

Standard ID:	AP-MIDL-001
Title:	Data Integration Middleware
Domain:	Application
Discipline:	Electronic Collaboration
Effective Date:	11/01/2005
Revision no.:	1
Original date:	6/09/2005

I. Authority, Applicability and Purpose

- A. **Authority:** Title 29, Chapter 90C provides broad statutory authority to the Department of Technology and Information to implement statewide and interagency technology solutions, policy, standards and guidelines for the State of Delaware's technology infrastructure. "Technology" means computing and telecommunications systems, their supporting infrastructure and interconnectivity used to acquire, transport, process, analyze, store and disseminate information or data electronically. The term "technology" includes systems and equipment associated with e-government and Internet initiatives.
- B. **Applicability:** Applies to all State of Delaware communications and computing resources. DTI is an Executive Branch Agency and has no authority over the customers in Legislative and Judicial Branches, as well as School Districts, and other Federal and Local Government entities that use these resources. However, all users, including these entities, must agree to abide by all policies, standards promulgated by DTI as a condition of funding, and continued use of these resources.
- C. **Purpose** – Determine and communicate the direction the State of Delaware is heading in middleware. The consolidation occurring in the IT industry along with the re-definition and reclassification of software solutions makes it very difficult to establish a precise direction or dictate specific products. This standard will attempt to enumerate some of the middleware products in use today and begin to steer the State towards a reduction in the numbers of solutions and the eventual selection of a middleware solution(s) useable by all.

II. SCOPE

- A. **Audience:** - This document is intended for Data Base Administrators, Systems Administrators, Network Administrators, Application Developers, and PC Support personnel. This document is not intended for use by non IT personnel.

These standards are adopted by the Department of Technology and Information (DTI), through the Technology and Architecture Standards Committee (TASC), and are applicable to all Information Technology use throughout the State of Delaware. Any questions or comments should be directed to dti_tasc@state.de.us.

- B. **Applicability** – This standard will cover all middleware installed or in use by the State of Delaware, including data owned by the State but housed by third-party contractors. This standard does not apply to Traffic Control Systems, CAD systems, GIS systems, or computer systems where the Federal Government dictates the middleware to be used. Only general use middleware is covered by this standard, not proprietary use middleware such as laboratory, instrumentation or CAD.
- C. **Environments** – This standard covers all servers, enterprise servers, PDA's, and desktop middleware. Not covered:
 - Networking software, Terminal emulators, screen scrapers and other tools that programmatically emulate a workstation or browser,
 - Application development tools, although some of these incorporate runtime middleware in their products.
 - Message switches,
 - Packaged applications and their embedded middleware of all types,
 - Systems management, network management and application management facilities,
 - Database gateways and enterprise information integration (EII) tools,
 - Data extraction, transformation and load (ETL) tools, which are not, strictly speaking, middleware in their most common use because they are used more offline than at runtime (although these can be relevant to application integration).

III. PROCESS

- A. **Adoption** – These standards have been adopted by the Department of Technology and Information (DTI) through the Technology and Architecture Standards Committee (TASC) and are applicable to all Information Technology use throughout the state of Delaware.
- B. **Revision** – Technology is constantly evolving; therefore the standards will need to be regularly reviewed. It is the intent of the TASC to review each standard annually. The TASC is open to suggestions and comments from knowledgeable individuals within the state, although we ask that they be channeled through your Information Resource Manager (IRM).
- C. **Contractors** – Contractors or other third parties are required to comply with these standards when proposing technology solutions to DTI or other state entities. Failure to do so could result in rejection by the Delaware Technology Investment Council. For further guidance, or to seek review of a component that is not rated below, contact the TASC at dti_tasc@state.de.us.
- D. **Contact us** – Any questions or comments should be directed to dti_tasc@state.de.us.

IV. DEFINITIONS / DECLARATIONS

A. DEFINITIONS

1. **Alpha Support:** - The first time that the product can be obtained by the user for testing, there is no production support.
2. **Beta Support:** - The second release for the product when a user can obtain the software and there is limited support.

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3. **Database:** A collection of information organized in such a way that a computer program can quickly select desired pieces of data. Traditional databases are organized by field, record and file. A field is a single piece of information; a record is one complete set of fields; and a file is a collection of records. To access information from a database, a database management system (DBMS) is needed. This is a collection of programs that enables the user to enter, organize, and select data in a database.
4. **Database Management System (DBMS):** A collection of programs that provides the capability to store, modify, and extract information from a database. There are many different types of DBMS's, ranging from small systems that run on personal computers to large systems that run on mainframes. The terms *relational*, *flat*, *network* and *hierarchical* all refer to the way a DBMS organizes information internally. The internal organization can affect how quickly and flexibly information can be extracted. Requests for information from a database are made in the form of a query, which is a stylized question. The set of rules for constructing queries is known as a query language. Different DBMS's support different query languages, although there is a semi-standardized query language called SQL (*structured query language*). For the purposes of this document, database and database management system are used interchangeably.
5. **EAI:** (Enterprise Application Integration) An emerging category of products that provide messaging, data transformation, process flow and other capabilities to simplify the integration of enterprise resource planning, legacy and other applications.¹
6. **EDI:** (Electronic Data Interchange) The electronic exchange of trading documents (such as invoices and orders) to facilitate e-commerce. The two most widely used EDI standards are the United Nations' EDI for Administration, Commerce and Transport (EDIFACT) and the Accredited Standards Committee's X12. Originally conducted only through value-added networks, EDI is gradually moving to the Internet. It remains a popular means of business-to-business information exchange because of the maturity of established standards and the wide adoption of EDI-associated technologies. See **EDIFACT** and **X12**.²
7. **EII:** Enterprise Information Integration - the execution of distributed queries against various data sources, the federation of the query results into views, and the consumption of these views by applications, query and reporting tools, or other infrastructure components.
8. **Embedded:** An embedded system is some combination of computer hardware and software, either fixed in capability or programmable, that is specifically designed for a particular kind of application device. Industrial machines, automobiles, medical equipment, cameras, household appliances, airplanes, vending machines, and toys are among the possible hosts of an embedded system. Embedded systems that are programmable are provided with a programming interface, and embedded systems programming is a specialized skill set.
9. **ETL:** Programs that extract data from source systems, transform the data, and load it into other systems. The programs can also simply transport the data between source and target systems.

¹ Gartner, Inc - http://www.gartner.com/6_help/glossary/GlossaryMain.jsp

² Gartner, Inc - http://www.gartner.com/6_help/glossary/GlossaryMain.jsp

10. **Extended Support:** The phase of general support, in the software life-cycle, where the vendor will provide existing patches/fixes but will not research new problems. This is the phase prior to the vendor claiming a particular version/release obsolete and will not provide patches/fixes of any kind.
11. **General Support:** - The phase in the software life-cycle when the vendor provides product support while new features are added to the software.
12. **Middleware:** "The software "glue" that helps programs and databases (which may be on different computers) work together. Its most basic function is to enable communication between different pieces of software."³
13. **Non Support:** - The phase in the software life-cycle when the vendor does not provide product support and new features are not added to the software.
14. **Operating System:** Software that coordinates various activities of the computer (memory management, and shared libraries for example) and mediates between application software and computer hardware (print services, for example).
15. **Paid Support:** The phase in the software life-cycle when the vendor provides product support while new features are added to the software for a fee.
16. **PDA (Personal Digital Assistant):** A PDA is generally described as a data-centric mobile device. By data-centric, it is meant that the device designers prioritized the data function over all other functions (voice and games).
17. **Programmable Access:** A means of reading and updating data in a database management system through controlled machine instructions.
18. **Remote Access:** A means by which users can gain authenticated access to internal network resources, preferably without posing a security risk to valuable assets within the network.
19. **RMI:** (Remote Method Invocation) A Java technology that allows one application process to invoke services existing in another, remote application environment.⁴
20. **Server:** A computer that shares its resources, such as printers and files, with other computers on the network and generally has greatly expanded hardware resources over typical single-user computers.
21. **SOA:** (Service-Oriented Architecture) An application topology in which the business logic of the application is organized in modules (services) with clear identity, purpose and programmatic-access interfaces. Services behave as "black boxes": Their internal design is independent of the nature and purpose of the requestor. In SOA, data and business logic are encapsulated in modular business components with documented interfaces. This clarifies design and facilitates incremental development and future extensions. An SOA application can also be integrated with heterogeneous, external legacy and purchased applications more easily than a monolithic, non-SOA application can.⁵

³ Gartner, Inc - http://www.gartner.com/6_help/glossary/GlossaryMain.jsp

⁴ Gartner, Inc - http://www.gartner.com/6_help/glossary/GlossaryMain.jsp

⁵ Gartner, Inc - http://www.gartner.com/6_help/glossary/GlossaryMain.jsp

22. **SOAP:** (Simple Object Access Protocol) A protocol introduced by a group of vendors led by Microsoft. Designed to be simple, it creates transparent mapping of the Distributed Component Object Model (DCOM) interface definition language and Extensible Markup Language (XML) definitions. It provides the key transport technology for Web services, the next-generation paradigm for delivering applications as a set of Internet-enabled services.⁶
23. **Systems Administrator:** The human being responsible for running and maintaining a computer system especially a mainframe, minicomputer, or local area network. Systems administrators, sometimes called network administrators, issue login names, maintain security, fix failures, and advise management about hardware and software purchases.
24. **UDDI:** (Universal Description, Discovery and Integration) A specification introduced by Microsoft, IBM and Ariba in 2000. It provides a directory service for enterprises to publish, search for and use Web services. UDDI specifies a standard format with which enterprises can describe themselves, and their method of conducting e-business transactions, within an Internet-based business registry.⁷
25. **Web Browser:** A program with a graphical user interface for displaying HTML files, used to navigate the World Wide Web. For example Internet Explorer, or Netscape.
26. **Web Services:** A software system identified by a URI, whose public interfaces and bindings are defined and described using XML. Its definition can be discovered by other software systems. These systems may then interact with the Web Service in a manner prescribed by its definition, using XML based messages conveyed by Internet protocols.⁸
27. **WSDL:** (Web Services Description Language) A language that provides a document format and an Extensible Markup Language (XML) grammar for working with Web services. It is used to describe Web services interfaces for publication in a public registry based on Universal Description, Discovery and Integration (UDDI). The WSDL specification was introduced by Ariba, IBM and Microsoft in September 2000, and later submitted to the World Wide Web consortium (W3C) with a request that a W3C working group be formed to oversee its development.⁹

B. DECLARATIONS

Middleware Must:

1. Be tunable for performance and space maximization.
2. Be scalable.
3. Work within the State's IT Infrastructure.
4. Provide the ability to populate a metadata repository.
5. Be in General Support phase by the vendor who publishes the middleware.

⁶ Gartner, Inc - http://www.gartner.com/6_help/glossary/GlossaryMain.jsp

⁷ Gartner, Inc - http://www.gartner.com/6_help/glossary/GlossaryMain.jsp

⁸ www.ncipher.com/investors/glossary.php

⁹ Gartner, Inc - http://www.gartner.com/6_help/glossary/GlossaryMain.jsp

6. Be in supported mode if in production environment.
7. Not be in alpha support in production. If alpha test middleware is installed, it must be on a development segment, in test, and DTI Systems Engineering must have advance notice that it will be installed and connected to the WAN.
8. Not be in production in beta support unless a business case warrants it. (For example, A specific competitive-advantage software application requiring a beta test middleware). DTI Systems Engineering must have advance notice.

V. DEFINITION of RATINGS

Individual components within a Standard will be rated in one of the following categories.	USAGE NOTES
COMPONENT RATING	
<ul style="list-style-type: none"> • STANDARD – DTI offers internal support and has arranged for external vendor support as well (where applicable). DTI believes the component is robust and can be expected to enjoy a useful life of 5+ years from the Effective Date. 	These components can be used without explicit DTI approval for both <u>new projects</u> and <u>enhancement</u> of existing systems.
<ul style="list-style-type: none"> • ACCEPTABLE – DTI offers internal support and has arranged for external vendor support as well (where applicable). DTI believes the component is stable, but has a useful life ⁽¹⁾ of less than 5 years from the Effective Date. 	<p>⁽¹⁾ Note the useful life concern for the “Acceptable” rating.</p>
<ul style="list-style-type: none"> • EMERGING – DTI considers the component to be a likely candidate for future classification as STANDARD or ACCEPTABLE within the state pending further investigation. 	
<ul style="list-style-type: none"> • DECLINING – Deprecated - DTI considers the component to be a likely candidate to have support discontinued in the near future. A deprecated element is one becoming invalid or obsolete. 	These components must be explicitly approved by DTI for <u>new projects</u> . They can be used for <u>minor enhancement</u> and <u>system maintenance</u> without explicit DTI approval.
<ul style="list-style-type: none"> • LIMITED SUPPORT – DTI has limited or no internal support capability for the component; or has no arrangement for vendor support for the product. Users must arrange for adequate overall support of the component through their own efforts. 	
<ul style="list-style-type: none"> • NOT SUPPORTED BY DTI – DTI offers no internal support and has no arrangement for vendor support. Users must arrange for all support of the component through their own efforts. 	
<ul style="list-style-type: none"> • DISCONTINUE – For reasons of overall risk, product support, high TCO, or other issues, the use of this technology is discouraged. All current instances of this technology should have a plan developed for its retirement. DTI expects to work aggressively with the users of such technologies to devise a collaborative plan. 	
<ul style="list-style-type: none"> • DISALLOWED – DTI declares the component to be unacceptable for use and will actively intervene to disallow its use when discovered. 	

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- A. Applicability of Ratings** – The ratings and usage notes are intended to encourage technology decisions to move toward components that enjoy the full support of DTI. However, acknowledging that mass replacement of lower rated components is not feasible, DTI will allow continued maintenance, enhancement, and possibly limited new development using these components. In making such determinations, DTI may require that the requester demonstrate that they have adequate support arrangements in place.
- B. Missing Components** – No conclusions should be inferred if a specific component is not listed. Instead, contact the TASC to obtain further information.

VI. Component Assessments

In many cases, the Components listed below are the standards themselves, not products. In those cases, there is no clear leader in this area, and so no product is recommended at this time.

	Component	Rating	Comments
A	<u>Data Middleware</u>		
1	DataStage XE	Standard	Ascential Software
2	iWAY	Emerging	Information Builders Still in Pilot Mode For use only on COTS
3	EDEE	Limited Support	(Utilized by DELDOT)
4	P2P	Discontinue	
5	Shadow z/Direct	Standard	Neon Systems Only DB2 on the BIGGS mainframe is supported. There are no current plans to extend this product .
B	<u>Application Middleware</u>		
1.	EntireX (Broker)	Standard	(Software AG)
2.	MOM	Standard	(Message Oriented Middleware)
3.	MQSeries	Standard	(IBM)
4.	RMI	Standard	(Java)
5.	COM	Declining	(Microsoft)
6.	DCOM	Declining	(Microsoft)
7.	EDI	Declining	
8.	Web Services	Standard	(XML, SOAP, UDDI, WSDL)
9.	Shadow z/Services	Standard	Neon Systems Only DB2 on the BIGGS mainframe is supported. There are no current plans to extend this product.

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