFO audits.

This project supports the following Strategic Plan objectives:

- ▶ PA-5: Improve HCFA's management of information systems/technology
- ▶ PA-2: Enhance program safeguards
- ▶ CS-3: Increase the usefulness of communications with beneficiaries
- ▶ CS-4: Increase the usefulness of communications with constituents, partners, and stakeholders
- ▶ QC-1: Improve Health Outcomes
- ▶ QC-2: Improving access to services for under served and vulnerable beneficiary populations
- ▶ QC-3: Protect beneficiaries from sub-standard care

The costs outlined in this project were taken from the project fact sheet and were further detailed through several in-person interviews with the project officer. These costs are primarily to support the cost of contract labor as part of the final alternative, which is to combine HCFA employees and Contract review teams to jointly conduct systems security reviews. The cost in the beginning will be focused on training, publication of manuals, and the review of prior years' findings. The out years will involve the cost of the contractor and the cost of conducting changes to security review findings.

Financial Analysis Summary

Results	
PV Costs	\$45,889,880
PV Benefits	\$117,310,000
NPV	\$71,424,120
Benefit Cost Ratio	2.56:1

Accordingly, a positive NPV and BCR indicate that HCFA will realize a positive return on investment because the quantifiable benefits realized are greater than the costs of the project.

3. OIS 67 Transition Legacy Systems

HCFA has been using Model 204 (M204) as the mainframe database support for the majority of its large-scale systems for the past ten years. Over the time, modifications to information needs brought about by numerous legislative, business and technological changes have all but rendered the existing M204 structure unscalable, and unfeasible for new or modified applications. While an excellent product in its initial state, the addition, modification and deletion of database data-sets has created a situation

whereby application program navigation through the database is cumbersome at best. Data redundancies are abundant and business applications and systems cannot effectively cross boundaries within the database, thereby causing a stovepipe effect. (Stove-piping applications mean the program must completely leave an application and its segment of the database before entering another application and its database segment). M204 does not satisfy technical and data management requirements for the future. Current processes in M204 are poorly documented modifications to the existing applications difficult and expensive. Increasingly, it has also become difficult and costly to support the database because of the shortage of skilled M204 programmers and compatible commercial off-the-shelf tools.

HCFA will migrate from the current Model 204 environment to a modern relational database environment. The impact of Y2K, the Balanced Budget Act, and the Information Technology Management Reform Act of 1996 (ITMRA) also necessitate this move. HCFA staff is currently planning a migration plan for that conversion, which must dovetail with the millennium and the BBA release schedule. Transitioning of legacy system into the DB2 environment will help HCFA to realize its goals and strategic objectives.

The transition from legacy systems to modern relational databases supports the following Strategic Plan objectives:

- ▶ PA-2: Enhance program safeguards
- ▶ PA-3: Maintain and improve HCFA's position as a prudent program administrator and an accountable steward of public funds
- ▶ PA-4: Increase public knowledge of the financing and delivery of health care
- ▶ PA-5: Improve HCFA's management of information systems/technology

The transition of the legacy systems into DB2 environment will also indirectly support several other Strategic objectives by enabling or enhancing HCFA's ability to address the following Strategic objectives:

- ▶ CS-3: Increase the usefulness of communications with beneficiaries
- ▶ CS-4: Increase the usefulness of communications with constituents, partners, and stakeholders

In addition, a critical part of HCFA's IT vision (the sunflower model) is the development of certain core national databases that will provide the database structure for Agency's operational and informational (policy decision-making, research) needs. Although the complete future state architecture is still under development, beginning to move forward with the transition of certain key databases into a DB2 environment is essential to be responsive to future operational requirements and policy/informational needs. There are efficiencies, which can be achieved in some instances by migrating

from the mainframe tier to the mid-tier, commonly called servers. Transition of Legacy M204 to DB2 is an endeavor to meet all these needs.

Project OIS 67 focuses on the migration of the back-end database structures of this environment. The costs identified in the project fact sheet were examined and confirmed by the project officer. The four major cost categories for this project are Hardware, Software, Training, System support. The first two years of the project will require large investments in Hardware, Training and Systems support. The remaining years' costs primarily are focused upon ongoing training programs.

Financial Analysis Summary	
Results	
PV Costs	\$11,129,910
PV Benefits	\$11,876,928
NPV	\$747,018
Benefit Cost Ratio	1.07:1

Accordingly, a positive NPV and BCR indicate that HCFA will realize a positive return on investment because the quantifiable benefits realized are greater than the costs of the project.

4. OIS 284 Medicaid Statistical Information System (MSIS) Database Conversion to DB2

This project will convert the current Medicaid Statistical Information System (MSIS) from M204 to DB2. This new national Medicaid information system will allow HCFA and the States to develop information that will help them to manage the large and expensive Medicaid program, support Medicaid policy/programmatic decisions, and aid medical research efforts.

This project's goal is the design and development of a working prototype of an online system in a DB2 relational database management environment. The prototype will include representative queries and extracts, update and maintenance procedures, reorganization and backup approaches, navigation capabilities such as drilling to detail, what-if scenarios, and comparison of data across States. It will provide easier and expedited direct customer access to data. This database, together with the Division of Access Development's data extract facility, will provide easy and efficient access to Medicaid data for managers, analysts, and researchers. These capabilities will enhance HCFA's ability to manage the Medicaid program.

Development of an online Medicaid Statistical Information System will support the legislative mandate of the Balanced Budget Act of 1997, which requires all 50 states to send their Medicaid data to HCFA, including Medicaid claims, eligibility, and encounter data (previously uncollected). The States began submitting this data to HCFA in January 1999, which has already significantly increased the amount of data maintained in the system.

The Medicaid Statistical Information System will also support several of the goals, objectives, and strategies outlined in HCFA's Strategic Plan. This effort supports HCFA's goal to be a leader in health care information resources management. The following are the Strategic objectives that will be directly supported:

- ▶ PA-2: Enhance program safeguards
- ▶ PA-3: Maintain and improve HCFA's position as a prudent program administrator and an accountable steward of public funds
- ▶ PA-4: Increase public knowledge of the financing and delivery of health care
- ▶ PA-5: Improve HCFA's management of information systems/technology

The development of a national Medicaid information system will also indirectly support several other Strategic objectives:

- ▶ CS-3: Increase the usefulness of communications with beneficiaries
- ▶ CS-4: Increase the usefulness of communications with constituents, partners, and stakeholders

The Project Owner of OIS 284 estimated all costs associated with the conversion of MSIS to DB2. Costs were estimated over a seven-year planning horizon, beginning in FY 1999 and extending through FY 2005. The costs that the Project Owner outlined in the OIS 284 Project Fact Sheet were used as the basis for this CBA. To build this program, the efforts prior to year FY 2000 focus on the development of back-end data structures. In the years FY 2000 to FY 2002, continued back-end refinement and front-end user interface development and training will advance concurrently. FY 2003 and beyond are predominantly recurring costs for system administration, maintenance, and user training.

Financial Analysis Summary

Results	
PV Costs	\$10,990,789
PV Benefits	\$24,869,422
NPV	\$13,878,633
Benefit Cost Ratio	2.26:1

Accordingly, a positive NPV and BCR indicate that HCFA will realize a positive return on investment because the quantifiable benefits realized are greater than the costs of the project.

5. OIS 467 Beneficiary Database Prototype (BDP)

The Medicare program currently retains its beneficiary data in a number of fragmented and application-specific sources. Reconciliation, when available, is often incomplete or dated. In such an environment, consistent outcomes are difficult to manage as decisions are based on inconsistent data. In addition, with the advent of additional Medicare choice options, HCFA must develop a beneficiary data management structure designed to support expanded program options and coverage.

Therefore, HCFA has initiated an effort to develop a prototype for the beneficiary data. This initiative has come to be known as Beneficiary Database Prototype (BDP). The term □Beneficiary Database Prototype□ categorizes the subset of Medicare data that documents both the insurance choices made by Medicare beneficiaries and demographic information about the beneficiary themselves.

More importantly, the need for the BDP has become more apparent because of many other factors including the following:

- ▶ The need for beneficiary information has become more urgent because of the Balanced Budget Act of 1997. The concept of integrated and comprehensive beneficiary information is essential to ensure that automated decisions requiring beneficiary information are consistent, accurate, and timely.
- ▶ HCFA previously made the decision to transition current databases from M204 to DB2. The BDP will be one of the first efforts to develop a DB2 database and to populate that database with the data from existing M204 systems. Therefore, it will also provide much needed information about the transition process.
- ▶ By exploiting commercially available relational database management systems, applications' development techniques, and distributed messaging technologies. The BDP platform will yield significant improvements in Medicare program operations and data management capabilities.

Accordingly, the Beneficiary Database Prototype will be developed to produce an operational beneficiary database configured to be deployed in the current Medicare systems environment, and prove the concept and feasibility of developing and maintaining a comprehensive integrated beneficiary database.

The BDP prototype will support several of the goals, objectives, and strategies outlined in HCFA's Strategic Plan. This effort supports HCFA's goal to be a leader in health care information resources management.

- ▶ PA-5: Improve HCFA's management of information systems/technology
- ▶ PA-2: Enhance program safeguards

The costs that the Project Owner outlined in the OIS 467 Project Fact Sheet were used as the basis for this CBA. The Project Owner and the CBA analysts discussed the foundations for these estimates in several subsequent discussions, to clarify the development of these cost estimates and the predicted timing of expenditures. Given the prototype development effort, costs for FY00 and FY01 were estimated, because of the need to first develop an operational prototype that will integrate into the Medicare Managed Care System. In determining the costs for this CBA, government labor (FTEs) and recurring costs beyond the scope of the project life cycle are not key variables in the cost analysis of this project. Primarily, these costs and budget requests are for contractor labor, where HCFA is not going to staff up beyond the status quo or incur additional overhead to accomplish these work efforts.

Financial Analysis Summary	
Results	
PV Costs	\$4,555,682
PV Benefits	\$5,262,112
NPV	\$706,430
Benefit Cost Ratio	1.15:1

Accordingly, a positive NPV and BCR indicate that HCFA will realize a positive return on investment because the quantifiable benefits realized are greater than the costs of the project.

6. CHPP 403 Collection of Managed Care Encounter Data and Implementation of Risk Adjusters for Medicare

The Balanced Budget Act of 1997 requires that Medicare+Choice organizations, as well as eligible organizations with risk-sharing contracts under Section 1876, submit encounter data to HCFA.

The BBA also requires the Secretary to implement a risk-adjustment methodology by January 1, 2000, that accounts for variation in per capita costs based on health status. Encounter data are necessary to implement risk adjustment payment.

This IT investment includes four components:

1. Analysis of hospital encounter data (1999 only).
2. Analysis of Health of Seniors survey data to support risk adjustment (1999 forward).
3. Design of a system to contain diagnostic information for each beneficiary and analyses of data for risk adjustment from 2000 forward.
4. Collect additional data from managed care plans (FY00) and modify system described in item three to accommodate these data.

The system should provide greater incentive for Plans to treat sicker beneficiaries - The implementation of a risk adjustment system will result in a payment system that more accurately reimburses managed care plans. As the current payment system does not account for health status differences, Plans are overpaid as managed care enrollees are, on average, healthier than Fee for Service (FFS) beneficiaries. Under the new risk adjustment system, however, Plans will be paid less for healthier beneficiaries and more for sicker enrollees. As a result, this system should provide greater incentive for plans to enroll and treat sicker beneficiaries.

The system should provide greater incentive for Plans to provide proper treatment □ The availability of additional diagnostic information on Medicare claims will allow HCFA to assess the adequacy of treatment provided by managed care plans for their enrollees. This increased oversight capability will provide incentives for plans to resist opting for substandard medical approach/treatment.

Medicare should save money by implementing a risk adjustment system □ The payments paid by Medicare to Plans for each enrollee are predicated on the average beneficiary cost of care, which includes the most expensive (i.e., least healthy) beneficiaries in fee-for-service. Because Plans generally enroll healthier beneficiaries than FFS, Medicare should save money through the implementation of risk adjustment.

Improved oversight capabilities - More detailed claims and beneficiary information will enable HCFA to implement more effective financial oversight programs and minimize waste, fraud and abuse.

Balanced Budget Act Compliance - One of the objectives outlined in HCFA's Strategic Plan calls for the implementation of risk adjustment mandated by the Balance Budget Act. This project will accomplish this objective.

Improved Medicare program decision-making - The availability of more accurate beneficiary data will facilitate the development of appropriate Medicare program decisions in the future.

The BBA statutory requirement is not the sole driving force behind the decision to implement the risk adjuster project. In fact, the expected benefits associated with the implementation of this project align closely with a host of goals set by GPRA and HCFA's Strategic objectives.

- ▶ Goal AC4-01 - Develop New Medicare Payment Systems in Fee-for-Service and Medicare+Choice
- ▶ QC-1: Improve Health Outcomes
- ▶ QC-2: Improving access to services for under served and vulnerable beneficiary populations
- ▶ QC-3: Protect beneficiaries from sub-standard care
- ▶ PA-2: Enhance program safeguards
- ▶ PA-3: Maintain and improve HCFA's position as a prudent program administrator and an accountable steward of public funds
- ▶ PA-5: Improve HCFA's management of information systems/technology

Direct costs were estimated over a ten-year planning horizon, beginning in FY 1999 and extending through FY 2008. The costs outlined in the CHPP403 Project Fact Sheets and the revised budgets for FY 2000 were used as the basis for this CBA. The Project Owner was consulted on several occasions to discuss the foundations for the cost estimates and to clarify the development of these estimates and the predicted timing of expenditures.

Financial Analysis Summary

Results	
PV Costs	\$310,976,318
PV Benefits	\$23,636,540,095
NPV	\$23,325,572,777
Benefit Cost Ratio	76.01:1

Accordingly, a positive NPV and BCR indicate that HCFA will realize a positive return on investment because the quantifiable benefits realized are greater than the costs of the project.

7. OIS 285 National Medicare Utilization Database (NMUD) Conversion

The development of a National Medicare Utilization Database supports HCFA's overarching goal to be a leader in health care information resources management. This project's goal is to make Medicare claims data easily and efficiently accessible to managers, analysts, and researchers. The project involves the design and development of a working prototype of an online system housing Medicare data in a DB2 relational database management environment. The NMUD will contain final action series data for Medicare claims and encounters. This database will support multi-year, multi-type

activity. Five years of data will be stored in this database, with more than 4.5 billion claims records. Development of the new database will address data extraction and query needs, update and maintenance procedures, backup approaches, navigation capabilities, and overall resource requirements. These capabilities will enhance HCFA's ability to manage the Medicare program.

Development of the online National Medicare Utilization Database will support several of the goals, objectives, and strategies outlined in HCFA's Strategic Plan. This effort supports HCFA's goal to be a leader in health care information resources management.

- ▶ PA-2: Enhance program safeguards
- ▶ PA-3: Maintain and improve HCFA's position as a prudent program administrator and an accountable steward of public funds
- ▶ PA-4: Increase public knowledge of the financing and delivery of health care
- ▶ PA-5: Improve HCFA's management of information systems/technology

The development of an NMUD will also indirectly support several other Strategic objectives:

- ▶ CS-3: Increase the usefulness of communications with beneficiaries
- ▶ CS-4: Increase the usefulness of communications with constituents, partners, and stakeholders

The costs that the Project Owner outlined in the OIS 285 Project Fact Sheet were used as the basis for this CBA, supplemented by the Project Owner's subsequent estimates of ongoing costs after implementation. To build this program, the efforts prior to year FY 2000 focus on the development of back-end data structures. In the years FY 2000 to FY 2002, continued back-end refinement and front-end user interface development and training will advance concurrently. FY 2003 and beyond are predominantly recurring costs for system administration, maintenance, and user training.

Financial Analysis Summary

Results	
PV Costs	\$15,266,487
PV Benefits	\$20,271,070
NPV	\$5,004,583
Benefit Cost Ratio	1.33:1

Accordingly, a positive NPV and BCR indicate that HCFA will realize a positive return on investment because the quantifiable benefits realized are greater than the costs of the project.

8. OIS 139 National Provider System (NPS)

The goal of the NPS is to create a provider identification system. The health care industry currently lacks a uniform, national standard for identifying health care providers. Many different systems are currently used to enumerate providers and maintain health care information. The development of the NPS supports HCFA's goal to foster excellence in the design and administration of HCFA's programs, and the goal to provide leadership in the broader public interest to improve health.

Although the primary impetus for the NPS is the HIPAA mandate, this project will support the GPRA:

- ▶ Goal MIP1: Reduce the Percentage of Improper Payments Made Under the Medicare Fee-for-Service Program

In addition, the NPS will support several of the goals, objectives, and strategies outlined in HCFA's Strategic Plan. The development of the NPS supports HCFA's goal to foster excellence in the design and administration of HCFA's programs, and the goal to provide leadership in the broader public interest to improve health. The following table presents the Strategic objectives that will be supported:

- ▶ QC-1: Improve health outcomes
- ▶ PA-5: Improve HCFA's management of information systems/technology

In addition to the quantifiable benefits used for the financial analysis, the NPS will also offer many non-quantifiable benefits. Non-quantifiable benefits, while difficult to measure, often provide significant value and should be seriously considered when evaluating a project such as this one. Non-quantifiable benefits associated with the NPS include increased security; more accurate, reliable, and useful data; more timely data exchange; and enhanced research capabilities. Another significant benefit that must be considered is the fulfillment of the Administrative Simplification Provisions of HIPAA. Without the NPS, health care providers, health plans, and health care clearinghouses would not be in compliance with this legislative mandate.

The majority of the costs for this project are dedicated to the registry development. The cost for the registry will begin in FY 2001. The remaining costs are associated with training, software development, and help desk initiatives. The following chart represents the summary of the CBA Team's findings.

Financial Analysis Summary

Results	
PV Costs	\$ 122,791,113
PV Benefits	\$1,038,412,502
NPV	\$ 915,621,390
Benefit Cost Ratio	8.46:1

Accordingly, a positive NPV and BCR indicate that HCFA will realize a positive return on investment because the quantifiable benefits realized are greater than the costs of the project. There are many intangible benefits no included in this calculation.

9. CMSO 37 Quality Improvement and Evaluation System (QIES)

HCFA's Quality Improvement & Evaluation System (QIES) project is a highly productive investment that will substantially improve both the quality of care and the cost effectiveness of services provided under the Medicare and Medicaid programs.

QIES is an information system that will collect provider and beneficiary-specific outcomes of care and performance data across a multitude of delivery sites (such as nursing homes, HHAs, ESRD, ICF/MRs, Rehabilitation and Long Term Care Hospitals, etc.) for use to improve the quality and cost effectiveness of services provided by the Medicare and Medicaid programs. QIES encompasses both the evolving National/State system of patient outcome assessment data, and a redesigned and expanded Online, Survey, Certification, and Reporting (OSCAR) system, which is being rebuilt using newer technologies and functionality and expanded to include important information on Federal oversight surveys (FMS and FOSS), enforcement data, and to fully support the Administrator's Nursing Home initiative. QIES will provide:

- ▶ data that will enable State Survey agencies to enhance on-site inspections as well as to monitor facility performance on an ongoing basis,
- ▶ information to support provider quality improvement activities and for beneficiaries and their families, and purchasers, to use when making health care facility choices,
- ▶ data necessary for developing and implementing case-mix based prospective payment systems for both Medicare and Medicaid,
- ▶ data required for assessing the appropriateness of services provided under case mix payment systems,
- ▶ critical information that will be needed in a post-acute care payment system,
- ▶ information to facilitate the development of clinical best practices and the establishment of coverage policy, and

- ▶ other information important to the effective implementation of HCFA's quality improvement strategy.

A major advantage of the QIES system is that it will allow HCFA to integrate its two quality improvement agents, the State Survey Agencies and the Peer Review Organizations (PROs). QIES will consist of databases housed in the States and HCFA with direct access for PROs through the wide area network already established as part of the PRO Standard Data Processing System (SDPS). Data produced by QIES will also be used by Medicare contractors in the fulfillment of their responsibilities for case mix payment systems.

The following table presents the Strategic objectives that will be directly supported:

- ▶ QC-1: Improve health outcomes
- ▶ QC-3: Protect beneficiaries from substandard care
- ▶ PA-3: Maintain and improve HCFA's position as a prudent program administrator and an accountable steward of public funds
- ▶ PA-5: Improve HCFA's management of information systems/technology

The cost information for QIES is based on historical experience, given that the project has been underway for over two years. A high degree of confidence can be placed in the estimates of future expenditures based on the project's experience to date.

Financial Analysis Summary	
Results	
PV Costs	\$ 38,600,000
PV Benefits	\$8,650,000,000
NPV	\$8,611,400,000
Benefit Cost Ratio	224:1

Accordingly, a positive NPV and BCR indicate that HCFA will realize a positive return on investment because the quantifiable benefits realized are greater than the costs of the project.

10. CBS 106 PlanID

Currently, there is no comprehensive system for the enumeration of health plans. A host of organizations maintain distinct identification systems resulting in a mesh of incomplete and overlapping enumeration schemes. The lack of a standard identifier for the health care industry has proven costly, both in terms of time and money, due to the resulting delays in the coordination of benefits and errors in the routing of health care claims.

The PlanID project (formerly □PAYERID□) will establish a national numbering system for unique identification of health plans. Each registered plan will receive a 10-digit identifier for use in electronic health care transactions. The numbers and information pertaining to the health plans will be stored in and accessible from the PlanID database, initially maintained by HCFA. Health plans, providers, billers, clearinghouses, and the public will be able to obtain this information in the form of print or electronic media. This system will allow greater accuracy and efficiency in the transmission of electronic claims and other health care transactions.

Title II of the Health Insurance Portability and Accountability Act of 1996 (HIPAA) mandates the establishment of a standard identifier for health plans. The Secretary of the Department of Health and Human Services is proposing that PlanID be adopted as the standard identifier in the Final Rule, scheduled to be published by May 2001. All health plans must be enumerated within two years of the promulgation of this Final Rule (small health plans were granted an additional year to attain compliance with the legislation).

This statutory requirement, however, is not the sole driving force behind the decision to implement this Strategic Plan. In fact, HCFA initiated the development of a unique health plan identifier in 1994, prior to the promulgation of the HIPAA, as the expected benefits associated with the implementation of this project aligned closely with GPRA and a host of HCFA's Strategic goal.

- ▶ MIP1-01: Reduce the percentage of improper payments made under the Medicare Fee-for-Service program.

The following lists the Strategic objectives that will be supported with the implementation of this project:

- ▶ PA-2: Enhance program safeguards
- ▶ PA-5: Improve HCFA's management of information systems/technology

Direct Costs were estimated over a seven-year planning horizon, beginning in FY 1999 and extending through FY 2005. The costs outlined in CBS 106 Project Fact Sheet were used as the basis for this CBA. The project owner was consulted on several occasions to discuss the foundations for the cost estimates and to clarify the development of these estimates and the predicted timing of expenditures.

Financial Analysis Summary

Results	
PV Costs	\$28,774,400
PV Benefits	\$208,041,524
NPV	\$179,297,125
Benefit Cost Ratio	7.23:1

Accordingly, a positive NPV and BCR indicate that HCFA will realize a positive return on investment because the quantifiable benefits realized are greater than the costs of the project.

11. CBS 143 Telephone Customer Service Strategy

The goal of this project is to continuously improve Medicare customer satisfaction through the delivery of high-quality and cost-effective service. Currently, HCFA provides a wide range of telephone services to its customers through a patchwork of call centers operated by program-specific contractors and agents. The Telephone Customer Service Strategy contains ten initiatives that will improve telephone customer service and reduce operating costs by consolidating call centers, linking sites, consolidating and optimizing toll-free lines, and establishing performance standards.

The Telephone Customer Service Strategy will support several of the goals, objectives, and strategies outlined in the HCFA Strategic Plan.

- ▶ CS-1: Improve beneficiary satisfaction with programs, services and care
- ▶ CS-4: Increase the usefulness of communications with constituents, partners, and stakeholders
- ▶ PA-3: Maintain and improve HCFA's position as a prudent program administrator and an accountable steward of public funds
- ▶ PA-5: Improve HCFA's management of information systems/technology

The Telephone Customer Service Strategy will also support the following legislation: 42 USC 1395; Section 1882.[42 USC 1395ss] of the Social Security Act; Section 1889 of the Omnibus Budget Reconciliation Act of 1990 and Section 1842 of the Social Security Act; Use of Carriers for the Administration of Medicare Benefits; Section 4001 of the Balanced Budget Act of 1997; and Executive Order 12862; Setting Customer Service Standards.

The costs outlined in the CBS 143 Project Fact Sheet were used as the basis for this CBA. The major costs involved in this project are associated with Telecommunications (FTS 2001), Program Management, the Medicare Customer Service Center, and the three phases of the Telephone Customer Service Strategy.

Financial Analysis Summary

Results	
PV Costs	\$298,977,271
PV Benefits	\$308,568,681
NPV	\$9,591,410
Benefit Cost Ratio	1.03:1

Accordingly, a positive NPV and BCR indicate that HCFA will realize a positive return on investment because the quantifiable benefits realized are greater than the costs of the project.

12. OIS 407 Medicare Managed Care Systems (MMCS) Redesign

The MMCS Redesign project has undergone review by OMB. The following includes the same information as for the projects above, but also additional detailed information about this project in the format of the eight Raines □ Rules questions.

SUPPORT MISSION: Support core/priority mission functions that need to be performed by the Federal Government.

The Health Care Financing Administration (HCFA) is the federal Agency charged with administering the Medicare and Medicaid programs. Medicare is a national health insurance program for people age 65 and over, persons eligible for social security disability payments for more than two years, certain workers with End Stage Renal Disease, and the dependents of those workers. The Medicare program is comprised of fee-for-service and managed care; the latter for beneficiaries enrolled in managed care organizations (MCOs).

The basic operational functions associated with the Medicare managed care program-- enrollment, beneficiary payment calculation, MCO payment, reconsideration/appeals of MCO-denied benefits--are supported by the Group Health Plan (GHP) system. The major subsystems of GHP are:

1. Plan Information and Control System (PICS) -- main repository of all MCO data.
2. Group Health Plan/Managed Care Option Information (GHP/MCCOY) -- the major component of the Managed Care System. It tracks enrollees and calculates all payments and adjustments.
3. Automated Plan Payment (APPS) -- the accounting package. This system tracks summary plan payments.
4. Reconsideration Case Tracking System (RECON) □ tracks reconsideration benefit appeals of MCO denied services.

The GHP processes nearly \$3 billion in payments each month making it the largest operational payment system running in the HCFA data center. It was developed over 10 years ago and was designed to service a much smaller base (about 20 percent) of managed care plans and enrollees than it currently services. In June 1998, GHP serviced payments for a record 6.9 million beneficiaries. By CY 2001, this number is expected to reach 8.5 million beneficiaries; and by CY 2004, it is expected to reach 10.3 million beneficiaries.

NO ALTERNATIVE SOURCE: Be undertaken by the requesting Agency because no alternative private sector or governmental source can efficiently support the function.

Unlike the Medicare fee-for-service program, where there is an extensive existing private sector industry engaged in the processing and payment of health care claims, there is no current private sector or other governmental source that could efficiently support the Medicare managed care enrollment and payment functions. However, we currently make extensive use of private sector contractors to support these functions: contractor staff to maintain the current GHP system, and contractor staff to operate the HCFA data center where the GHP system is run. In addition, we are proposing to use private sector contractors to support the development and implementation of the managed care system redesign.

WORK PROCESS REENGINEERING: Support work processes that have been simplified or otherwise redesigned to reduce costs, improve effectiveness, and make maximum use of commercial, off-the-shelf technology.

There continues to be healthy growth in Medicare beneficiary enrollment in managed care plans, as well as a concomitant increase in the number of transactions that must be supported by the GHP system. Consequently, we are making significant new demands (including those resulting from the Balanced Budget Act) on these systems:

- ▶ for payment calculation purposes, such as risk adjustors;
- ▶ for purposes of providing information to beneficiaries for making enrollment choices; and
- ▶ for purposes of extracting information for our oversight of MCOs.

Several provisions of BBA will also create additional transaction stress on GHP: retroactive adjustments associated with risk adjustors; and an open enrollment period. Given the mission-critical nature of the GHP systems, and these massive new demands and stresses on the system, we conducted (under contract) a series of analyses to:

1. determine whether the systems were at imminent risk of failure (current state analysis);

2. determine whether the systems could address HCFA's current and future business requirements (future state/gap analysis); and
3. if a systems redesign is required, identify feasible redesign alternatives.

Current State Analysis: The contractor analysis determined that, as a result of technology changes that HCFA had implemented, the current system was not at imminent risk (next 3-4 years) of failure assuming current functionality and growth projections. However, the contractor emphasized that the transaction stresses mentioned above would pose particular threats to the system's continued operation. In addition, the current GHP system is a Model 204-based system. M204 programmers are increasingly in short supply. M204 also imposes certain limitations on the structure and functioning of the system. The current system would, therefore, become increasingly expensive to maintain and operate.

Future State/Gap Analysis: The contractor determined that the technology changes implemented to stabilize the current operating environment were a short-term solution only: inherent design flaws in the existing system, as well as the new business demands (particularly resulting from BBA), prohibit this alternative (i.e., modification of the existing GHP system) from being a long-term, cost-effective solution.

Alternatives Analysis: The contractor developed three redesign alternatives for HCFA's consideration, ensuring that each of the alternative met specific criteria imposed by HCFA, including:

- ▶ The alternatives must be incremental--in distinct modules or phases.
- ▶ The alternatives must be consistent with HCFA's IT architecture: policies, standards, and vision.
- ▶ The alternatives must meet the managed care business requirements, including providing the flexibility to meet future needs.

The contractor also identified the preferred solution using a set of scoring criteria that included the following: the selected alternative must be the most cost effective and involve the least risk to the Agency.

The preferred redesign option meets HCFA's managed care business requirements, is an incremental/phased approach, was the most cost-effective and involved the least risk among the three alternatives. An independent cost-benefit analysis has been conducted by Price-Waterhouse-Cooper, with a very favorable return on investment ratio.

While it is unlikely that any single COTS product will meet the requirements for MMCS, we will be requiring the contractors engaged in designing and developing the technical solutions to develop these solutions so as to be able to make maximum use of available COTS products to support the solution. Examples include COTS products

for data abstraction; on-line analytic processing; web-technology reporting systems for report creation, distribution and viewing; software development; and security.

BUSINESS CASE ANALYSIS: Demonstrate a projected return on the investment that is clearly equal to or better than alternative uses of available public resources.

As stated above the alternatives analysis contractor was required to identify the preferred solution using a set of scoring criteria that included the following: the selected alternative must be the most cost effective and involve the least risk to the Agency.

The preferred redesign option meets HCFA's managed care business requirements, is an incremental/phased approach, was the most cost-effective and involved the least risk among the three alternatives. An independent cost-benefit analysis has been conducted by Price-Waterhouse-Cooper, with a very favorable return on investment ratio. A summary of that analysis follows.

Financial Analysis Summary	
Results	
PV Costs	\$32,829,514
PV Benefits	\$23,577,295,000
NPV	\$23,544,465,486
Benefit Cost Ratio	717:1

The return on investment for the managed care system redesign effort is significant. In nominal dollars, the return at the end of FY 2005 is more than \$33.3 billion. In real dollars, this amount is in excess of \$23.5 billion. [NOTE: This assumes that the current systems, if not redesigned, are at risk of failure. This would be a mission critical failure, jeopardizing the payments to all managed care organizations.] If HCFA assumes that the present system can indefinitely absorb growth, and that only process and payment improvements will be realized, the nominal return is still more than \$38.1 million by the end of FY 2005. In real dollars, that equates to a savings of \$19.8 million.

CONSISTENT WITH IT ARCHITECTURES: Be consistent with Federal, Agency, and bureau information architectures which: integrate Agency work processes and information flows with technology to achieve the Agency's strategic goals; etc.

The development of the Medicare managed care system redesign is one of the major components of the implementation of the HCFA Information-Centric IT Model.

HCFA has developed a technical review process to ensure that IT investments are consistent with the Agency's IT architecture. In the high-level alternatives design completed by the alternatives analysis contractor, however, the contractor was required to develop three redesign alternatives for HCFA that were consistent with HCFA's IT architecture: policies, standards, and vision. The selected alternative is consistent, with specific areas of the architecture being identified as relevant for this project: security, web technology, software component technology, report generation, and data warehouse. The HCFA IT Architect Staff has been involved in this project, and will continue to be part of the project team as the project moves forward.

REDUCE RISK: Reduce risk by--avoiding or isolating custom-designed components to minimize the potential adverse consequences on the overall project; using fully tested pilots, simulations, or prototype implementations before going to production; establishing clear measures and accountability for project progress; and securing substantial involvement and buy-in throughout the project from the program officials who will use the system.

There are five specific strategies that we are employing to reduce and manage the risk associated with this investment.

1. Modular Contracting: This project will be developed in distinct phases, with separate contracting efforts for each of the phases. The alternative analysis contractor was tasked with developing three feasible alternatives, each of which was to be modular, with distinct phases or "chunks." The selected alternative provides the most cost-effective, and least risky approach to meet the business requirements, in that it
 - ▶ minimizes the need to develop complicated (and throw away) interfaces between legacy systems and new systems, and modifications to the legacy system;
 - ▶ has the least reliance on the availability of scarce M204 programmer expertise for success of the project; and
 - ▶ is most responsive to the requirement that each chunk solve a specific part of the overall mission problem and delivers a net benefit independent of future chunks. The current GHP system supports both beneficiary enrollment and beneficiary payment business functions. The code supporting these functions is complexly intertwined, making the task of redesigning the code supporting one module separately (in a distinct phase) from redesigning the code supporting the other module a complex, costly and risky prospect. Separating the beneficiary enrollment module from the beneficiary payment module and proceeding with the beneficiary enrollment first, would create a tenuous patchwork of code following completion of the beneficiary enrollment module: the old code for the beneficiary payment module being antiquated M204 (not part of HCFA's future IT architecture) and the new code for the redesigned beneficiary enrollment module being

DB2. This patchwork situation would be acceptable on a transitional basis at best, thus not making these two phases truly independent of each other. In addition, there would be substantial effort and cost required to develop and test interfaces and bridge software between the M204 and DB2 environments. The selected alternative, by jointly redesigning the code of these currently intertwined systems, would provide a net benefit to the Agency, irrespective of the systems redesign efforts included in other phases/chunks.

2. Performance-based Contracting: We fully intend to establish clear measures and accountability for project progress through the use of performance-based contracting. We are currently finalizing the specific acquisition strategy. Some examples of acquisition strategies that we have discussed include: incentive payments for the successful accomplishment of work modules--as assessed against both quality and schedule measures--as well as penalties for work modules that fail quality or schedule measures. We would logically tie these measures to work units (or tasks) used for earned value management reporting (see below); these tasks would be drawn from the project plan established under the contract. However, the specific tasks or work units to which the financial incentives/ disincentives would be tied have not yet been identified.
3. Earned Value Management: In addition, we will be requiring contractors under this project to provide earned value management reports as part of their monthly performance reports. This analysis will allow HCFA to determine early on any variances in cost, schedule, and/or performance that have occurred; as well as the impact such variances might have on total project (contract) cost, schedule, or performance. HCFA will be able to make early management decisions about the contract and the project, thereby avoiding some of the problems encountered with earlier systems development projects.
4. Independent Verification and Validation: We are also involving an IV&V contractor in helping us oversee this project. We have already begun conversations with our IV&V contractor in the development of the statement of work; and will be using the contractor to assist in the evaluation of the software development capability of the contractors bidding on the MMCS redesign. We also plan to use the services of an IV&V contractor to assist us in the review of design deliverables and recommendations to ensure the technical quality of the deliverables and to provide assurances that the design recommendations developed by the systems development contractor represent the most effective solution to the Government. In addition, we plan on utilizing independent testing contractors to ensure, once the approved design recommendations are engineered and developed, that they are independently validated and certified as acceptable for integration and operation (a critical aspect of the performance-based contracting strategy discussed above). The value of utilizing an IV&V contractor

has been proven during our millennium compliancy effort, as well as from lessons learned from prior systems development efforts.

5. Buy-in and Involvement of Program Officials: To oversee the MMCS Redesign project, we have created the Medicare Managed Care Systems Core Team (□Core Team□). This Core Team is comprised of the senior leadership and staff of the major business components (including our regional offices) whose requirements the system must address. In addition, the project team established to manage the project include appropriate staff from these business components.

MODULAR CONTRACTING: Be implemented in phased, successive chunks as narrow in scope and brief in duration as practicable, each of which solves a specific part of an overall mission problem and delivers a measurable net benefit independent of future chunks.

As discussed above, this investment will be developed in distinct phases, with separate contracting efforts for each of the phases. The alternative analysis contractor was tasked with developing three feasible alternatives, each of which was to be modular, with distinct phases or chunks. The selected alternative provides the most cost-effective, and least risky approach to meet the business requirements, in that it

- ▶ minimizes the need to develop complicated (and throw away) interfaces between legacy systems and new systems, and modifications to the legacy system;
- ▶ has the least reliance on the availability of scarce M204 programmer expertise for success of the project; and
- ▶ is most responsive to the requirement that each chunk solve a specific part of the overall mission problem and delivers a net benefit independent of future chunks. The current GHP system supports both beneficiary enrollment and beneficiary payment business functions. The code supporting these functions is complexly intertwined, making the task of redesigning the code supporting one module separately (in a distinct phase) from redesigning the code supporting the other module a complex, costly and risky prospect. Separating the beneficiary enrollment module from the beneficiary payment module and proceeding with the beneficiary enrollment first, would create a tenuous patchwork of code following completion of the beneficiary enrollment module: the old code for the beneficiary payment module being antiquated M204 (not part of HCFA's future IT architecture) and the new code for the redesigned beneficiary enrollment module being DB2. This patchwork situation would be acceptable on a transitional basis at best, thus not making these two phases truly independent of each other. In addition, there would be substantial effort and cost required to develop and test interfaces and bridge software between the M204 and DB2 environments. The selected alternative, by jointly redesigning the code of

these currently intertwined systems, would provide a net benefit to the Agency, irrespective of the systems redesign efforts included in other phases/chunks.

RISK SHARING: Employ an acquisition strategy that appropriately allocates risk between government and contractor, effectively uses competition, ties contract payments to accomplishments, and takes maximum advantage of commercial technology.

As discussed above, we intend to use a performance-based contracting approach in this project, which will establish clear measures and accountability for project progress. We are currently finalizing the specific acquisition strategy. Some examples of acquisition strategies that we have discussed include: incentive payments for the successful accomplishment of work modules--as assessed against both quality and schedule measures--as well as penalties for work modules that fail quality or schedule measures. We would logically tie these measures to work units (or tasks) used for earned value management reporting (see below); these tasks would be drawn from the project plan established under the contract. However, the specific tasks or work units to which the financial incentives/disincentives would be tied have not yet been identified. In addition, we will be requiring contractors under this project to provide earned value management reports as part of their monthly performance reports. This analysis will allow HCFA to determine early on any variances in cost, schedule, and/or performance that have occurred; as well as the impact such variances might have on total project (contract) cost, schedule, or performance. HCFA will be able to make early management decisions about the contract and the project, thereby avoiding some of the problems encountered with earlier systems development projects.

Strategic Objectives

The following lists a number of HCFA's Strategic objectives and corresponding functional categories that will be supported with the implementation of this project. Each functional category is paired with an explanation of how this project will support the Strategic objectives.

Quality of Care

QC-1: Improve Health Outcomes

- ▶ Make quality-oriented payment and coverage policy decisions based on the best available evidence available.
- ▶ Take aggressive actions to remove barriers that prevent achievement of specific outcome priorities.

QC-2: Improving access to services for undeserved and vulnerable beneficiary populations

- ▶ Improve surveillance tools used to identify potential access problems among underserved and vulnerable populations.

QC-3: Protect beneficiaries from sub-standard care

- ▶ Develop appropriate performance measures and uniform data collection and reporting to support performance evaluation.

Program Administration

PA-2: Enhance program safeguards

- ▶ Take aggressive action to minimize waste, fraud, abuse, and error in the administration of HCFA's programs.
- ▶ Provide effective financial oversight of HCFA programs.

PA-3: Maintain and improve HCFA's position as a prudent program administrator and an accountable steward of public funds

- ▶ Develop, test, and implement flexible and innovative approaches to purchasing health care services, including implementing the prospective payment system and risk adjustment authorized by the Balanced Budget Act of 1997.
- ▶ Ensure that provider and plan payment schedules and rates accurately reflect the appropriate payment for services rendered.

PA-5: Improve HCFA's management of information systems/technology

- ▶ Develop and implement cost-effective strategies for data collection, storage, transmission, management, security, and privacy.
- ▶ Exercise leadership in health care data management and utilization.

Customer Service

CS-3: Increase the usefulness of communications with beneficiaries

- ▶ Provide easy access to information in a clear, culturally, and linguistically competent manner and in a variety of formats that recognize the needs of the diverse populations we serve.

CS-4: Increase the usefulness of communications with constituents, partners, and stakeholders

- ▶ Provide health plans and providers, contractors, States, and other partners timely, accurate, and complete information and other necessary assistance to support their work in service to HCFA program beneficiaries.
- ▶ Formulate communication strategies to meet the needs of the public and evaluate the effectiveness of those strategies.
- ▶ Establish communication standards to ensure timely and consistent access to comparative information on HCFA programs and health delivery system options.

- ▶ Apply technological innovations as a means to reach our constituents, partners, and stakeholders.
- ▶ Establish mechanisms to increase the usefulness of HCFA's Internet home page through activities such as expanding content and establishing additional links from other sites.

D. INFORMATION TECHNOLOGY ARCHITECTURE

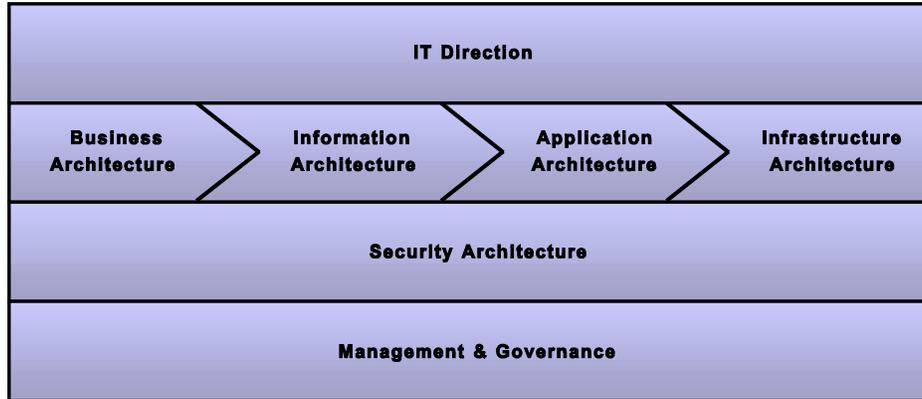
HCFA has developed an enterprise-wide Information Technology Architecture (ITA) pursuant to mandates of the Clinger-Cohen Act and guidelines spelled out in OMB Memorandums 97-02 and 97-16. Our ITA describes of the relationships among business processes, management processes, and information technology, and proposes a strategic context for the ITA's continuing evolution. An Information Technology Architecture Staff that reports directly to the CIO was established to spearhead our ITA development and planning efforts. The Chief Architect heads this ITA Staff and is charged principally with planning, organizing, and coordinating with HCFA business and IT resource managers to achieve the strategic vision for HCFA's IT environment.

Achieving the vision of our CIO presents a momentous change to HCFA's legacy application systems environment, organizational management, and IT culture. The issues and implications of the gaps in Flexibility and Availability, Performance, Security, and Maintenance discussed in the IT Vision, must be factored into our planning. The results of our analysis will enable us to formulate appropriate IT strategies and project plans to fill current gaps, identify opportunities to meet future information needs with IT solutions, and develop appropriate metrics to measure and evaluate our progress. As business needs evolve and change, our ongoing analysis and assessments of performance and outcomes will permit tactical and strategic corrections to our approach, thereby ensuring that IT solutions are continually re-aligned and responsive to HCFA's business goals.

Our strategic vision, as illustrated in the sunflower model of an information-centric ITA, offers a cogent conceptual view that conveys how HCFA's IT assets can be realigned to enhance support of current business functions and better meet future needs. Based upon this vision, we have formulated a set of guiding design principles, an architectural framework, and an integrated enterprise ITA (comprised of a business architecture, information architecture, application architecture, infrastructure architecture, and security architecture). The completed ITA consists of an inventory of our "as-is" infrastructure (operating system hardware platforms, networks, custom and COTS applications software, middleware, and databases); a target architecture detailing relevant sub-components, infrastructure and interfaces; and a set of policies and standards for inter-operability, data sharing, asset management, and technology evolution.

1. Overview of the ITA Model

The HCFA Information Technology Architecture (ITA) is fully compliant with the guidance in OMB Directive M-97-16 and with the Federal Enterprise Architecture Framework, Version 1.1 that was published in September 1999. The following model captures, in a simplistic representation, the essence of an ITA driven by business and information needs.



2. ITA Components

The target ITA is composed of six distinct, but interrelated, structural components - the IT Direction, Business Architecture, Information Architecture, Application Architecture, Infrastructure Architecture, and Security Architecture. As a whole, these components form an integrated enterprise architecture designed to align IT with HCFA's current and strategic business goals. To oversee the implementation of these components, HCFA adopted a management and governance approach to integrate the architectural concepts, policies, and standards guidance into HCFA's everyday IT decision-making.

a. IT Direction

IT Direction comprises the Agency's Business Objectives, IT Vision, IT Objectives, and IT Guiding Principles, which collectively provide direction to the IT organization in fulfilling the technology mission that supports the business goals. The IT Direction articulates how technology supports the business. This articulation is information/communication/education to the business, which the business can accept or modify. It opens dialogue with the business components and is used to facilitate the partnership relationship that is critical between the business and IT organizations.

b. Business Architecture

The Business Architecture describes the state of HCFA's business from an enterprise-wide perspective. It represents the functions and processes that support the business, the organizations that perform the business, the locations where the business is performed, and the factors that could cause the business to change. For any enterprise architecture effort to be successful, it must be linked to the business direction of the organization. The Business Architecture shows this linkage. The Business Architecture serves as the knowledge base for the ITA, helping tie the business of the organization to its IT by defining what, where, by whom, and why HCFA's business is performed. In addition to serving as the foundation for the ITA, the Business Architecture serves as a stimulus for developing detailed business, budget, and contingency plans for HCFA. It can also be used in performing impact analyses when adapting to changing business needs, and in conducting broad-based reorganizations.

c. Information Architecture

The Information Architecture identifies the major types of information needed to support the business functions defined in the Business Architecture. It links information behavior, information management processes, and information support staff to other aspects of the HCFA enterprise, such as business processes, organizational structure, and physical location. It also aids in matching information requirements with information resources. The Information Architecture is an essential ITA component, as it promotes an integrated view of HCFA's enterprise information and data resources, and provides the framework for identifying, developing, and evaluating policy needed to effectively manage and protect those resources. It promotes a common vocabulary for discussing and understanding HCFA's information usage and future needs; identifies HCFA's data and information assets and their means of access; and facilitates an environment in which technology enables the transformation of data and information into business knowledge.

d. Application Architecture

The Application Architecture guides the design and development of business applications that provide enterprise information access. It identifies the policies, standards, and preferred tools for application development. The Application Architecture defines how applications are designed, how they cooperate with one another, and where they reside within the hardware, software, and communications network infrastructure. It recommends the orderly grouping of applications around the business processes they support and the data and information they maintain. The Application Architecture provides a conceptual view of the preferred logical components of an application, and offers specific design guidance in the

development of these components in order to create adaptable applications that are "componentized," service oriented, and can easily be integrated to work in a cooperative fashion under a distributed processing, client/server design model. Applications that are modular in scope enable HCFA to quickly adapt its information systems in response to changes in business requirements, operational needs, or technology. The Application Architecture guides HCFA's move toward an IT environment whereby applications are more adaptable to change, the maintenance of applications is less burdensome (consumes fewer resources), and more IT resources are available for new development in response to changing business needs. It defines boundaries for application development, promotes the sharing and reuse of software, optimizes the utilization of the platform infrastructure, and identifies specialized programmer roles.

e. Infrastructure Architecture

The Infrastructure Architecture identifies and describes the hardware, software, and communications network technologies required to manage business applications throughout HCFA's enterprise. It is driven by the Technical Reference Model, which provides a taxonomy for organizing and describing technologies to be used within HCFA's enterprise for the design and development of information systems. It also identifies policies and standards for deploying the hardware, software, and network technologies required to support HCFA's business applications. The Infrastructure Architecture establishes enterprise standards for all technologies used for applications development/deployment and information access within HCFA. Management and technology policies and standards allow HCFA to manage the insertion of new technology and the retirement of obsolete technology within the infrastructure, and to leverage the use of technology to maximize its benefits, contain costs, and better control its technology destiny.

f. Security Architecture

The Security Architecture identifies and defines the major security services that are needed to protect the enterprise business functions and processes, information, and application systems defined in the HCFA ITA. It provides a high-level framework within which to identify enterprise security policies and manage the distribution, use, and administration of security services throughout the enterprise. The Security Architecture helps to ensure the implementation of an enterprise-wide approach to security within the design, development, deployment, and use of information, applications, and infrastructure throughout HCFA in a manner consistent with Federal policies and guidelines.

g. Management and Governance

Governance provides a formal process for defining who has the power to make technology decisions and how those decisions should be made. It addresses the problem of decision-making in an environment where IT responsibilities are decentralized, and it deals with the processes needed to manage both the acceptance of the architecture and follow-up assessments and planning. A governance structure determines the responsibilities of the various parties involved in IT decision-making and includes a framework for resolving disputes. It balances the common good and individual liberty by defining what is of central importance and what is local. Adherence to this principle will enable HCFA to share responsibility for the deployment, operations, and management of technology with all components and stakeholders. It will also ensure business unit participation in evaluating and making IT investment decisions using consistent criteria and will maximize the use of IT resources across the enterprise.

One of the main functions of the HCFA ITA, in fact, is the support of the IT investment review process by providing an architectural framework against which all IT projects can be evaluated. The governance process implemented in late FY1999, provides HCFA staff with the policies, procedures, and tools needed to make sound IT purchase and development decisions for the future. Around the same time, the HCFA IT Council was established to oversee the governance process. The Council consists of one representative from each HCFA Center, Office, and Consortia and is chaired by the Deputy CIO.

3. Future Paths

After the establishment of this Target Architecture, HCFA embarked on the development of a Migration Strategy to move the Agency from its current IT environment to the target environment. The Migration Strategy that is being implemented creates an IT environment that is more responsive to the demands of changing business needs, able to store and manipulate dramatically larger volumes of data; adopts to new and more efficient technologies with minimal disruption; and provides adequate technology for administering new HCFA programs. In addition, as business drivers for the Agency change, so does HCFA's target architecture; therefore, as part of governance and the Migration Strategy, HCFA has established an ITA "evergreening" process to continuously update its target IT environment, as needed.

Migrating from HCFA's current systems environment and infrastructure to the target ITA will necessitate detailed implementation planning, coordination, and diligence in execution to ensure success. This migration will be phased in over a multi-year time horizon, based upon an evolutionary implementation plan. We recognize that implementing a target ITA is an evolutionary process, and we must continually balance conflicts that will inevitably arise between meeting on-going business needs with

immediate technology solutions in the current environment and our long-term ITA goals. It will be important for HCFA to make short-term investments in activities that sustain current operations at acceptable levels (e.g., legislative mandates), while pursuing our architectural goals concurrently. Guiding principles have been established to help us make decisions about the necessary trade-offs and compromises when faced with mitigating circumstances, permitting forward progress toward our target ITA.

Implementation efforts will focus initially on strategic business needs that can benefit from developing integrated databases that reside within an inner-core. A common interface layer surrounding the managed database core will enable legacy applications to access the data using standardized, flexible, and reusable software modules designed specifically for this universal purpose. Improving program management and customer service are two key business areas that will potentially benefit from this approach. In the early stages of implementation, Medicare beneficiary data and information needs, have offered the best near-term opportunity for HCFA to prove this architectural concept.

Strategic and tactical planning of the business, technical, and organizational aspects of implementing an ITA has been ongoing throughout the ITA effort. No change occurs without risk, and change of the magnitude needed to fully implement an ITA is not without its share of risks to the business, the technical, the environment, and personnel. Deliberate and ongoing planning, analysis, execution, and evaluation of our effort using a phased approach to implementing our target ITA permits us to anticipate and manage risk. Our plans will be subject to continual refinement as we consider outcomes and implications of subsequent phases on our changing business and IT environment. Progress toward achieving our target environment, changes in our strategic outlook driven by dynamics in our business environment, and details of our tactical steps will be reflected in each annual submittal of our IRM Strategic Plan.

In addition to concerning ourselves with an Agency-wide ITA, we have had to consider how our ITA aligns with that of the Department. To this end, through participation on the Department-wide Information Technology Architecture Group (ITAG), we have continued a dialog with other OPDIVs throughout HHS. The ITAG is a cross-OPDIV working group which provides a cooperative forum for collecting, analyzing, and prioritizing HHS ITA requirements; developing a Department-level ITA; and acting as a sounding board for ideas that assist the OPDIVs in ITA-related future planning and provides feedback on issues and concerns. The objectives of the ITAG are to enhance interoperability of shared business processes across OPDIVs, facilitate both internal and external communications, and increase standardization.

4. National Health Care EDI Standards and Identifiers

The Health Insurance Portability and Accountability Act of 1996 requires HCFA to adopt national EDI standards for health care transactions (claims, remittance advices, eligibility inquiries and responses, claims status inquiries and responses, prior authorizations, and attachments) and national identifiers for health plans, employers, and providers. These standards must be used by all health plans and providers in the country, including the Medicare and Medicaid programs. These standards are expected to be officially adopted by late 1999 or early 2000; full implementation is required within two years. Our carriers and intermediaries must be capable of receiving and sending the standard transactions.

These standards will have a major impact on the systems for all health plans and providers because the standards not only mandate the format for the information being sent on health care transactions, but also mandate the content of the transactions. Health plans must re-engineer their systems to ensure that only the appropriate required data is captured and does not include data that is not required, such as local coding practices. In addition, a national provider identifier (NPI) will replace all of the proprietary identification systems now in use. While entities are refining their processing of electronic transactions, their parallel process for the paper transactions must also change. Medicaid State agencies and Medicare intermediaries and carriers will receive written instructions on how the standards should be implemented. In addition, we will conduct training in every Region to support understanding of the standards.

Both the Medicare and Medicaid programs are impacted by the EDI standards. HCFA has begun the process of identifying our internal systems and processes may be impacted by the standards, and are beginning the process of scheduling those changes. The impacts are widespread. All systems which contain provider identifiers must be refined to use the NPI. Our transactions with Medicare+Choice plans must use the standards. Our Common Working File must communicate with outside organizations using the standards and our National Claims History database and related systems must be revised to handle the new claims standards. Medicaid data systems resident at HCFA must be revised to handle the new claims standards. Any future system revisions of current systems and all new systems must be built with these standards in mind. Our IT Investment Review Process will include an analysis to assure that standards are followed.

HCFA is developing the systems which will assign the national provider identifier to all providers (the National Provider System and the National Provider Identifier) and the national plan identifier (PlanID) for all health plans. These systems are classified as major IT projects and were addressed in Section C, Capital Plans.

E. AUTOMATED INFORMATION SYSTEMS (AIS) SECURITY

To address vulnerabilities and risks identified from various audits and reviews, HCFA established an enterprise-wide Systems Security Initiative. Over a 3-year phase-in period, HCFA is increasing the intensity of its efforts to build an effective systems security management program. This includes the development and implementation of effective corrective actions to ensure that HCFA's data and data systems are not compromised. Also, a Security and Standards Group was established to provide centralized policy and oversight. In implementing the Initiative, there are four broad areas of focus: security policies and procedures; training, awareness, and security administration support; systems engineering; and oversight and management. Each area is a major component of the Initiative and has significant activities completed to date as well as planned for FY2000 and beyond.

1. Policy and Procedures

HCFA initiated the development of the HCFA Information Technology Reference (HITR), which will be the primary source for the Agency on information technology management. The HITR will include a security section that will contain an updated HCFA Systems Security Program Handbook. The Handbook will reflect changes in legislative, regulatory, and policy mandates, and address areas such as Internet and network systems security policy. Also, a draft version of HCFA's Security Plan Methodology was completed. The Methodology will emphasize the importance of system security planning throughout the information system development life cycle. The HITR and HCFA's System Security Plan Methodology will be completed in FY2000. Beyond FY2000, investment will be made at the maintenance and "evergreening" level.

2. Training and Administration

HCFA is developing a formal Information Systems Security Awareness and Training Program for all HCFA employees. The program will emphasize the need and requirement for confidentiality of Privacy Act protected information and will include: agency-wide training for all staff; senior management briefings; technical training classes; and ongoing training and support for all central and regional office Information Systems Security Officers. For FY2000 and later years, improvements in security administration begin to take effect within HCFA: implementation of centralized security administration, training of systems administrators and security officers, and annual mandatory security awareness training for all employees.

3. Systems Engineering

HCFA initiated development of its Security Architecture, which will be an integral part of the IT Architecture (discussed elsewhere in the IRM Plan). It will be developed in several phases and devoted to the identification of systems security standards and security services and mechanisms that are appropriate for HCFA's business and IT environment. Having this set of standards and services will result in the consistent and cost-effective implementation of safeguards for access to, and transmission and storage of, HCFA's sensitive information. For FY2000 and beyond, the development and implementation of the Security Architecture will continue. Legacy systems will be carefully examined to assess the return on investment and risk in migration. New technologies will be assessed for appropriateness, maturity, and interoperability. Once established, the Security Architecture itself will continue to evolve, driven by technology innovations and HCFA's mission needs. The constant goal of the Security Architecture is to enable HCFA to deploy information technology solutions with confidence.

4. Oversight and Management

This activity includes risk assessments, system security plans, security audits to manage performance, and the development and maintenance of incident detection and response capabilities, including those for disaster recovery. HCFA's strategy for performing oversight and management is to continually assess risk and take remedial actions as necessary. Risk assessments will identify and systematically examine the vulnerabilities and attendant risks existing in HCFA's enterprise security program. Specific remediation steps will be based on: assessment results; benchmarking to identify best practices; risk analyses of vulnerabilities to prioritize the highest-risk areas; and return-on-investment analyses to identify the most cost-effective solutions. Systems needing remediation as identified from the assessments will require new or updated system security plans from the system owners.

Because HCFA contracts with intermediaries and carriers (including Durable Medical Equipment Regional Carriers and Common Working File Hosts) throughout the country to process and pay claims for medical services rendered to Medicare beneficiaries, the security requirements that HCFA must meet also must be fulfilled by these contractors. As part of Oversight and Management under the SSI, HCFA will issue up-to-date security requirements and guidelines for Medicare contractors. HCFA will assure compliance through a series of security audits. The plan is for every intermediary and carrier to undergo a review at least every three years, with corrective actions being taken to obviate any security problems or deficiencies. HCFA plans to incorporate security oversight into its Medicare contractor performance evaluation efforts.

In FY 1999, HCFA-initiated reviews and CFO audits were completed. In addition, HCFA completed system security plans for its internal General Support Systems. Other recent activities have included IV&V review of system security plans for newly-developed internal HCFA systems, and analysis of security requirements under the Health Insurance Portability and Accountability Act. Because of the necessity for Y2K activities, there has been a moratorium on software and hardware changes during FY1999. In addition, remedial actions during the period were limited only to severe weaknesses and low-cost fixes.

Work in the Medicare contractor oversight area will increase in FY2000 and scale up in out years. HCFA will prioritize and initiate corrective/remedial actions, as well as assess return on investment. Beginning in FY 2000 and extending into later years, activities will include analysis of risks, support of internal and external audits, and establishment of an incident response capability (as required by Presidential Decision Directive #63 - Protection of the nation's critical information infrastructure)

F. PERFORMANCE MEASUREMENT AND EVALUATION PLAN (PMEP)

HCFA is in the process of implementing a Performance Measurement and Evaluation Plan (PMEP) that will be used to measure the efficiency and effectiveness improvements of all major IT investments. HCFA's long term goal is to fully implement Earned Value Management (EVM) for all major IT projects. EVM is an objective measurement of how much work has been accomplished on a project. Using the earned value process, a management team can readily compare how much work has actually been completed against the amount of work planned to be accomplished. At this time, full implementation of this process is not complete, but HCFA has taken a stepped approach to the full implementation of its PMEP. As a first step, we are instituting Performance Based Contracting (PBC), one of several elements of a mature EVM process, in a number of critical IT projects.

1. Earned Value Management

HCFA defines EVM as a management technique that relates resource planning to schedules and to technical cost and schedule requirements. All work is planned, budgeted, and scheduled in time-phased increments; constituting a cost and schedule measurement baseline. It not only compares budget and actual expenditures, but it also examines actual accomplishments. Actual accomplishment gives managers greater insight into potential risk areas. It also provides more accurate estimates for project completion costs. With this information managers and project owners are better able to plan risk mitigation for the completion of projects.

It provides managers with an early warning to identify and control problems before they become insurmountable. The EVM analysis will allow HCFA to determine early in the project level cycle any variances in cost, schedule, and/or performance that have occurred; as well as the impact such variances might have on total project (contract)

cost, schedule, or performance. HCFA will be able to make early management decisions about the direction of contract and the project, thereby avoiding some of the problems encountered with earlier systems development projects.

To support the development of the EVM system, HCFA has required that each major IT project be developed with the help of an Integrated Project Team (IPT). The team will be headed by a project owner with the appropriate skills and knowledge base to ensure the teams success. The remainder of the team should be cross-functional, as necessary, to accomplish the various tasks of the project. The members should reflect the user community, the project's stakeholders and should have a core of project management, value management, budget, finance, and procurement knowledge. Each with the objective that the project is directly linked to mission performance so that the needs of the program are accomplished.

To ensure that senior managers are aware of EVM performance across projects, an oversight process was developed. This process affords the Group Directors in OIS who are responsible for major projects the opportunity to meet monthly with the CIO to review the status performance objectives. The review process will help identify risks that would impede project performance.

For a number of critical IT projects, we began our acquisition process and discussions with contractors without the intent of using a traditional earned value reporting requirement. Based on the timing of the various types of contracts and the reporting requirements used to develop the Statement of Work and the Work Breakdown Structure, these projects were not intended to utilize traditional earned value reporting. We do not believe it is prudent to implement a rudimentary earned value reporting requirement to these projects at this point, primarily because of the level of detail of the Work Breakdown Structure and the agreement we currently have with the contractor. However, we will utilize sound performance indicators to measure project progress according to schedule, cost, and goals achieved. If possible at some future point in time, we will take advantage of opportunities to convert these projects to a traditional EVM reporting process.

2. Performance Based Contracting

Performance Based Contracting (PBC) requires structuring all aspects of an acquisition around the purpose of the work to be performed as opposed to how the work is to be performed or broad and imprecise statements of work. It emphasizes quantifiable, measurable performance requirements and quality standards in developing statements of work, selecting contractors, determining contract type, incentives, and performing contract administration, including surveillance. Once a contract is awarded, the IPT is expected to manage the contract to achieve, on average, at least 90 percent of the cost, schedule and performance goals. The contractor should use the performance-based EVM system described in the HCFA IT Investment Guide to manage the contract and

provide management information on the actual accomplishment of the goals compared to the baseline goals and cost throughout the acquisition life cycle.

3. Performance Measurement System

The main objective of a performance based system is to manage the project's status in terms of meeting the project schedule (budget versus actual costs) realization of benefits (quantifiable and non-quantifiable) along the critical path of this initiative. The following table is an example as the basis for a Performance Measurement Plan:

IT Investment	Measurement Tool
Project Schedule	Variance analysis of work scheduled and work performed
Project Costs	Variance analysis of budgeted cost of work scheduled and actual cost of work performed
Project Benefits	CFO Audits

HCFA is gradually implementing the performance based system described above. We are focusing our attention on working with project owners to write Statements of Work that are performance based, and we are training our contracting staff to encourage the use of performance metrics in all contracts when appropriate. In the future, when the initiatives are implemented, we will use these metrics to determine the success of the project. We have identified specific outcome performance metrics for the following major IT projects:

- ▶ Beneficiary Database Prototype
- ▶ Managed Care System Redesign
- ▶ PlanID
- ▶ Transition Legacy Systems
- ▶ Medicaid Statistical Information System
- ▶ National Provider System
- ▶ Medicare Contractor Systems Security Initiative and HCFA Internal Security Systems Initiative
- ▶ Telephone Customer Service
- ▶ National Medicare Utilization Database Conversion
- ▶ Quality Improvement and Evaluation System
- ▶ Risk Adjuster of Medicare

4. Earned Value Management (EVM) Project Proposal Clause Statement

As the Agency grows into full implementation, EVM will be required in all major IT acquisitions. At this time, two contracts incorporate particular EVM requirements, the Beneficiary Database Prototype and the Managed Care System Redesign contracts. The following is representative of the type of EVM documentation that will be required for all new major IT projects and is the exact clause in the two projects cited.

The government will use the EVM information to complete exhibit 300B of OMB Circular A-11, Part 3 to specify the baseline cost, schedule, and performance goals for this contract. As the contract progresses, the contractor shall include any variance from the baseline cost plus or minus 10 percent, and any variance from the scheduled work plus or minus 10 percent, and the corrective actions that the contractor will take to mitigate the risk.

The contractor shall identify in writing corrective actions that have been or will be taken if the current cost, schedule, or performance estimates have a variance of plus or minus 10 percent (or greater). The contractor shall also identify the effect the actions will have on cost, schedule, and performance; and explain how the project will be brought back within baseline goals or, if not, how and why the goals should be revised and whether the project is still cost beneficial and justified.

The government and contractor shall agree upon the exact format of the EVS within 30 calendar days after contract award. EVM reports are due each quarter (90 calendar days) after the report format is determined acceptable to the government, unless the government determines that another reporting schedule would more appropriately meet its needs.

The contractor will be required to submit the required information in a format that is compatible with the current HCFA IT Architecture.

The following are the proposed EVM terminology and product displays which will be delivered by the contractor on the predetermined reporting periods.