NOAA ENTERPRISE ARCHIVE ACCESS TOOL (NEAAT): ACCELERATED APPLICATION DEVELOPMENT (XAD)

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Problem:

A challenge for any consumer of National Oceanic and Atmospheric Administration (NOAA) environmental data archives is that the disparate nature of these archives makes it difficult for consumers to access data in a unified manner. If it were possible for consumers to have seamless access to these archives, then they would be able to better utilize the data and thus maximize the return on investment for NOAA's archival program. When unified data access is coupled with sophisticated data querying and discovery techniques, it will be possible to provide consumers with access to richer data sets and services that extend the use of key NOAA data.

Theoretically, there are two ways that unified archive access may be achieved. The first approach is to develop a single archive or archiving standard that would replace the current NOAA archives. However, the development of such an archive would pose significant technical and administrative challenges. The second approach is to develop a middleware application that would provide seamless access to all existing archives, in effect allowing each archive to exist "as is" but providing a translation service for the consumer. This approach is deemed more feasible from an administrative and technical standpoint; however, it still presents unique technical challenges due to the disparate architectures that exist across NOAA archives.

Once the technical approach is selected, the next issue is to define the methodology to implement the capabilities. A traditional waterfall methodology is unlikely to keep up with the ever increasing volumes of data and number of data sources,

Methodology:

NOAA has selected the second approach described above (middleware) and has begun developing the NOAA Enterprise Archive Access Tool (NEAAT). The purpose of NEAAT is to

provide a middleware and a simple standardized API between NOAA archives and data consumers. It is important to note that NEAAT serves two main purposes:

- To provide an application programming interface (API) that enables designated consumers to write their own custom applications capable of searching and acquiring data seamlessly from multiple NOAA archives.

- To allow archive managers to expose their data to consumers in conjunction with other NOAA resources without modifying their archiving systems or way of presenting data.

The NOAA Enterprise Archive Access Tool (NEAAT) development effort is being managed by the Comprehensive Large Array-data Stewardship System (CLASS) project. The initial phase of the project will define the scope of the project, develop a concept of operations and an initial set of functional requirements, and establish the development and testing environments. Once these are complete, an initial drop (release) of the system will be developed and placed in the test environment for a select group of users to evaluate. Design, development, and initializing the solution are conducted using the Accelerated Application Development (XAD) process, and within a shortened development cycle. The XAD process provides a process solution that is useful for rapid application development when processes for routine maintenance or other new development process lifecycles are not appropriate. XAD allows user requirements to be developed and tested in a quick-turnaround cycle including feedback from the user and/or user representative, and also allows the flexibility of multiple releases in a short turnaround timeframe.

The key principles in supporting the XAD approach include:

- Active user involvement

- Team members (developers and users) are allowed to document and make decisions

- The team focuses on frequent deliveries, determining which activities are necessary to deliver the right product

- Iterative and incremental development is used to create the solution

- High-level requirements are baselined to control system or product scope

- The system or product is continually tested using both developers and users

The NEAAT architecture is based on the three high-level elements necessary for an access API:

- Searching for appropriate data sets

- Ordering data

- Providing a framework for service integration

The diagram below provides a high level overview of the NEAAT architecture. NEAAT is comprised of four key elements:

- Front-End Manager

- Translator

- Back-End Manager

- Security Manager
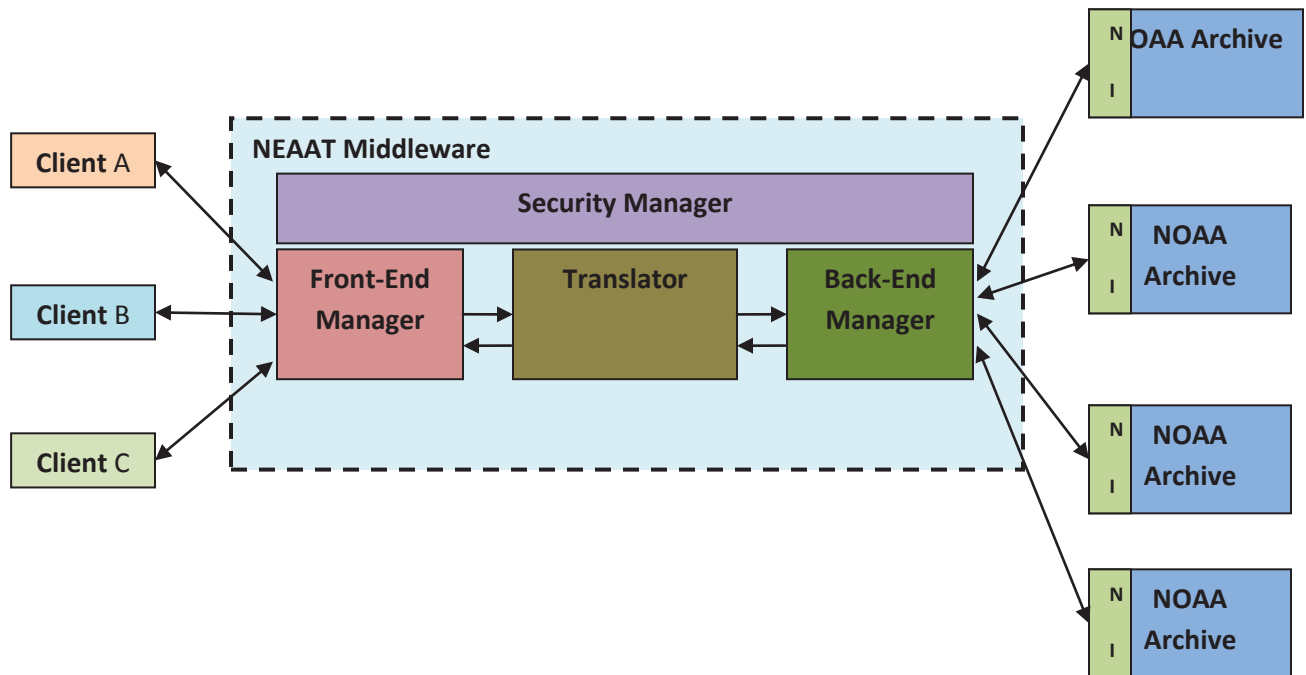
Central Conclusions:

Once it is operational, NEAAT will provide a number of benefits to NOAA and its customers. These benefits include maximizing the return on investment for the many NOAA archives, providing a capability that enables easier development of customized applications, and minimizing the effort to acquire data.

The XAD process joins business and project technical experts together into a high-performance team. The XAD process allows use of productive strategies and tools and unconventional approaches in the development environment and life cycle.

- Provides for quick turnaround and success for development

- Reduces the impact to changes that are manageable

- Defines architecture and environment within a boundary

- Delivers defined, specific, and measureable benefits that can be expressed to users, management, and stakeholders

- Delivers defined value to the business as a whole

In summary, NOAA expects this XAD methodology to provide an effective approach to allow users a much easier path to the data in NOAA's many data archives.

Bibliography:

Comprehensive Large Array-data Stewardship System (CLASS), Level 1 Requirements Document and Mission Success Criteria, Version 1.16, November 6, 2008

National Oceanic and Atmospheric Administration Enterprise Architecture Version 1.61

CLASS Target System Architecture Overview Initial Release March 2009

CLASS Accelerated Application Development Guide (DCN 1274)

NEAAT Concept of Operations

NEAAT Requirements, v1.0