

Response to Solicitation Number 4TS-TT-01-0001:

DoD Information Environment (IE) for the High Performance Computing Modernization Program (HPCMP).

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Notation

In an effort to assist readers in associating responses with requirements and questions, responses directly follow respective questions. Throughout this document, RFP text appears with gray background and bars to the left of the text. Blue Angel responses appears in italic text:

■ RFP text format

Blue Angel Response text format

Summary

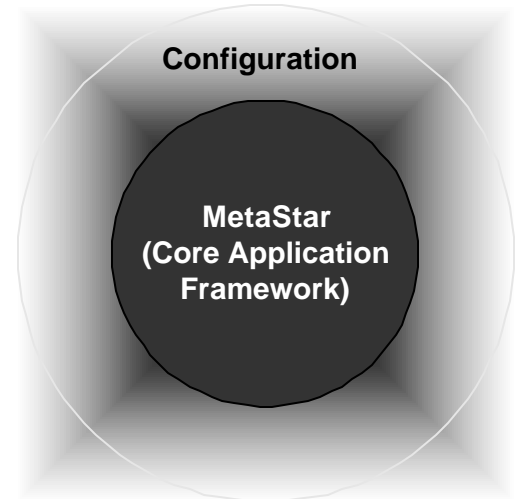
Blue Angel Technologies (BAT) is pleased to submit the attached proposal in response to Notice Concerning Solicitation, “DoD Information Environment (IE) for the High Performance Computing Modernization Program (DOD HPCMP)”. This response addresses all segments of the Notice Concerning Solicitation.

BAT’s core competency is delivering commercial off-the-shelf (COTS), standards-compliant solutions that facilitate the capture, organization, publishing, and discovery of quality information collections either within or between groups and organizations. BAT has a full suite of product components that operate individually as fully functioning, stand-alone applications, or, taken together can be used as an integrated solution so that the resulting solution is highly scalable. These products have been in the market since 1996 and used in operational environments throughout the world in numerous applications.

For this project, we are recommending the use of the MetaStar product suite as the solution. MetaStar is an advanced information clearinghouse that not only provides a highly sophisticated set of data management and discovery capabilities but also the ability to interface with other systems. As part of our response, BAT is pleased to offer services for bringing this project to an

operational state .We believe MetaStar is the only commercial off the shelf product capable of providing the necessary functionality to meet the DOD HPCMP requirements.

BAT's technical vision for the future is different from the way solutions were built in the past. In the past applications were constructed from the ground up, closely integrated, centralized, and proprietary. This approach took a long time and lots of resources. BAT envisions the future as being a distributed component based environment where application components communicate with each other through various standards based interfaces. Furthermore, it will be the norm rather than the exception whereby solutions will be comprised of solutions from a number of vendors into more powerful solutions than developed previously. It is through such a strategy that a number of substantial benefits can be achieved:



- **Rapid deployment:** *Since product components perform well-defined application level tasks, they can be configured to carry out designated corporate functions. Therefore, applications can be developed quickly.*
- **Cost Effective:** *Since applications will be comprised of multiple components, each requiring minimal configuration they can be deployed less expensively. Furthermore, due to configurability and a steady stream of upgrades, applications can be maintained for less.*
- **Adaptability:** *Due to the component nature of applications it will be easy to modify and potentially replace system components without replacing the entire system.*
- **Synergies:** *Since components will be communicating through standards based interfaces; it will be possible to establish application connectivity with other organizations in new and*

innovative ways. It is through such enhanced connections that organizations can focus on core competencies and outsource other functions without becoming leveraged by inflexible proprietary systems.

By utilizing a component architectural approach whereby the components communicate via open standards, MetaStar is able to meet a wide variety of information needs for different types of organizations. For example, The Department of Defense currently uses MetaStar within the Defense Technical Information Center (DTIC). DTIC was looking for a system that would allow Department of Defense (DoD) personnel and the public to easily locate all DoD information resources. However, DTIC was looking to replace their homespun system, as it was buggy, difficult to maintain, and in need of significant additional enhancements to meet the needs of the users so that users could not only search information but create and maintain it. They were looking for a way to allow military personnel to maintain their information (XML metadata) without introducing the normal plethora of clerks and system administrators usually required. Thus, they were looking for a solution that included automated workflow capabilities and was off-the-shelf. They were also looking for a solution that supported open-standards as a means of supporting future integrations with other legacy systems. With MetaStar, the DoD and Blue Angel Technologies were able to deploy an Internet application that included remote data entry and management, comprehensive workflow, support of international standards and simple or complex search and retrieval. This was all accomplished without programming changes and within the DoD's time requirements and budget restraints. The U.S. Department of the Interior utilizes MetaStar for their ECOOL application. ECOOL is a data entry and information discovery network that allows Department of the Interior Human Resource Managers to use the internet to capture resume information as well as discover qualified job seekers. ECOOL contains a sophisticated data entry and validation component similar to what is required in this RFP.

The Oak Ridge National Laboratory (ORNL) has scientists working globally gathering scientific information about the environment and earth's resources. The scientists frequently work in isolated locations and many do not have direct access to telephone, electricity, or the Internet.

The challenge that ORNL faced was cataloging scientist's information and making it both known and available so that the rest of the scientific community could quickly and easily discover and use it. Due to budget constraints, they also needed to find a cost-effective way of accomplishing these tasks.

ORNL also wished to implement a solution that could be scalable in the future so that other organizations and scientists could either contribute or search the distributed knowledge base. They wanted the cost for this system to be minimal both from a number of aspects including startup software and hardware costs in addition to the cost of ongoing operations and maintenance. In sum, MetaStar is a very cost-effective solution for constructing modern clearinghouses of information from potentially large numbers of sources and varied collections. By partnering with Blue Angel Technologies and utilizing MetaStar as the base platform on which to build their application, ORNL was able to quickly deploy a scalable internet application and put in place a sound internet architecture. The cost to ORNL to bring additional scientists and organizations into their community or application is minimal because the MetaStar platform is component based and no programming was necessary for deployment. New scientists simply need the data descriptions and access to a web server on which to post their research.

We feel that our experience in configuring the MetaStar software for use with these specific applications together with our extensive background in developing worldwide information sharing solutions, positions BAT to cost effectively deliver an IE for the DOD HPCMP community that not

only meets the requirements outlined in this RFP, but provides DOD HPCMP with a scalable application for deploying additional services in the future.

Proposed Solution

For background, the MetaStar suite of tools provides an open architecture meant to address each of the areas of information management: from data capture and management, to publication, discovery and eventual information use. Each tool operates independently through standards-based interfaces or as a component of an integrated information management system.

The goal of the MetaStar suite of tools is to enable information sharing using open standards within distributed environments. MetaStar includes support for a number of Internet standards, including but not limited to: XML (Extensible Markup Language), HTTP/HTML, SGML (Standard Generalized Markup Language), ISO23950 Search and Retrieval Protocol, HTML (Hypertext Transfer Protocol), FGDC (Federal Geospatial Data Committee), GILS (Government Information Locator Service), Dublin Core, etc.

BAT products consist of the following components:

- ***MetaStar Enterprise** integrates database, search engine and Web technologies in a single clearinghouse solution that provides real-time updating and indexing of information over the Web and makes the updated results immediately available for use. The product even provides built-in workflow functionality! Enterprise consists of the following components: (For purposes of this response, MetaStar Enterprise is referred to as “MetaStar”).*
 - ***MetaStar Repository** is an administrative tool for managing metadata records. Repository provides the ability to build, store, update, import, and export metadata in a variety of file formats (including XML). The tool accommodates repeating, hierarchical, and locally defined elements, and*

operates with third-party relational database management systems (e.g., Microsoft SQL, Oracle) using the ODBC industry standard interface. Repository's enables users to operate at the logical level while completely managing the underlying physical database – without programming.

- ***MetaStar Server** is used to make metadata available for searching and retrieval on the Internet or Intranet. MetaStar Server provides built-in support for publishing various data in XML form. The server is integrated with a number of popular off-the-shelf search engines (e.g., AltaVista, Fulcrum, etc.) and is configurable for both full-text and structured searches.*
- ***MetaStar Gateway** provides the ability to concurrently search one or more physically distributed servers with a single query and presents the search results to the user in a consistent and uniform manner. Gateway provides a Web-based query interface and customizable HTML templates and Java Server Pages for configuring both the query and search results pages. Gateway is implemented in Java and interfaces to most popular Web servers on UNIX, Windows NT, and Windows 2000.*
- ***MetaStar Data Entry** provides the ability for users to insert, delete, and update metadata records directly through desktop Web browser. Once entered, records can be configured to follow a workflow process before being automatically published to the Web. Data Entry is fully customizable through HTML templates and Java Server Pages. Data Entry is implemented in Java and interfaces to most popular Web servers on UNIX, Windows NT, and Windows 2000.*

As outlined in the Statement of Work, the goal of the IE is to provide the DOD HPCMP

gathering among DOD HPCMP associated sites, standardize data exchange and reporting and integrate data into a common information architecture. Together, the MetaStar components serve as the perfect platform to satisfy this goal and on which to develop the IE for the DOD HPCMP. Furthermore, BAT has extensive experience in partnering with other government organizations to deploy scalable, secure information sharing applications.

MetaStar will serve as the central platform (IE) for bringing together the distributed data and users of the DOD HPCMP community. Paramount to the IE is dynamically gathering and updating relevant information from the various High Performance Computers (HPCs). BAT proposes to update this information through a direct database connection from the HPC to a relational database (Oracle recommended) managed within MetaStar. MetaStar Event (i.e., a component interface within MetaStar) will update a specific table within the Oracle database with the specific elements as defined in the Solicitation. This update will take place either upon an event occurring, such as start/end of a job or at fixed time intervals. This information will be incrementally indexed and made available for discovery by DOD HPCMP users, enabling them to query the most up-to-the-date allocation, utilization and queue status information.

Users can discover this information from their web browser via the MetaStar's Gateway component. As mentioned above, Gateway provides a Web-based query interface and customizable HTML templates and Java Server Pages for configuring both the query and search results pages. Gateway supports discovery through direct queries formulated through HTML forms as well as through browsing (URL queries that dynamically link to further URL queries). MetaStar supports the construction of static and dynamically generated URL queries. HTML forms as well as URL queries can reference named queries that can obscure part or all of the information contained in a query.

Thus, for example, a URL query can contain one or more controlled terms used by the query. Such queries can be established in static HTML. Alternatively, if the controlled terms are contained in the record sets, they can be generated dynamically and presented in dynamically and presented as URL queries linking the result to further queries. For example, a user might click on a certain "Site Group". MetaStar might display all S/AAA's within that Site Group, each with its own URL query. Clicking on one person might display all Projects for that S/AAA with the Project Description. Clicking on a specific project might display the full record. This is but one example of MetaStar's ability to support browsing.

Gateway also works in close conjunction with MetaStar Login. Login controls user rights and access privileges. MetaStar security can be replaced or blended with various external authentication services (EAS) through MetaStar Login's Java application program interface (API). With this interface, for example, it is possible to provide login security using Kerberos so that a client can prove its identity to MetaStar (and vice versa) across an insecure network connection. After the client and server have used Kerberos to prove their identity, they can also encrypt their communications to assure privacy and data integrity as they interact. The combination of these MetaStar components and the Kerberos security functionality will provide a secure method for users to easily discover and obtain information.

MetaStar also provides a mechanism, via the Data Entry component, for adding, amending or deleting information from a users web browser as well. MetaStar supports Web Browser input of any number of information records, each with its own structure in addition to uploading associated files. MetaStar can be easily configured to handle any XML structured data, that is, records that are hierarchically organized, with arbitrary repeating elements, and with each element containing designated data types (e.g., dates, numbers, text, geospatial coordinates, etc.). Furthermore, MetaStar enforces required fields, minimum and maximum occurrence limits, and can perform spell

checking of an entire form or selected fields. Data entry forms are implemented with HTML, Java Server Pages, and Java.

Security and user rights for these actions can also be managed through the MetaStar Login and Kerberos (or any other 3rd party) products. BAT recommends using Red Hat's Kerberos implementation, however others can be substituted upon the customers' request. Users will have the ability to directly access their own records for actions such as updating contact and project information, posting allocation-swapping advertisements, and even executing such swaps. MetaStar allows any of this information to be imported into 3rd party application such as spreadsheets or word processors, for the generation of paperwork as well.

Data Entry contains configurable workflow for automatically notifying approving authorities or other parties of such actions. The Event Filter can also trigger MetaStar's workflow functionality so that when jobs commence or conclude, the submitter can be notified of such occurrences. When records are added, amended, or deleted, Data Entry communicates with the other MetaStar components so that this new information is incrementally indexed and made available for discovery.

Data Entry can also be utilized by end users to submit jobs into the queue. Data Entry is fully customizable through HTML templates and Java Server Pages, and can be configured with functionality such as look up tables, data dictionaries, and drop down windows through an easy to use Windows tool. Further, multiple instances of Data Entry can exist, thus HPCPM can either design a single interface into the IE or deploy separate interfaces for each HPCPM site (or make available a standard interface that each site has the option of modifying).

Data Entry's Event Filter will validate the request against a document type definition (DTD) to assure the proper elements have been populated and enough hours are available for that specific

job and then send the request to the HPC in the required file format. Note that DTD's do not contain all the typical verification parameters to insure that a form has been correctly entered. MetaStar supports a host of additional configuration capabilities such as date verification, numeric fields, controlled terms, etc.

DOD HPCMP sites will also have the ability to send files to MetaStar for job submission. MetaStar will perform the above tasks such as validation of the elements, incremental indexing of the information and workflow upon import of the file.

We look forward to providing not only the software for this project, but also the Web technical expertise, and related services to insure that the project is a success! Our corporate goal is to establish a long-lasting relationship with the NAS/NRC, as it is through such relationships that substantial benefits will be achieved.

General Requirements

Company Profile

Blue Angel Technologies (BAT) creates, markets and supports software for a wide range of Internet applications, from building static web pages to developing high-volume interactive web applications. The company's products and services enable organizations in making the most of their information resources. BAT products enable organizations to forge knowledge-enabled stores and linkages, connecting people with the information they seek quickly, easily, and cost-effectively. The BAT services group assists organizations in determining their needs and configuring the resulting system accordingly to meet their needs.

BAT has over eight years of experience in delivering software applications that solve practical problems. BAT's integrated MetaStar family of feature-rich software products provide powerful computing solutions addressing each step in the information management process.

Central to BAT's corporate direction is its continued commitment to open standards such as the Federal Geospatial Data Committee (FGDC), the Dublin Core, the Government Information Locator Service (GILS), BIB-1/MARC, and the ANSI/NISO Z39.50/ISO23950 search and retrieval protocol. BAT's products have been successfully deployed in a number of organizations as a means of joining numerous data sources into one so that the end-user experience is of maximal value. In addition, BAT's employees are well known in the industry for supplying sound technical advice and consulting services, particularly in the area of standards and web-based technologies.

Company History

In 1992, Blue Angel Technologies (BAT) was founded by Margaret St. Pierre with the vision to facilitate the free flow of information globally, unencumbered by geographic or sociological differences so that people and organizations can make more informed decisions. In short, BAT's

vision is to “connect people with the information they need”. Our vision is in direct alignment with that of this project.

In 1996 Jim Restivo, President, and Jon Riewe, Chief Operating officer joined BAT to assist the company to realize the company’s vision. Shortly thereafter BAT began marketing information management software products for use on the Internet that leverages Margaret’s substantial insights. Today, BAT is a leading provider of such clearinghouse solutions with resellers located globally.

Blue Angel Technologies, Inc. is a privately held company headquartered in Phoenixville, Pennsylvania.

Qualifications and Experience

BAT has over 8 years experience with developing standards based applications in the distributed Web and data environment. Experiences include both client and server applications. Applications have operated on numerous operating systems and across many different vendor software packages.

BAT tools make extensive use of standards as the substrate used by the underlying search and retrieval protocol of its products which, include both client and server products.

An important distinction to make regarding BAT’s offering is that it is comprised of a suite of fully documented off-the-shelf components that can be used together or standalone to meet customer needs. Once installed, the components are configured to meet the customers’ needs by establishing a set of HTML templates, Java Server Pages, text setup files, and configuration settings through an administration tool. With such a strong off-the-shelf product offering, BAT customers benefit from a cost effective solution that has a steady stream of new features and functionality as the products are improved.

BAT also has in-house consulting staff dedicated to developing dynamic web sites for customers. Our staff's skills include expertise in most Web related technologies including but not limited to HTML, JavaScript, Java Server Pages, PERL, CGI, cross-browser compatibilities, Servlets, Web Servers, and many others. Our Web services staff also includes commercial artists that can generate artwork.

Technical Approach:

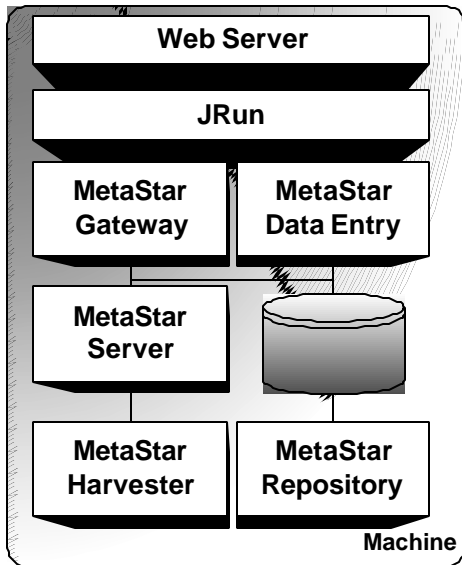
IE Integration (Tools 1-5):

1. The contractor shall provide a fully integrated scalable system IE architecture.

MetaStar provides a highly scalable architecture that can grow with increased loads, new sites added to the IE and the provision of additional functionality. Should system loads grow beyond initial projections, the architecture is scalable both horizontally and vertically. In particular, should the system encounter increased loads additional system resources can be added (e.g., CPU's, hard disks, and memory), additionally the software components can be divided across hardware as needed. (Please refer to the Attachments – Architecture and Data Flow)

For example, MetaStar is used by the USGS to unify over 200 distributed databases located around the world. In summary, the proposed architecture is extremely scalable. The State of Texas' TRAIL application is a great example of MetaStar's scalability. BAT's contract with Texas called for BAT to size the software topology of the application up to 800,000 searches per month. This was the projected load in the year 2003. In late 2000, Texas was surprised with the rate of adoption due to popularity being experienced by its system. So much was this the case that loads were approaching 1,000,000 hits per month, surpassing its 2003 projections three years ahead of schedule. In order to scale the application upward, Texas simply added an additional two servers, replicated the appropriate MetaStar components, and load balancing. The only changes necessary

to the application were simple configuration file changes to tweak the manner in which the indexes are built.



components running as a system on the same

Alternatively, the diagram below shows the components distributed across four machines.

MetaStar customers in production scenarios one, two, and more machines for the same

For example, one customer uses MetaStar to 200 databases on as many machines with a

query.¹ Some customers utilize single CPU configurations, while other utilize dual- and

processor configurations. The primary reason for running the system across multiple machines is typically to increase overall system performance due to loads experienced by one or more

components. For example, placing the MetaStar Harvester on a separate machine may make sense if the web crawl requires significant CPU utilization that would otherwise adversely affect the

Since MetaStar is comprised of a number of

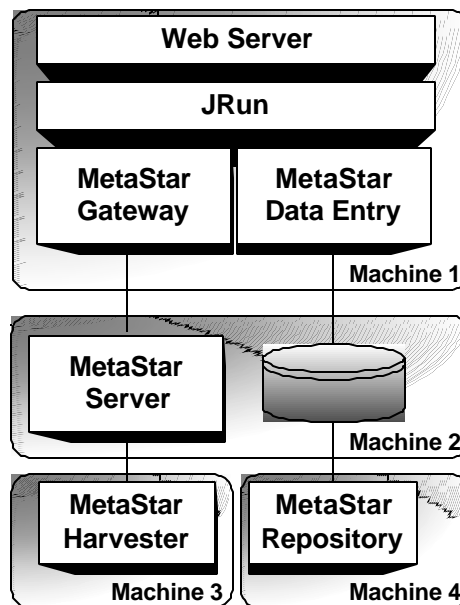
components, the actual system topology varies according to how the components are deployed on machines. Component deployment varies greatly depending on the expected levels of system loads experienced by each component. Realize that MetaStar addresses the entire information management process and as such will experience loads respectively. For example, the diagram to the left shows a number of MetaStar

machine.

same set of BAT has utilizing system.

access over single

quad-



overall system's performance.² Similarly, if many collections of records are being searched concurrently with a single query, it often makes sense to place MetaStar Server on one or more dedicated machines.

The configuration of the topology is impacted by a number of factors such as the frequency of searches, the organization of the data searched, the security issues surrounding data, and ownership of the data. For example, very often, the ownership of data will require users to configure a distinct copy of MetaStar

Blue Angel Technologies has a complete Scaling document available for viewing at the following url: <http://www.blueangeltech.com/rfp/ScalingIssuesDraft.doc>

2. The XML specification of the IEDA shall support all definitions and requirements. The contractor shall identify any needed changes in local site practices required by IE implementation.

All MetaStar components are XML enabled. MetaStar is fully configurable to handle any number of XML record structures. The MetaStar Repository supports any structured element definitions that are hierarchically organized and have arbitrarily repeating elements within the hierarchy. MetaStar supports record elements of a variety of types including, date, integer, float, time, controlled terms, and text. Text fields can contain megabytes of text.

3. The IEDA shall support initial sites and have a well-documented process for adding additional sites.

Since the IEDA will communicate through standards based interfaces; it is possible to establish application connectivity with other sites with considerably less effort than if proprietary approaches were used. As part of the contract, BAT will document and publish the process and steps necessary for adding additional sites.

¹ Note that this customer actually uses MetaStar and a number of other software products that all interface via standards based protocols (i.e., ISO23950, XML, GRS, FGDC, etc.).

² MetaStar Harvester's system load can vary significantly based on various factors such as the number of crawl agents and the average size of retrieved documents.

4. The IEDA shall be implemented using industry standards and implemented in a secure robust environment supporting 24 by 7 operation. The network and system performance must be sufficient for supporting the entire DOD HPCMP operations.

MetaStar supports system access 7 days a week, 24 hours a day, 365 days a year. System downtime is typically associated with scheduled events such as deployment of new features and capabilities. Note that utilization of such additional hardware as power generators, and potentially backup machines are recommended depending on the level of downtime tolerated.

MetaStar is deployed in numerous production scenarios and with varying configurations and peak loads. MetaStar's configuration and the hardware it is deployed with has significant impact on system performance and the number of concurrent sessions that can occur. Without detailed system load expectations it is not possible to provide performance expectations. BAT staff will work with the customer to insure that the system is configured to provide the required responses.

Allocation/Utilization Reporting (Tool 1):

5. The IE shall provide user contact and project information and the associated allocation, foreground and background utilization by system.
6. The IE shall provide utilization/allocation information by project, as requested, for all the sites, selected sites, or for a single site and either by site or by system.
7. The utilization/allocation information will denote which site and which system the allocation and utilization is from.

5-7: MetaStar performs significant logging and with varying levels of detail about system usage. MetaStar reports can meet and exceed the above requirements. From these logs both canned and ad hoc reports can be generated. Users can generate reports via the convenience of a web browser. BAT will work with the DOD HPCMP community to develop standard reports as well as the ability to generate custom reports. Any element such as those listed above can be reported upon or summarized under.

8. The IE shall provide each site's utilization information current as of midnight on the previous day for all jobs, which have successfully completed.

9. . The IE must deploy a mechanism to ensure that users can not access the information while it is being updated with the previous day's information
10. The IE shall provide each site's user contact, project and allocation information, current as midnight of the previous day

8-10: BAT will configure the proposed system so that utilization information can be refreshed and available for discovery or download at defined intervals. For example, MetaStar can be configured to update utilization information upon completion of each job or batch up x number of completed jobs and then update the IE. As utilization data is being updated and records are indexed (incrementally or in total) those specific records will be locked.

11. The IE shall maintain user contact, project, allocation, and utilization data for one Fiscal Year and be summarized by Year to Date, month-to-date, and by month.
12. The IE shall make available summaries of user/project, allocation, and utilization data for the previous Fiscal Years.

11-12: MetaStar can be configured to maintain user profile and usage statistics for arbitrary lengths of time. The details of how historical data is stored will be determined during the analysis phase of the project. MetaStar permits historical data to be stored in the relational database (Oracle or SQL Server), however, should the size of the database grow to become very large, archiving capabilities can be added. MetaStar is architected in a way that users can view or report on historical data that has been archived.

13. The IE shall only allow the proper users to access the information.

The IE will provide security via the following methods:

User Management: *MetaStar has built in login, policy, and user profile management capabilities which are fully customizable to meet the needs of the IE. The representation and management of this information is handled by the MetaStar system in a relational database and provides security to various other portal related applications.*

External Authentication Services: *MetaStar security can be replaced or blended with other external authentication services (EAS) through its Java MetaStar Login*

application program interface (API). With this interface, for example, it is possible to provide login security using Kerberos while checking against an LDAP directory that will subsequently control access to the portal and associated data and applications.

Protocol and Certificates: *MetaStar can be used with the Secure Sockets Layer (SSLv3/TLS) protocol to insure that content is encrypted. Note that an SSL server identification from a company such as Verisign (varying levels of security can be obtained from either 40 or 128 bit server identifications).*

14. The IE shall generate allocation and utilization summary reports by: a.)Service; b.)MSRC/DC; c.)Site; d.)S/AAA;

d.)Project; e.)User; f.)Machine; g.)Report Period (Run Date, Monthly, Quarter, Fiscal Year); h.)Project Type(Challenge, Priority, Regular, etc.); i.)CTA; j.)Foreground vs Background Jobs

15. The IE shall generate reports of: a.)Number of active users with >1 CPU hour utilization in the given month; b.)Number of cumulative users with >1 CPU hour utilization in any month, FY to date; c.)Un-normalized expansion factors; d.)Normalized expansion factors by queue; e.)Normalized expansion factors by Challenge Project. (Refer to Document#5 for expansion factor specifications)

16. The IE shall generate Commercial off the Shelf (COTS) Software Utilization reports of : a.)Number of accesses to each program or library (program executions and library link references); b.)CPU-hours used on each COTS program. (Programs only, not for COTS libraries); c.)Number of load references for dynamic libraries.

17. The IE shall generate metrics reports by: a.)Service; b.)MSRC/DC; c.)Site; d.)S/AAA; d.)Project; e.)User; f.)Machine; g.)Report Period (Run Date, Monthly, Quarter, Fiscal Year); h.)Project Type(Challenge, Priority, Regular, etc.); i.)CTA; j.)Foreground vs Background Jobs. (Refer to Document#5 for metric specifications)

14-17: MetaStar has the ability to generate the reports as defined above.

Queue/Process Status (Tool 2):

18. The IE shall provide current queue status for all HPC computers within DOD HPCMP domain.

19. The IE shall provide multiple views of queue status information.

20. The IE shall only provide queue status for authenticated IE users .

18-20: After logging onto the system, those users possessing the proper rights will included in all queue status screens that will be accessible to administrators. If desired, DOD HPCMP can design a single screen showing queue status for all HPC computers. In addition, multiple views can easily be created in MetaStar. For example, MetaStar can be configured to additional views such as

queues summarized by date submitted. Clicking on a specific queue might show the detail of that request: where originated, from whom, etc.

Allocation Matchmaker/Exchange (Tool 3):

21. The IE shall allow the exchange of allocation by S/AAA with other S/AAA within the same service or between services.

MetaStar will support the exchange of allocations within or across services via the MetaStar Data Entry API. Those individuals possessing the appropriate rights within MetaStar will have the ability to execute exchanges. Once executed, MetaStar will amend the appropriate records.

22. The IE shall provide Allocation and Utilization information by user/project for the S/AAA requesting it.

MetaStar supports querying Allocation and Utilization information via various views including user and project so that the most up to date information is available. Within MetaStar, the user and project elements will be searchable. MetaStar is bundled with a search engine from Hummingbird/Fulcrum Technologies to support online reporting under web loads. An easy to use search screen will enable direct query of this information. MetaStar supports both complex (Boolean) and simple searching, as well as full text and numeric searching.

23. The IE shall allow S/AAA's to post allocations to advertise that they are available to swap. The allocations should include number hours, system, and site.

24. The IE shall allow S/AAA to search the posted allocations.

25. The IE shall provide a mechanism to allow S/AAA's to notify each other to initiate the exchange of allocation.

23-25: MetaStar supports on-line discussion lists as well as the ability to post "advertisements" for allocations available for swap. These advertisements can be directly queried or browsed separately. Should a S/AAA find an advertisement they wish to act upon, clicking on it can initiate an email to the poster of that advertisement. Such email can automatically incorporate the requesting S/AAA's contact and user information.

26. The IE must enforce the process that an S/AAA must place currently allocated hours into reserve before they can be exchanged. Movement of these hours must be reported back to the affected sites.

27. The IE shall allow the moving of allocations among projects.

28. The IE shall facilitate moving allocations between Principal Investigator and S/AAAs.

29. The IE will only allow the exchange of hours which are in the reserve account.

26-29: MetaStar supports configurable workflow and business logic rules to meet customers specific needs. Through the MetaStar Event Filter, transactions can be reflected in records stored with MetaStar and made available for reporting to the local site. For example, MetaStar's business rules and workflow can be configured so that exchanges cannot be executed until hours are moved to a reserve status. Once held in reserve, they are restricted from being allocated for a project. MetaStar can be configured to automatically email the S/AAA if hours have been held in reserve longer than x number of days, or automatically move those hours out of reserve after x amount of time.

30. The IE tool shall only allow the exchange of allocations for the amount of allocation less the utilization.

Blue Angel Technologies foresees creating a sub element of remaining allocation (allocation less utilization). Exchanges will be keyed off this element.

31. The allocation exchange will be effective within two business days.

*Once the exchange has cleared an optional workflow process, it is immediately effective. The **optional** workflow process can be set up to alert and approving authority that a swap has been proposed. Once the approving authority approves the record, the exchange is executed.*

32. The IE will maintain a log of all allocation transactions.

33. The IE will allow HPCMO, site management and S/AAA to review the log of allocation transactions.

34. The IE shall generate allocation swapping log reports by: a.)Service; b.)MSRC/DC; c.)Site; d.)S/AAA; d.)Project; e.)User; f.)Machine; g.)Report Period (Run Date, Monthly, Quarter, Fiscal Year); h.)Project Type(Challenge, Priority, Regular, etc.); i.)CTA; j.)Foreground vs Background Jobs

32-34: All events that occur in MetaStar are written to the log files. These log files are stored in XML format. As such, they can be easily viewed in XML or incorporated into a relational database for subsequent reporting. BAT and DOD HPCMP shall design reports as defined in question 34.

User Fill-In (Tool 4)

35. The IE shall facilitate, via the web, the “filling-in” and “submitting” of all the paperwork required to open a DOD HPCMP account, including sections 1 and 2 of account application form.
36. The IE shall facilitate, via the web, the updating of project and contact information.
37. The IE will maintain a log of all fill-in actions.
38. The IE will allow the review of all fill-in actions.

35-38: MetaStar allows users to add, delete or amend records from their web browser. The layout of web forms and required elements is easily configurable. Workflow features exist that will alert a system administrator(s) of such action. If desired, the system administrator will approve the record before it is published into the system. All actions taken by users and administrators are stored in a log file. Log files are written in XML form and as such are easily mined for administrative viewing and reporting purposes. Furthermore, log files can be easily stored in a relational database to support further reporting capabilities.

Account Application Management (Tool 5)

39. The IE shall facilitate, via the web, the management of all paperwork required to open a DOD HPCMP account, including sections 1 and 2 of account application form
40. The IE shall determine what allocation and project requests have been received.

39-40: MetaStar allows users or prospective users to submit web based forms. MetaStar enables optional email notification to an approving authority notifying such person(s) that a record has been submitted. Or, an approving authority can log into the system and access a listing of all submitted records. The approving authority, via their web browser, can review, approve or reject the record, even indicating a reason for rejection. The “submitter” will be notified via email of such rejection (or approval).

41. The IE shall facilitate the assigning of resources.

The approving authority or system administrator, via their web browser, has the ability to manage the records that have been submitted to MetaStar. These management abilities include but are not limited to approve, reject and amend (assign)

42. The IE shall add the "S/AAA only" information at the bottom of each Section 1 & 2.
- Response to Solicitation:
No. 4TS-TT-01-0001

The web forms can be configured to display such information and allow only a S/AAA to populate such fields.

43. The IE will maintain a log of all account application management actions.

44. The IE will allow the review of all application management actions.

43-44: All actions in MetaStar are recording in log files. Log files are written in XML form and as such are easily mined for administrative viewing and reporting purposes

IE Interface Requirements (Tools 1-5)

45. The IE shall employ proper access controls, which prevent unauthorized access. Static passwords are insufficient.

46. The IE shall be accessible via web-based interface. SSLv3/TLS shall be used to protect communications between the web server and browser.

45-46: Utilizing a combination of security measures MetaStar will provide appropriate security at all levels of the system. See response to question 13 for additional details.

47. The IE shall function fully and correctly regardless of client's operating system (e.g. Windows, Unix, etc.) and web browser (e.g. MS-IE, Netscape, etc.)

48. The IE shall function fully and correctly with open standards and lowest common denominator. (i.e. Netscape 4.7 and MS-IE 5)

49. The IE shall function fully and correctly with open standard database interfaces (i.e. Oracle, MS Access, XML, etc.)

50. The IE database architecture shall be portable and interoperable with different databases

47-50: MetaStar is currently certified with the following databases: Oracle, MS SQL Server and MS Access. Furthermore, MetaStar fully utilizes XML as the data interchange syntax. Records can be communicated, imported, and exported in XML as well as other file formats.

All end user access to MetaStar is accomplished via a web browser. MetaStar is certified to operate with all versions of Netscape Navigator 3.0 and above and Microsoft Internet Explorer 3.0 and above. MetaStar's only requirement is that the web browser support Cookies for purposes of identifying and monitoring sessions. An advantage of MetaStar is that it also operates with most browser side processing technologies. For example, numerous customers use MetaStar with JavaScript, Java Applets, VBScript, etc. Note that using such client side enhancing technologies is

not required by MetaStar, and their use may require higher web browser versions. Thus, the level of HTML used by MetaStar can be controlled to be as minimal as desired, and hence support older platforms.

MetaStar components are able to operate on a variety of operating systems including UNIX and Windows.

Upgrades/Enhancements/Bug Fixes Requirements (Tools 1-5)

51. The IE environment shall include on-line help which includes, but is not limited to, how to use the tool and how to report a problem.

MetaStar supports extensive context sensitive help capabilities. A system administrator is able to edit and add help messages that are available from all system screens

52. The contractor shall validate the operation of the IE tool to ensure the integrity of the user authentication, verification, privacy, and access controls.

53. The contractor shall validate the integrity of the data being provided by IE.

Please refer to Attachment – Implementation Plan, as well as Deployment and Testing sections under Management Approach. BAT shall fully test and validate the complete system before deployment.

54. The contractor shall provide complete and accurate implementation, maintenance and usage guides/documents, including source code, and a final "Acceptance Period" Report, which would capture lessons learned, unforeseen domain specific/cross-site dependencies/anomalies, etc.

The MetaStar system documentation is available in electronic format and assessable via the BAT website (Knowledge Base). This documentation includes description of the administration, user, and operational manuals covering installation, maintenance, and the user of the MetaStar software.

As part of the contract, BAT will also deliver system documentation (MS Word format) describing the software configuration and a user manual as part of this project. All documentation is written in English and is continually updated when changes are made to the

programs and available at no additional cost. BAT will supply this documentation with delivery of the licensed product(s).

BAT will provide a final Acceptance Period Report as defined above. Such Report will be posted on-line for subsequent use.

To protect the interests of the DOD HPCMP, all source code will be accessible to DOD HPCMP in case the business closes. BAT currently places source code in an escrow account with DSI located in California.

55. The contractor shall provide installation, usage and maintenance training for a specified period of time.

BAT provides formal training for all MetaStar components and the use of the resulting system. The training covers how to fully install, configure, customize, maintain, and use the resulting system.

56. The contractor shall provide a web-based mechanism within IE by which problems can be reported and tracked.

BAT is nearing completion of the implementation of a web based CRM system whereby HCPMP can directly log, track and receive assistance via the internet from BAT staff.

57. The contractor shall provide a service for the resolution of critical problems (i.e. those that render IE inoperable) within 24 hours, for a period of six months after initial deployment.

BAT shall provide 7x24 support for a period of six months after initial deployment and correct critical problems within a 24 hour period from which the error was diagnosed. 7x24 hours support after the initial six months can be purchased for an additional fee.

58. The contractor shall provide a service for the resolution of all other (non-critical) reported problems/bugs within 72 hours, for a period of six months after initial deployment.

BAT agrees to provide resolution to other problems/bugs within 72 hours from diagnosis of such problems, for a period of six months from initial deployment

Resource Discovery/Scalability/Extensibility Requirements (Tools 1-5)

59. The contractor shall deliver a robust production product capable of detecting, tracking, reconciling, and reporting resource status and availability.

MetaStar has been a commercial offering since 1996 and is used in production environments by over 100 customers. Furthermore, BAT averages three new product releases each year, thus MetaStar is a robust and stable product.

Blue Angel Technologies has integrated MetaStar with numerous systems;, legacy, client server and web based.

60. The contractor shall deliver a scaleable production product capable of cleanly adding and removing n number of participating sites.

MetaStar provides a highly scalable architecture that can grow with increased loads, new sites and the provision of additional functionality. Should system loads grow beyond initial projections, the architecture is scalable both horizontally and vertically. Please refer to question and answer #1.

61. The contractor shall deliver a modularized production product optimized for extensibility

MetaStar is a modular product suite where each component is able to communicate with another through open standards. MetaStar is different from the way solutions were built in the past. In the past applications were constructed from the ground up, closely integrated, centralized, and proprietary. This approach took a long time and many resources. MetaStar is a distributed component based solution where components are extremely configurable and possess application program interfaces (API's) for extending and modifying the system's behavior. Furthermore, it is possible to combine MetaStar with other applications and web technologies.

Security Requirements (Tools 1-5)

62. The contractor shall provide a web interface to IEDA without compromising or reducing the current level of MSRC/DC security.

63. The contractor shall provide a web interface that uses client side Kerberos tickets to authenticate all IE access.

64. The contractor shall provide a web interface capable of using PKI certificates to authenticate IE access.
65. The IE shall require kerberized access. The contractor shall work with DOD HPCMP security personnel at all stages of the implementation to insure kerberos integrity.

62-65: : MetaStar security can be replaced or blended with other external authentication services (EAS) through its Java MetaStar Login application program interface (API). With this interface, for example, it is possible to provide login security using Kerberos and other EAS tools currently being utilized by DOD HPCMP.

The IE will also include secure, authenticated, and encrypted two-way transactions using the Secure Socket Layer (SSL) protocol.

SSL is an open standard that allows a Web browser to securely communicate with web applications through an encrypted session. SSL is often used to transfer credit card numbers and other sensitive information. Furthermore, SSL is used in conjunction with a digital certificate. The Digital Certificate establishes a legal relationship between a legitimate organization and the Web site. A digital certificate can be purchased from many different vendors (e.g., Verisign).

BAT shall acquire and integrate Red Hat Kerberos authentication software into the resulting system.

Management Approach:

Summary of Management Approach

Blue Angel Technologies (BAT) is pleased to offer the Department of Defense High Performance Computing Modernization Program (DOD HPCMP) a next-generation solution for the development of an Information Environment (IE) that will leverage BAT's unique experience in deploying information sharing and retrieval applications for governments worldwide.

BAT will meet DOD HPCMP's timetable for implementation of a fully compliant solution.

We have assembled a talented team of program management, project management and development

specialists to meet this deadline. Clearly, full cooperation from the DOD HPCMP community for which the applications will be created will be key in meeting the time table defined.

Project Management. *BAT will use a tested and proven Project Management Methodology (PMM) to support the IE solution. There are three primary objectives to the PMM:*

- Establish a clear line of communications between the DOD HPCMP Team and the BAT Team*
- Merge DOD HPCMP goals with the expertise of the BAT Team to meet the needs of the DOD HPCMP community*
- Ensure on-time execution of the IE Solution, which will consist of various design, development, interface, outreach and implementation deliverables.*

BAT's PMM, as led by Rick Fagan, Project Manager, will allow for clear lines of communication between Blue Angel and DOD HPCMP. In addition, this methodology will form the umbrella under which all of our other methodologies and actions exist. The PMM is a tool that will be used to oversee our design methodology, implementation, on-going support and enhancement of the IE Solution.

The PMM establishes clear means of communication between the DOD HPCMP users, design team and DoD stakeholders. The PMM receives inputs from the DOD HPCMP Executive Management group in the form of business requirements and existing documentation (RFP, contract, existing system definitions, etc.) and produces project documentation for review and approval. In addition, it acts as the guiding tool for our interactions with the design methodology, risk management plan and change management plan.

The role of the Project Manager is integral to the success of any project. As part of the PMM, the Project Manager will use the IE Solution project plan, communication tools, BAT

development resources, DOD HPCMP user requirements and the project management philosophy to manage the IE project.

BAT's project management objective is to foster interaction between DOD HPCMP's Executive Management group, and BAT's Project Team. In this instance, the Executive Management group will consist of the DOD HPCMP Project Director, managers, and staff. In addition, the BAT team will consist of Project Manager Rick Fagan, as well as our BAT Project Team as described below. The overall BAT Project Team will take guidance from the DOD HPCMP Project Director.

Figure 1 depicts how the project management methodology fosters the information flow between DOD HPCMP and the BAT Project Team.

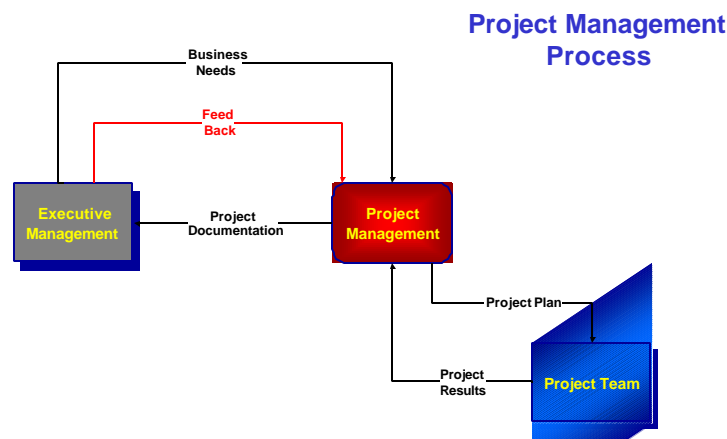


Figure 1. Project Management Process.

Project Management begins when BAT receives business needs from DOD HPCMP Executive Management. BAT's Project Management Team then delivers a Project Plan to the DOD HPCMP Project Team that will produce Project Results. Project Management converts these results into Project Documentation, which will be delivered to DOD HPCMP Executive Management. The management cycle is closed by Feedback, which leads to corrective actions and the generation of another set of Project Documentation.

BAT's PMM can be broken down into the following phases:

- *Analysis*
- *Design*
- *Construction*
- *Control*
- *Review and Approval*
- *Maintenance*

Figure 2 presents BAT's internal project management phases. An explanation of the phases follows the figure.

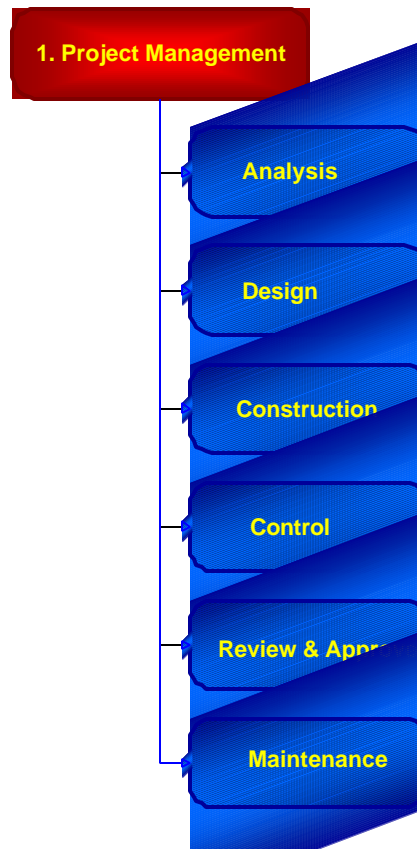


Figure 2. Internal Project Management Phases

- **Analysis:** *This phase of the project includes working with the DOD HPCMP Executive*

Management to gain project clarification, establish and document the solutions definition,

and to arrive at a project specification. The result of the analysis phase is a document that the customer agrees with that will satisfy the system requirements. This document will include a description of the mapping of data from the current system to the new system.

- **System Design:** *This phase of the project includes a detailed system specification and design of the system and the components involved in the architecture. Subsequently, all modules involved in the system are specified and designed (including module test plans).*
- **Construction:** *This phase of the project includes system configuration, construction and integration. A prototype system will be developed initially and based on the feedback from the prototype; changes would be implemented before delivery of the Pilot Implementation. Based on feedback from the Pilot Implementation, appropriate changes would be made before installation of the full system.*
- **Control:** *The Control Phase is where the BAT Project Manager documents and controls the success of the IE project. Rick Fagan will document overall project adjustments, change control results and outstanding action items.*
- **Review and Approve:** *The PMM includes an ongoing process wherein the DOD HPCMP Project Team reviews and approves deliverables, with an eye toward making continuous improvements*
- **Maintenance:** *This phase includes the establishment of on-going responsibilities regarding system maintenance.*

During each of these Phases, DOD HPCMP Executive Management and staff will have input as to whether the new system meets the requirements. Each of the above Phases will also be broken down into tasks, tied to specific dates. For example, during the System Design Phase, DOD HPCMP personnel will have on line access to the system specification to ensure it is progressing within the time frame allotted.

BAT and DOD HPCMP will also conduct periodic “status update” conference calls to address progress. Defining the breakdown of tasks within each phase and the frequency of status update conference calls will be detailed during the Analysis Phase of the project.

Status Reports

BAT will provide monthly status reports to DOD HPCMP that includes project milestones, roles and responsibilities for each of these milestones, start and end dates, completion dates, explanations and clarifications for each Phase of the Project. These reports will be available as a URL and provided in hard copy as well if desired. A sample has been shown below.

communications is configured (Password protected)		
	MarcoPolo-ServerDocumentation.doc	
Policies and Procedures		
Duties and Responsibilities	A description of MarcoPolo search engine team member duties and responsibilities MPSearchDutiesandResponsibilities.doc	Marty
Lessons Learned	Lesson we have learned and key things that we should consider to ensure the continued success of the project LessonsLearned.doc	Everybody
Contacts		
Contacts	Contact information for project staff and all partners ContactList.doc	Marty
Cataloging		
Cataloging Status	Chart showing up-to-date progress of cataloging CatalogingStatus.htm	Signid
Catalog Record Types	Description of MarcoPolo search engine catalog record types CatalogRecordTypes.doc	Signid
Partner Content Resource Types	Table of Partner Content Resource Types PartnerContentResourceTypes.xls	Kristina
Style Sheets	Cataloging style sheets for all partner sites StyleSheets.htm	Signid
MarcoPolo Metadata Profile	MarcoPolo Metadata profile describing all fields and examples MarcoPoloMetadataProfile.doc	Marty
GEMCat	GEMCat Master site with program download, training materials, and more	GEM
GEM Controlled Vocabulary	The index page for all the GEM controlled vocabularies	GEM
GEMCat Escape Sequences	Description of how GEMCat uses HTML Escape Sequences to display special characters	GEM
EonEMLink Admin Screen for Record Data Entry	NCEE Web Form to their Access database for entry and editing of records	NCEE

Schedule Risk Analysis

During the Analysis Phase of the project, BAT will submit a comprehensive Schedule Risk Analysis to the DOD HPCMP. Until all requirements are fully understood and documented and a complete Implementation Plan is put in place, it is premature to submit a Schedule Risk Analysis.

However, in BAT's experience, the Analysis and Design Phases are paramount not only to the project meeting specified dates, but to the overall success of all subsequent Phases. Fully understanding all requirements and parlaying those requirements into a functional and technical specification, and then not significantly altering these specifications during the Construction, Control and Review and Approve Phases ensures the highest probability of project success.

Deployment Plan

During the Analysis Phase, BAT will submit a comprehensive Deployment Plan to the DOD HPCMP. This Plan shall include methodologies and procedures for deploying (1) Prototype System (2) Beta System (3) Full System and (4) Additional sites.

BAT believes that during all Stages defined above, the system should be deployed one site at a time. As each site is deployed, the deployment testing methodology and deployment schedule agreed upon during the Analysis Phase of the project shall be followed.

BAT agrees to meet the Deliverables or Performance as outlined in Section F-3 of the Solicitation.

Testing

BAT understands and will comply with DOD HPCMP for an Acceptance Testing Methodology Plan. BAT will submit the plan to the DOD HPCMP for approval prior to beginning work on a deliverable. The plan will identify all required functionality, necessary testing for validating the functionality, and the responsible parties. It is understood that completion of this

plan and the DOD HPCMP's acceptance of each deliverable must occur prior to BAT receiving payment for the deliverable. Furthermore, this Testing Methodology shall include testing procedures to be followed when rolling the system out to new sites.

Resumes

See Attachment – Resumes, for the resumes of the BAT personnel who will primarily be involved in the Analysis, Design, Construction and Deployment of the IE for the DOD HPCMP.

Rick Fagan will serve as the Project Manager and have overall responsibility for the success of the project.

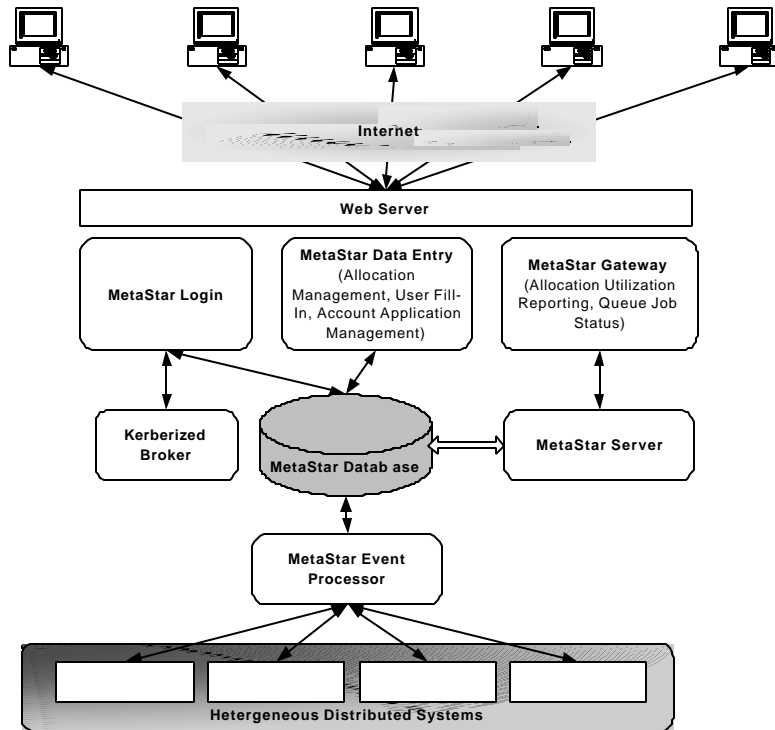
Margaret St. Pierre will oversee the project at the executive level within BAT.

Attachment – Implementation Plan

The purpose of this attachment is to list the high-level tasks involved in moving forward with the implementation of MetaStar. The following draft plan is provided as a proposal and would be refined prior to project commencement.

#	Task	Comments	Who
	Finalize Contract		HPCMP BAT
	Formulate Project Team		BAT HPCMP
	Begin Analysis Phase	<i>This phase of the project includes working with the customer to gain project clarification, establish, and document the solutions definition, and to arrive at a project specification Identify necessary 3rd party components Extensively interview HPCMP staff During the Analysis Phase, BAT and HPCMP will determine tools to be deployed for Prototype</i>	BAT HPCMP
	Sign-off on Analysis document		HPCMP
	Begin Design Phase	<i>This phase of the project includes a detailed system specification and design of the system and the components involved in the architecture</i>	BAT
	Sign-off on System specification		HPCMP
	Install MetaStar on BAT site	<i>We propose to install a copy of the MetaStar on Blue Angel's Web site and use this installation as a test environment during development. This will enable HPCMP Staff to have immediate access to MetaStar screens while they are being developed and provide HPCMP staff with an opportunity to suggest changes as development progresses rather than after the development and configuration is completed.</i>	BAT
	Construct Prototype	<i>Initial prototype shall include at least two of the five tools as defined in the Statement of Work</i>	BAT
	Sign of on Prototype		HPCMP
	BEGIN BETA		BAT

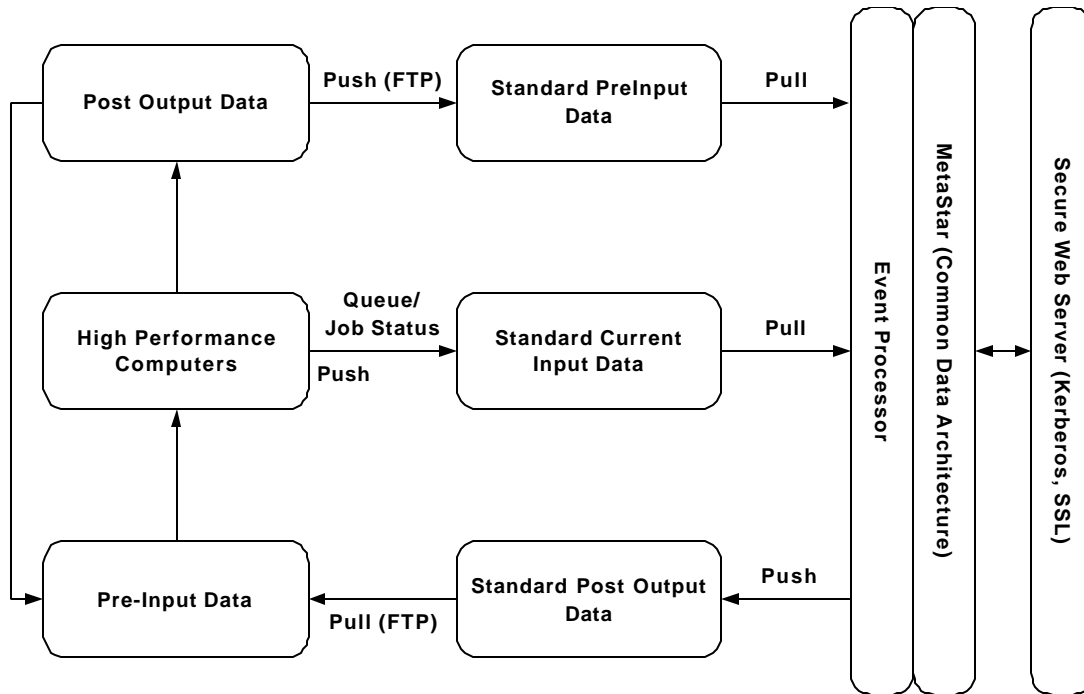
#	Task	Comments	Who
	CONSTRUCTION		
	Provide requirements on look and feel of new system.	Blue Angel to work with HPCMP to formulate system specification: <ul style="list-style-type: none"> ➤ the mapping of data ➤ the data entry screens required ➤ the look and feel of each of the screens ➤ arrive at icons or required text to be included for each screen. 	HPCMP BAT
	Design the screens	Blue Angel will design the screens to meet the requirements of the HPCMP staff.	BAT
	Review and comment on screen design	HPCMP to review and comment on the screens. Blue Angel to modify accordingly.	HPCMP BAT
	Sign-off on screen design	HPCMP to sign-off on screen design	HPCMP
	Configure workflow		BAT
	Design reports		BAT
	Integrate 3 rd party security functionality	Kerberos	BAT HPCMP
	Sign-off on 3 rd party integration		HPCMP
	Review and update Search requirements as appropriate	HPCMP to update (if necessary) search requirements defined in system specification	HPCMP
	Implement searches	BAT to configure searches as defined in specification.	BAT
	Sign-off on searches	HPCMP to sign-off that searches are performed as expected. It is estimated that this Task will mark the half way point of the implementation, however, final dates and timing to be mutually agreed upon at the conclusion of Task 3	HPCMP
	Data Import	Blue Angel to import existing data	BAT
	Sign-off data import	HPCMP to sign-off that data was fully imported	HPCMP
	Install MetaStar on HPCMP platforms defined as part of Beta period	Blue Angel to install MetaStar on the HPCMP's Web Server and chosen platform.	BAT
	Testing	HPCMP to test system operationally and for appropriate performance benchmarking.	HPCMP BAT
	Bug fixes	Blue Angel to correct bugs that are uncovered in testing	BAT
	Sign-off on Beta System	HPCMP to confirm that system is operating as defined	HPCMP
	Begin work on Full Rollout	Continue to hone system as its deployed at additional sites	BAT
	Sign off on final system		HPCMP



Attachment - Proposed IE Architectural Diagram

Users will login into the system over a secure connection to enter or query information as defined in the RFP. MetaStar will serve as the Information Environment, brokering the interactions between users and the Heterogeneous Distributed System. MetaStar can be run on a single server or its different components can reside on separate servers. BAT will work with the DoD HPCMP Team to determine the optimal system configuration as part of the Analysis Phase.

Attachment - Proposed IE Dataflow Diagram



BAT agrees with the DoD HPCMP Team as to the proposed dataflow. MetaStar fits well with the concept proposed under Figure 1 in the Statement of Work. MetaStar's Event Processor will control the pushing and pulling of data as it relates to the IE.

Attachment - Resumes

Rick Fagan—Blue Angel Technologies Inc. Manager of Implementation Services

Mr. Fagan has more than 20 years of experience as a computer, and information services professional. Rick's experience includes both management and software development positions. He has experience managing large computer and network operations projects, including EDI and Internet data exchange applications, engineering and construction applications as well as, maintenance and operations.

PROFESSIONAL EXPERIENCE

2000-present, Blue Angel Technologies Inc., Valley Forge, PA

Manager of Implementation Services

Responsible for leading the Implementation Services Group

Manages the ongoing maintenance and enhancement to the WorldCom MarcoPolo site

Coordinates all services for Blue Angel Technologies new and existing customers

1998-1999, Shared Medical Systems, Great Valley, PA

Healthcare Data Exchange (HDX) Senior Programmer/Analyst

HDX is a division of Shared Medical Systems that manages all EDI transactions for SMS.

Served as a project manager responsible for the planning and management of trading partner connections into the HDX EDI network. The responsibilities with this role include:

- technical/business liaison between HDX and its trading partners, working knowledge of spec requirements for translation of payer data into HDX standard formats (ANSI X12),
- qualify and quantify data analysis, insure the proper coding and testing of translation maps,
- determine the appropriate configuration files necessary for connection and data translation,
- work with HDX provider implementation team overseeing the installation of the payer interface in provider sites

1995-1998, Aetna US Healthcare, Blue Bell, PA

Senior Programmer – Healthcare Data Interchange Corporation (HDIC)

Responsibilities included defining and creating reports for the HDIC management team.

Wrote Visual Basic applications to extract data from Sybase servers for monthly transaction statements. Created numerous reports in Visual Basic and Excel for both HDIC and Aetna US Healthcare.

Create all ad-hoc reports for HDIC as requested by management team. Reports are defined and created on an as need basis using a variety of "4GL" tools such as Visual Basic, Access, Crystal Reports and Excel.

Member of Orion/Electronic Link Solution (ELS) team that performed modifications to the original version of the Orion/ELS product with emphasis on printing Specialist Claims forms. Was lead analyst investigating the viability of rewriting ELS product in the next generation of the Omnis language and needs analysis on database migration. Presented findings to Technical Manager that led to decision to rewrite ELS in Visual Basic 3.0.

Participated in application design team sessions to lay groundwork for GUI and coding standards, to be used in next generation or the ELS product (ELS 2). Helped code ELS 2 in Visual Basic 3.0 integrating with an external Watcom database. Had responsibility for design and coding of referral entry segments of the ELS application. Also had responsibility for application reports and listings that were integrated into ELS Application using Crystal Reports.

Authored original installation system for the ELS 2 database using INSTALLSHIELD. Was responsible for coding install system for client database that installed a Watcom database, ODBC drivers for database and report drivers, program records and program groups for the ELS application and database.

Regularly perform data extracts from HDIC Sybase provider database to a contact management database as requested by Electronic Data Interchange Services group.

1991-1995, Self Employed Consultant

Software Consultant for Versyss Corporate and other clients. Worked on various applications for Versyss customers as requested. Applications worked on include retail building supply systems, wholesale distribution systems, and construction management systems. Responsible for design and coding of call logging system for corporate MIS and all Versyss branch locations in the United States

1981-1991, Versyss Inc

Software Manager

Responsibilities included the management of all aspects of software department reporting directly to branch manager.

Duties included training and supervision of three section supervisors and a staff of ten programmers. Responsibilities include setting policies and procedures of software department, set work schedules, determine pricing for software packages and custom modifications.

Acted as technical liaison between the sales and software departments to determine the feasibility of various application modifications

Senior Programmer / Analyst

Designed, coded, maintained and modified existing applications for the construction, materials management, fuel oil, medical, and wholesale distribution industries.

1979-1981, RDF Inc, Philadelphia, PA

Applications Programmer

Self employed contract programmer. Wrote various applications for clients including a bulk mailing system for a retail store. Designed and wrote a telephone billing system application that went from the interface of the computer system and telephone switching equipment, to the printing of the phone bills and analysis reports for management.

1977-1979 Phillips Business Systems, Bala Cynwyd, Pa

Applications Programmer

Programmed on Phillips systems. Worked on various applications including financial applications, fuel oil systems and credit unions

EDUCATION

1977, Spring Garden College, Philadelphia, PA

Tom Wanuga—Blue Angel Technologies Inc.
Development Manager

Mr. Wanuga has 15 years of experience in software development and project management. Tom's experience includes managing all aspects of software development for Blue Angel Technologies. This includes new product development, current product enhancement and development work related to service projects. While serving as Chief System Architect at Vertex Inc, a \$50 million software company in Berwyn, PA, Tom spearheaded and managed the development of four new product lines in a span of three years. These products were marketed and sold to Fortune 1000 companies and encompassed both desktop and client server platforms.

PROFESSIONAL EXPERIENCE

1995-present, Blue Angel Technologies Inc., Valley Forge, PA

Vice President - Development

- Responsible for the deployment of all development resources, product and service related, for over four years.

1993-1995, Vertex Inc, Berwyn, PA

Chief System Architect

Successfully led the development of four product lines from concept to market in a three year span. Resulting sales increased revenues from \$17 million to \$50 million.

1992-1993, Addax Inc.

Partner & Chief Architect

- Served as chief architect and team lead for the development and maintenance of multiple software products

1987-1992, Chesterbrook Associates.

Lead Developer

- Lead developer for a number of consulting engagements for corporations such as Javelin Software Corp. and Lotus Corp

1985-1987, Dataflow Technology Corporation

Team Lead

- Led a team in the implementation of the simulation program DataSim

EDUCATION

- 1981 - Bachelor of Science in Computer Science from Cornell University.
- 1986 -Master of Science in Electrical Engineering and Computer Science, in addition to an Electrical Engineer's Degree from Massachusetts Institute of Technology (MIT).

At MIT, his graduate work was performed with the Computation Structures Group and was sponsored by a National Science Foundation Scholarship

Recipient of Thomas J. Watson Fellowship

Margaret St. Pierre – Blue Angel Technologies Chief Technology Officer

Margaret St. Pierre is founder and Chief Technical Officer of Blue Angel Technologies. She is recognized as one of the leading experts in the Z39.50 protocol and related standards. Prior to founding Blue Angel, Ms. St. Pierre she was a member of the Advanced Systems Development team at Thinking Machines Corporation, in Cambridge, Massachusetts where she was the lead architect and developer of expert systems. In her role as Chief Technology Officer, she is responsible for setting technical direction and recommending the architecture for the company's software products. She is also responsible for managing the technical staff.

PROFESSIONAL EXPERIENCE

1993-present, Blue Angel Technologies Inc.

Chief Technology Officer

Since 1993, she has been with Blue Angel Technologies, where she became heavily involved in the development of open Internet standards. She was a regular attendee of the ANSI/NISO Z39.50 Implementor's Group, the Open Systems Environment Implementor's Workshop (OIW) Special Interest Group on Library Automation (SIGLA), and the Internet Engineering Task Force (IETF). She worked with the OIW SIGLA to develop the WAIS Profile of Z39.50 Version 2 as a standard protocol for searching full-text documents on the Internet. She was a consultant to, and member of, the Government Information Locator Service (GILS) core team assigned to develop the GILS Profile based on Z39.50 Version 2. Since 1993, she has provided consulting and/or development services for numerous information retrieval systems in both the commercial and government sector, including the Library of Congress, the U.S. Geological Survey, NATO Shape Technical Center, Computer Sciences Corporation (the National Document and Information Service Project being developed for the National Libraries of Australia and New Zealand), Iowa State Library system, Boulder Public Library, Syracuse University (GILS Profile development), Fulcrum Technologies, America Online, Microsoft Corporation, Consortium for the Interchange of Museum Information, Center for Networked Information Retrieval and Discovery, PRC Inc., FS Consulting, and WAIS Inc.

She led a team that designed, implemented, and integrated both client/gateway and server protocols based on the WAIS Profile of Z39.50 Version 2 for use in the WAIS Inc. information retrieval products. The implementation used a common API to both Z39.50-1988 and Z39.50 Version 2. When WAIS Inc. was later purchased by America Online in 1995, she enhanced the system for GILS compliance. She worked with FS Consulting to design and implement Z39.50 Version 2 protocol for use in the Orion Scientific Systems (see URL: <http://www.orionsci.com>) search and retrieval product. The system was later ported and tested on a number of UNIX platforms.

She was the chief architect and lead developer of the Fulcrum Technologies product Surfboard, which includes a WAIS/Z39.50 Version 2 to HTTP gateway, and a WAIS/Z39.50 Version 2 Server for full-text searching. The gateway uses WAIS and Z39.50 Uniform Resource Locators (URLs) to search one or more WAIS and Z39.50 databases and combines the results into a single HTML page to return to the Web browser. The server consists of a commercial protocol tool-kit integrated with a commercial SQL-based ODBC-compliant search engine.

She is primarily responsible for setting technical direction and

recommending the architecture for the company's software products. She is also responsible for managing the technical staff.

1987-1993, Advanced Thinking Machines, Cambridge, MA

Project Lead – Development Team

- Between 1987 and 1993, she was a member of the Advanced Systems Development team at Thinking Machines Corporation, in Cambridge, Massachusetts. She was the lead architect and developer of an expert system for VLSI simulation, called ThinkCAD, for use in the modeling, testing, and verification of all in-house VLSI designs. The system was written in Lisp and included a definition language for modeling and simulating mixed register-transfer level and gate-level designs. She led the functional verification effort for the Connection Machine-5 (CM-5), a massively parallel supercomputer and was responsible for the functional verification of the CM-5 Vector Unit, a vectorized and pipelined coprocessor for the SPARC-based processing node of the CM-5, and the Processor and Control Network Interface of the CM-5 Network Interface chip. During the course of this work, she developed a general methodology for automating the functional verification of VLSI designs³, which later became the core technology used by Sun Microsystems, when Thinking Machines was purchased by Sun Microsystems later in 1994.

HARDWARE AND SOFTWARE EXPERIENCE

- See above

EDUCATION

- Ms. St. Pierre received her Bachelor of Science in Electrical Engineering and Computer Science from the University of Santa Clara.

She completed both a Master of Science in Electrical Engineering and Computer Science, in addition to an Electrical Engineer's Degree at the Massachusetts Institute of Technology, with an emphasis in Computer Aided Design, Artificial Intelligence and Expert Systems

- During the course of her studies, she developed a Mycin-like⁴ rule-based expert system for diagnosing diseases. It consisted of a separable backward-chaining inference engine, a knowledge base made up of static domain knowledge that remains constant over all consultations, and dynamic knowledge created by the inference engine during a consultation. For her thesis, she developed a general framework for tying multi-level simulators into Schema, an integrated expert system for VLSI design. She designed the framework to easily incorporate additional simulators, to serve as a foundation upon which to build new analysis tools, and to provide the ability for mixed-mode simulation using a common graphical user interface to all simulators.

³ St. Pierre, Margaret et al., "Functional VLSI Design Verification Methodology for the CM-5 Massively Parallel Supercomputer", Proceedings of the 1992 IEEE International Conference on Computer Design, Cambridge, Massachusetts, October 1992.

⁴ Buchanan, B. et al, ed., Rule-Based Expert Systems, Addison-Wesley, 1984.

Jeff Tanara—Blue Angel Technologies Inc.
Lead Developer

Mr. Tanara has over 8 years experience as a computer software engineer. Jeff's experience includes serving as a developer of software applications as well as an architect for designing new products based upon emerging technologies. His vision and skill were paramount in the development of Blue Angel's MetaStar Enterprise software which serves as a application platform for some of the most prestigious web sites in the world, including WorldCom's MarcoPolo site, Texas State Library and Archives TRAIL site and the National Library of Australia's PictureAustralia site. He has extensive experience in evaluating new technologies and incorporating them into deployable and scalable software applications.

PROFESSIONAL EXPERIENCE

1996-present, Blue Angel Technologies Inc., Valley Forge, PA

Lead Developer

- Responsible for bringing Blue Angel Technologies Inc product concepts to market ready solutions.
- Led the effort to develop and commercialize the Z39.50 client and server SDKs that serve as the search enabling technology for both Blue Angel Technologies Inc. and third party products (OEM relationships).
- Led the architectural design and implementation of Blue Angel Technologies Inc. flagship product, the MetaStar Enterprise system.
- Lead developer of the MetaStar Gateway, and the establishment of many new features across the Blue Angel Technologies Inc. product line..

1992-1996, Vertex Inc, Berwyn, PA

Senior Software Developer

- Acted in the capacity of technical expert for all new and emerging technologies.
- Recommendations led to the development of four new product lines in a three-year span. These new product lines resulted in a three fold increase in net sales (\$17m to \$50m)
- Part of the development team responsible for specification design, code development, testing and product launch.

EDUCATION

1992 - Bachelor of Science in Computer Science from Pennsylvania State University

Past Performance

Department of Defense – Defense Technical Information Center

Richard Tremblay, Project Manager, U.S. Defense Information Technology Center

Phone: 703- 767-9035

The Department of Defense Technical Information Center (DTIC) was looking for a system that would allow Department of Defense (DoD) personnel and the public to easily locate all DoD information resources. However, DTIC did not wish to take on the burden of creating and maintaining a system for managing this information. They were looking for a way to allow military personnel to maintain their information (XML metadata) without introducing the normal plethora of clerks and system administrators usually required. Thus, they were looking for a solution that included automated workflow capabilities and was off-the-shelf. They were also looking for a solution that supported open-standards as a means of supporting future integrations with other legacy systems.

The Department of Defense Resource Locator application, designed and deployed by the DoD and Blue Angel Technologies is an Internet-based system used to capture, manage and make available to the public Department of Defense information sources. The application was constructed and configured around the Blue Angel MetaStar software. MetaStar is a platform that makes it simple to deploy internet applications and adhere to open standards. The records in this application adhere to the GILS standard (Government Information Locator Service)

From a Web browser, Defense Department personnel located around the world are able add, amend, and delete data via MetaStar Data Entry. When a change occurs, the application automatically sends an email to a designated approving authority to inform them that a record is waiting for review and subsequent approval or rejection. If the approving authority approves the record, it is automatically posted to the publicly viewable database making the information

immediately available to others.

If the approving authority rejects the change, an email is automatically sent to the originator informing them that the record has been rejected with an explanation for the rejection. The originator can make appropriate changes and re-submit the record if desired. The application also checks for records that have not been updated within a year and automatically sends email notification to the record owner requesting them to update specific records. If the record is not updated within the specified time frame, it is deleted from the system (all workflow defaults are configurable).

The Blue Angel configured application also gives a system administrator the ability to dynamically create browse lists to facilitate easily locating the appropriate data. MetaStar Repository manages the underlying structure of the database as well and was used to create the data entry screens, default values and drop down lists that are utilized by Defense Department personnel when entering and maintaining records

With MetaStar, the DoD and Blue Angel Technologies were able to deploy an Internet application that included comprehensive workflow, remote data entry and management, support of international standards and simple or complex search and retrieval. This was all accomplished without programming changes and within the DoD's limited budget

SCI Corporation

Jack Sharpe – CEO; jack.sharp@sci-gateway.com

***Background:** SCI Corporation, a provider of financial software to state and local governments, was looking for a way to quickly and cost effectively shift the focus of their organization and products from legacy based to e-government based. SCI's back end applications were mainframe and AS/400 based, but the in world around them, government services were*

quickly moving to the internet. SCI was looking for a way to move its applications to the web, yet allow their customers to maintain the investments in legacy technologies.

Solution: SCI chose to partner with BAT to develop an e-government solution for their customers. Using MetaStar as the underlying platform, BAT was quickly and cost effectively able to develop a solution that provides citizens on-line access to government services as well as the ability to share this information with the SCI backend legacy applications. Jurisdictions who use this e-application allow their constituents to request services, pay bills, report incidents, and easily discover information about their community and its programs via the Internet

Oak Ridge National Laboratory

Paul Kanciruk, Program Manager, Environmental Informational Analysis Program

Phone: 423-574-7426 Fax: 423-574-4665

Background: The Oak Ridge National Laboratories (ORNL) has scientists working throughout the world to gather scientific information about the environment and resources on the planet. The scientists frequently work in isolated locations and many do not have access to telephone, electricity or the Internet.

The challenge that ORNL faced was capturing scientist's information and making it both known and available so that the rest of the scientific community could quickly and easily discover and use the information. Due to budget constraints, they also needed to find a cost-effective off-the-shelf way of accomplishing these tasks.

Solution: The solution was to implement BAT's MetaStar product suite. ORNL scientists created descriptions on their laptop computers to describe their research and data. The scientists placed the resulting files on regional web servers. The MetaStar Harvester then crawled these web sites and extracted summary information. The harvested information is then placed into the relational

database of the MetaStar Repository. From there it is indexed by the MetaStar Server that makes it immediately available for discovery via searching and browsing by scientists around the world. ORNL has subsequently hooked other Z39.50 servers into their various gateway instances. Because of the implementation, ORNL forged a centralized worldwide index of data that provided high quality fielded browse and search that resulted in researches finding the most up-to-date information that users seek. In summary, they unified a massive knowledge base by automating information sharing. Additionally, they constructed this solution quickly and cost effectively.

MarcoPolo

Kevin Sartorius, Program Officer, MCI WorldCom Foundation

Phone: (918) 590-3110, Fax: (918) 590-2331, kevin.sartorius@wcom.com

In 1997, the WorldCom Foundation created a unique collaboration of some of the nation's most prestigious educational organizations. Their collective goal was to offer peer-reviewed educational resources of the highest quality on-line and free of charge to all of the nation's K-12 teachers. They called their partnership the "MarcoPolo" Program.

But MarcoPolo needed a way to bring the extensive resources of its seven partners together, intelligently cataloged, attractively presented and intuitively accessible so teachers and students could quickly find the information they needed.. The WorldCom Foundation looked for a successful educational consortium model and found Syracuse University's Gateway to Educational Materials (GEM

Sponsored by the U.S. Department of Education, GEM has been offering teachers (more than two-million per month) free access to lesson plans and other educational materials provided by its more than 180 members. Blue Angel Technologies' MetaStarTM solution is the technological

gateway through which these resources can be captured, cataloged, and made easily available to our nation's educators

Solution: *The WorldCom Foundation and GEM collaborated to unite the MarcoPolo partner sites using Blue Angel Technologies' MetaStar platform. The discipline-specific MarcoPolo partner sites brought together with Blue Angel software include the American Association for the Advancement of Science, the Council of the Great City Schools, the Kennedy Center for the Performing Arts, the National Council of Teachers of Mathematics, the National Council on Economic Education, the National Endowment for the Humanities, and the National Geographic Society*

The WorldCom Foundation, Syracuse University, and Blue Angel Technologies have created an outstanding example of collaboration and innovation that is providing the educational community with unsurpassed access to professional resources. The exceptional capabilities offered by MarcoPolo will be rolled out to 10,000 coordinators and hundreds of thousands of teachers throughout the country this year.

President Clinton and former Education Secretary Richard Riley are strong supporters of the MarcoPolo collaboration. Mr. Clinton praised the combined effort, saying it offered "unprecedented access to the kind of world-class educational materials that in the past only the wealthiest school districts could afford."

Natural Resources Canada

Mike Mitchell: 819-994-6963

Background: *Natural Resources Canada (NRCan) is a federal government department comprised of four main sectors: Earth Sciences, Canadian Forest Service, Minerals and Metals, and Energy.*

NRCan was seeking a way to intelligently capture, catalog and discover information across its various sectors (and other data sources) all from a single access point

To help solve this critical issue, Natural Resources Canada looked to Blue Angel Technologies.

Solution: *Using MetaStar as a technology platform, NRCan and Blue Angel configured an application that allows anyone to easily discover information about Canada's natural resources. From a single search screen, the user can simultaneously search multiple web servers and consolidate the results in real-time. MetaStar also provides a web-based interface for maintaining their data, including the necessary workflow capabilities.*

By choosing to work with Blue Angel to configure an internet based application, Natural Resources Canada was able to build and maintain a national knowledge infrastructure on Canada's land and resources, so all Canadians can easily access the latest economic, environmental and scientific information