

1. AUTHORITY

The Government Information Technology Agency (GITA) shall develop, implement and maintain a coordinated statewide plan for information technology (IT) (A.R.S. § 41-3504(A (1))), including, the adoption of statewide technical, coordination, and security standards (A.R.S. § 41-3504(A (1(a)))).

2. PURPOSE

The purpose of this standard is to establish common, standards-based, database access conventions. It identifies database types, access languages, protocols, and connectivity methods that enable database access.

3. SCOPE

This applies to all budget units. A budget unit is defined as a department, commission, board, institution or other agency of the state receiving, expending, or disbursing state funds or incurring obligations of the state including the Arizona Board of Regents but excluding the universities under the jurisdiction of the Arizona Board of Regents, the community college districts and the legislative or judicial branches (A.R.S. § 41-3501(2)).

The Budget Unit Chief Executive Officer (CEO), working in conjunction with the Budget Unit Chief Information Officer (CIO), shall be responsible for ensuring the effective implementation of Statewide Information Technology Policies, Standards, and Procedures (PSPs) within each budget unit.

4. STANDARD

Software application systems, driven by business requirements, as well as technical and economic environments in each budget unit, have a strong influence upon database choices. Database technology standards are necessary to provide a consistent direction and framework as new software application systems are procured or developed and to assist budget units planning to change existing software application systems. Database access standards provide common, interoperable connectivity methods, protocols, and access languages independent of vendor-specific databases and the Database Management System (DBMS).

4.1. This standard recognizes that different types of database technology and database management systems (DBMS) exist. For the purposes of this standard, types of database technology included are:

- Hierarchical;
- Relational, including object-relational;
- Object-oriented; and
- Other, including native Extensible Markup Language (XML) database technology.

The following requirements apply to the various types of database technology, as appropriate.

- 4.2. This standard is applicable to database technology, both independent and contained in software application systems, utilized by budget units with the exception of personal use databases contained in office productivity software and solutions.
- 4.3. Database access shall be securely implemented with regard for availability, integrity, and confidentiality of the data as established in *Statewide Standard P740-S741, Classification and Categorization of Data*, and in accordance with *Statewide Policy P800, IT Security*, and related statewide security standards.
- 4.4. Database technologies shall comply with most currently approved ITI: ANSI, ANSI/INCITS, ANSI/INCITS/ISO/IEC, ISO/IEC standards.
- 4.5. Structured Query Language (SQL) implementations within database technology shall comply with the most currently approved¹ ITI: ANSI, ANSI/INCITS, ANSI/INCITS/ISO/IEC, ISO/IEC standards. Proprietary, vendor-specific, SQL extensions may limit flexibility and adaptability and are not recommended for general use.
- 4.6. Database technologies shall provide the capability for the following types of connectivity:
 - 4.6.1. Java™ Database Connectivity (JDBC) providing the application program interface (API) to connect Java™ programs to a wide range of cross-DBMS SQL databases.
 - 4.6.2. Open Database Connectivity (ODBC) providing the API promoting open connectivity to various databases.
- 4.7. Database technologies shall provide the capability for the following types of web services (web services refer to modular platform-independent, language-independent system functionality that is based on open standards and used on demand to support business solutions) support:
 - 4.7.1. Electronic Business eXtensible Markup Language (ebXML) suite of approved OASIS specifications.
 - 4.7.2. Extensible Markup Language (XML) standards and Extensible Hypertext Markup Language (XHTML) as defined and approved by the World Wide Web Consortium (W3C).
 - 4.7.3. Simple Object Access Protocol (SOAP) specification.
 - 4.7.4. Universal Description, Discovery, and Integration (UDDI) XML-based registry for publishing and discovering web services, both as a private internal registry or a public/hosted node using the standard UDDI Publication API.

¹ For the purposes of this statewide standard, “most currently approved” assumes widespread mainstream adoption and implementation by industry.

- 4.7.5. Web Services Description Language (WSDL).
- 4.7.6. Java 2 Platform Enterprise Edition™ (J2EE) and the most current Java Standards as defined and approved in the Java Community Process (JCP).
- 4.8. The entry and update of data stored in budget unit and state databases shall be accomplished in accordance with the business rules established in software application systems. Data shall be entered and updated using software applications and business rules to protect the data from unauthorized or accidental access and to ensure security, data integrity, and accurate interpretation of the data. Data access and permissions shall be assigned within the context of the software application and shall be in accordance with *Statewide Standard P800-S810, Account Management*.
- 4.9. Free-form data entry and update using direct database access shall be restricted. Direct database access, when required, shall be in accordance with *Statewide Standard P800-S810, Account Management*. Owners of the data and information² stored in the relevant databases shall provide written delegated authority or specific access permissions in accordance with *Statewide Standard P740-S741, Classification and Categorization of Data* and are responsible for ensuring that the relevant business rules implemented by the software application system for normal entry and update are not violated.
- 4.10. Direct database access for ad-hoc queries and end-user reporting shall be read-only. Software utilized for ad-hoc queries and end-user reporting shall conform to database technology connectivity and access requirements defined in this standard.
- 4.11. Budget units should minimize the variety of database management systems as well as ad-hoc query and end-user reporting software to effectively and efficiently utilize their common information resources (people, hardware, software, support services, data and documentation).
- 4.12. Database technologies shall utilize identification, authorization, and access controls if already provided by Network, Security, Platform, and Software statewide policies and standards. Reusing common security and access control mechanisms avoids potential inconsistencies and redundancies and ensures interoperability and compatibility with Network and Platform operating systems, as well as software application security.
- 4.13. Database access routines should be written as independently of the platform and underlying data structure as feasible. Separating database access logic from the application logic of a software application makes databases easier to relocate,

² Refer to *Statewide Standard P740-S741, Classification and Categorization of Data*, for definitions of ownership.

restructure, or to re-platform the back-end services with minimal disruption to the software applications that use the databases.

5. DEFINITIONS AND ABBREVIATIONS

Refer to the Glossary of Terms located on the GITA website at http://www.azgita.gov/policies_standards or definitions and abbreviations.

6. REFERENCES

- 6.1. A. R. S. § 41-621 et seq., “Purchase of Insurance; coverage; limitations, exclusions; definitions.”
- 6.2. A. R. S. § 41-1335 ((A (6 & 7))), “State Agency Information.”
- 6.3. A. R. S. § 41-1339 (A), “Depository of State Archives.”
- 6.4. A. R. S. § 41-1461, “Definitions.”
- 6.5. A. R. S. § 41-1463, “Discrimination; unlawful practices; definition”.
- 6.6. A. R. S. § 41-1492 et seq., “Prohibition of Discrimination by Public Entities.”
- 6.7. A. R. S. § 41-2501 et seq., “Arizona Procurement Codes, Applicability.”
- 6.8. A. R. S. § 41-3501, “Definitions.”
- 6.9. A. R. S. § 41-3504, “Powers and Duties of the Agency.”
- 6.10. A. R. S. § 41-3521, “Information Technology Authorization Committee; members; terms; duties; compensation; definition.”
- 6.11. A. R. S. § 44-7041, “Governmental Electronic Records.”
- 6.12. Arizona Administrative Code, Title 2, Chapter 7, “Department of Administration Finance Division, Purchasing Office.”
- 6.13. Arizona Administrative Code, Title 2, Chapter 10, “Department of Administration Risk Management Section.”
- 6.14. Arizona Administrative Code, Title 2, Chapter 18, “Government Information Technology Agency.”
- 6.15. State of Arizona Target Data/Information Architecture.
- 6.16. Statewide Policy P100, Information Technology.
- 6.17. Statewide Policy P700, Enterprise Architecture.
- 6.18. Statewide Policy P740, Data/Information Architecture.
 - 6.18.1 Statewide Standard P740-S741, Classification and Categorization of Data.
- 6.19. Statewide Policy P800, IT Security.
 - 6.19.1 Statewide Standard P800-S810, Account Management.
- 6.20. Statewide Policy P750, Service Oriented Architecture Policy

7. ATTACHMENTS

None.