

Information Technology Policy

Database Management Systems

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ITP-INF0001

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Category
Information

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Contact
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1. Purpose

The purpose of this Information Technology Policy (ITP) is to establish enterprise-wide standards for [Database Management Systems \(DBMS\)](#) and their effective use in production environments.

2. Scope

This ITP applies to all offices, departments, boards, commissions and councils under the Governor's jurisdiction (collectively "agencies"). Agencies not under the Governor's jurisdiction are strongly encouraged to follow this ITP.

Third party vendors, licensors, contractors, or suppliers shall meet the policy requirements of this ITP that are applicable to the products and services provided to the Commonwealth.

3. Background

A DBMS is software that manages databases. DBMSs provide a common and controlled approach to maintaining data integrity and accessibility in storing data, adding new data, and in modifying and retrieving existing data within a database. Security and backups are key components.

4. Definitions

- 4.1. American National Standards Institute (ANSI)** - In the United States, ANSI serves as a quasi-national standards organization. It provides area charters for groups that establish standards in specific fields. ANSI is unique among the world's standards groups as a nongovernmental body granted the sole vote for the United States in the International Standards Organization (ISO).

- 4.2. Enterprise Class DBMS** - Integrates multiple business processes or applications into a single DBMS and hardware platform. This is in contrast to creating application-specific DBMSs.
- 4.3. Java Database Connectivity (JDBC)** - A set of programming Application Programming Interfaces (APIs) that allow easy connection to a wide range of databases through Java programs.
- 4.4. NoSQL** - A non-relational database architecture (sometimes referred to as “non-SQL” or “not only SQL”). NoSQL databases do not follow the strict table/row structure of Relational Databases. The non-relational nature of these databases allows them to be more flexible and scalable than traditional Relational Databases. NoSQL databases are increasingly used in big data and real-time web applications. The data structures used by NoSQL databases (e.g. key-value pair, wide column, graph, or document) are different from those used by default in Relational Databases, making some operations faster in NoSQL.
- 4.5. Open Database Connectivity (ODBC)** - A vendor-neutral interface, based on the SQL Access Group (SAG) specifications, that permits maximum interoperability among diverse DBMSs. The ODBC interface defines: function calls that allow an application to connect to a DBMS, execute SQL statements, and retrieve results; a standard way to connect and log on to a DBMS; and a standardized representation for data types. Database drivers link the application to their choice of DBMS.
- 4.6. Relational Database** - A type of database that stores and provides access to data points that are related to one another. Relational Databases are based on the relational model, an intuitive, straightforward way of representing data in tables. In a Relational Database, each row in the table is a record with a unique ID called the key. The columns of the table hold attributes of the data, and each record usually has a value for each attribute, making it easy to establish the relationships among data points
- 4.7. Structured Query Language (SQL)** - A relational data language that provides a consistent, English keyword-oriented set of facilities for query, data definition, data manipulation and data control. It is a programmed interface to relational DBMSs.

5. Objective

The main objectives of this policy are to:

- Standardize on Relational and NoSQL DBMSs that best meet current and future enterprise requirements.
- Increase data sharing opportunities across agencies, reduce data redundancy, and improve application interoperability.
- Increase opportunities for consolidation of like data and business processes.
- Provide for further standardization on database software tools, including data modeling, meta-data repositories, and business intelligence software.
- Leverage existing DBMSs, where appropriate.

STD-INF001A: *Database Product Standards* provides guidance to agencies on the current standards and the status of other database solutions that are being used or being considered for use. The current standards support the use of DBMSs that are in compliance with ODBC, JDBC, and ANSI SQL:2016 (ISO/IEC 9075) standards.

OPD-INF001B: *Database Management Systems: Production and Operational Standards* provides specific production and operational guidance for current database solutions. These standards have applicability across all current standard products and are required for all application development efforts. If a specific standard applies only to mission-critical applications, it will be identified as such.

6. Policy

New and existing application development projects that could benefit from a DBMS shall use one of the current standards as defined in STD-INF001A.

New application development projects utilizing a DBMS shall adhere to production and operational standards as defined in OPD-INF001B. Existing production applications are encouraged to adopt these standards as well.

Agencies shall analyze the total cost of ownership when selecting one or more of the current DBMS standards. Total cost of ownership includes, but is not limited to, the cost of licensing of DBMS software, hardware platforms, backup solutions, training of operations, database administration, and development staffs. Agencies shall evaluate the alignment of business and technical requirements against the features and capabilities of current DBMS standards when selecting a DBMS.

This policy is in effect for Enterprise Class DBMSs only.

Major revisions to existing applications using a DBMS and not using the current standards will be reviewed as part of the IT Procurement Review Process to determine if the investment warrants a change in standards at that time. For applications using a DBMS product classified as "Retire," a date for migration from this technology has been established. A definition for the classification of "Retire" can be found in STD-INF001A *Database Product Standards*.

7. Related ITPs/Other References

- Definitions of associated terms of this policy are published on the Office of Administration's public portal: <http://www.oa.pa.gov/Policies/Pages/Glossary.aspx>
- Commonwealth policies, including Executive Orders, Management Directives, and IT Policies are published on the Office of Administration's public portal: <http://www.oa.pa.gov/Policies/Pages/default.aspx>
- Management Directive 205.34 Amended Commonwealth of Pennsylvania Information Technology Acceptable Use Policy
- ITP-ACC001 *Digital Accessibility Policy*
- OPD-INF001B *Database Management Systems: Production and Operational Standards*
- STD-INF001A *Database Product Standards*

8. Authority

[Executive Order 2016-06 Enterprise Information Technology Governance](#)

9. Publication Version Control

It is the [Authorized User's](#) responsibility to ensure they have the latest version of this publication, which appears on <https://itcentral.pa.gov> for Commonwealth personnel and on the Office of Administration public portal: <http://www.oa.pa.gov/Policies/Pages/default.aspx>. Questions regarding this publication are to be directed to RA-ITCentral@pa.gov.

10. Exemption from this Policy

In the event an agency chooses to seek an exemption from the guidance within this ITP, a request for a policy waiver is to be submitted via the enterprise IT policy waiver process. Refer to [ITP-BUS004 IT Policy Waiver Review Process](#) for guidance.

This chart contains a history of this publication's revisions. Redline documents detail the revisions and are available to CWOPA users only.

Version	Date	Purpose of Revision	Redline Link
Original	02/23/2005	Base Document	N/A
Revision	01/15/2021	ITP Review and Refresh	N/A
Revision	03/09/2022	Utilizing Accessible ITP Template Included third parties in scope Added definition for Relational Databases Added Definition for NoSQL	Revised IT Policy Redline <03/09/2022>