
APPLICATION DEVELOPMENT ENVIRONMENT STANDARDS



Information Systems
Branch

Economy Sector

Version 3.0 - DRAFT
June 14, 2022

TABLE OF CONTENTS

1. Revision History	3
2. Overview	4
2.1. Outline	4
2.2. Detailed Description	4
2.3. Purpose	4
2.4. In Scope	4
2.5. Out of Scope	4
3. Standard Toolset	5
3.1. Platform	5
3.2. CMS	5
3.3. Development Languages	5
3.4. Framework / Library	5
3.5. Database	5
3.6. Logging	6
3.7. Testing	6
3.8. Source Control	6
3.9. Issue Tracking	6
3.10. Security	6
3.11. Document Generation	6
4. Browser Compatibility	7
5. Server Environment	7
6. Government and Ministry IM/IT Standards	8
7. Contravening these standards	8

1. REVISION HISTORY

Date	Version	Author	Description
August 22, 2017	1.0	Irfan Charania	Initial Draft
June 7, 2021	2.0	Irfan Charania	Updated Draft
June 14, 2022	3.0	Irfan Charania	Updated Draft

2. OVERVIEW

2.1. OUTLINE

This document will outline the Application Development Environment for use by ministries within the Economy Sector, collectively referred to as “the Ministry”.

2.2. DETAILED DESCRIPTION

The Application Development Environment will describe the acceptable tools, environments and methodologies for use by developers working for the Ministry.

These standards apply to both internal and external developers working on new applications, as well as enhancements to existing applications.

2.3. PURPOSE

This document is part of the Ministry’s standards documentation project to clearly document all of the Ministry’s development standards.

The standards documentation will provide developers with information regarding the Ministry’s environments and processes, to ensure that deliverables are compatible with the Ministry’s support infrastructure, and to ensure consistency within the Ministry’s application ecosystem.

2.4. IN SCOPE

The following items are in scope for this document:

- Supported Platforms
- Development languages and tools
- Database environments
- Browser Compatibility
- Server environments

2.5. OUT OF SCOPE

The following items are out of scope for this document:

- Coding practices
- Application architecture standards

3. STANDARD TOOLSET

The following tools are standard for Ministry web application development. The versions specified are the **minimum** versions supported. More recent versions (stable/LTS) are preferred by the Ministry software architecture team.

3.1. PLATFORM

- Visual Studio 2019 / 2022
- .NET Full Framework 4.8
- .NET LTS (6.x as of this date)

3.2. CMS

- Kentico Enterprise Marketing Solution (EMS) v12
- WordPress 5.x

3.3. DEVELOPMENT LANGUAGES

- C#
- T-SQL
- JavaScript/TypeScript v4
- PowerShell v5
- DAX

3.4. FRAMEWORK / LIBRARY

- Bootstrap v4.3 ([BC Gov Bootstrap Theme](#))
- ASP.NET MVC
- ASP.NET Core RazorPages
- jQuery v3
- React
- Angular
- Kendo UI
- Entity Framework Core
- ESLint (w/[AirBnB-base](#) ruleset)

3.5. DATABASE

- Microsoft SQL Server Standard Edition 2019 (**preferred and default**)
 - Visual Studio Database Project using SQL Server Data Tools (SSDT)
 - SQL Server Integration Services (SSIS) – used for:
 - large volume data loads
 - importing data into existing data sets
 - SQL Server Reporting Services for reports
 - SQL Server Analysis Services (Tabular)
 - TabularEditor

- ALM Toolkit
- DaxStudio
- MySQL 7.3+ / MariaDB 10.5
- Oracle 19C Enterprise Edition
 - ODP.NET Managed Driver
- Elasticsearch 7.17.x

3.6. LOGGING

- NLog – used for application logging
- JSNLog – used for client-side logging with NLog

3.7. TESTING

- Unit tests must be built using Visual Studio Unit Test Project
 - xUnit.net
 - Fluent Assertions
- [K6](#) for load tests
- [Cypress](#) for automated component/E2E testing within CI pipeline
- [iMacros](#) for application health monitoring

3.8. SOURCE CONTROL

- Azure DevOps Server 2020 serves as the standard source code and artifact repository, and automated build & release management software.

3.9. ISSUE TRACKING

- Ministry JIRA environment

3.10. SECURITY

- SonarQube LTS (v9.4 as of this date)
 - Static Code Analysis tool that produces a SQA grade for the issues present. It must pass the SonarQube quality gate. If a pass cannot be achieved the Contractor must provide a written request to the ISB for an exemption for the code in question.
 - [SonarQube Quality Gates](#)
- IBM AppScan (provided by OCIO)

3.11. DOCUMENT GENERATION

- Aspose
- OpenXml
- PDFSharp
- Generated output documents must be in an Office 2016 compatible format

NOTE: If you wish to use any additional tools/libraries/3rd party controls, Ministry approval is required.

4. BROWSER COMPATIBILITY

External-facing web applications should be built with a mobile-first design using progressive enhancement (responsive design with responsive images) unless explicitly stated otherwise. The [BC Gov Bootstrap Theme](#) provides a good starting point, and includes appropriate accessibility guidelines.

Web applications should support the following [browsers list config](#):
browserslist ">0.5%, not dead, not op_mini all, ff ESR, not IE 11"

As of this writing, the above equates to the following browsers:

- and_chr 94
- and_uc 12.12
- chrome 94
- chrome 93
- chrome 92
- chrome 91
- edge 94
- edge 93
- edge 92
- firefox 92
- firefox 91
- firefox 78
- ios_saf 15
- ios_saf 14.5-14.8
- ios_saf 14.0-14.4
- ios_saf 12.2-12.5
- opera 78
- safari 14.1
- safari 13.1
- samsung 15.0

Note: Program areas may specify an older version for supporting business clientele.

5. SERVER ENVIRONMENT

Ministry web servers are running:

- Operating Systems:
 - Windows 2016/2019

- RedHat Enterprise Linux 8
- Internet Information Services (IIS) 10
- .NET Framework 4.8
- .NET Core 6.x LTS

6. GOVERNMENT AND MINISTRY IM/IT STANDARDS

The Contractor will be required to adhere to the Province's applicable Information Management and Information Technology standards in carrying out the services under the Contract. A standard is a specific statement of the rules and constraints governing the naming, contents, and operations of software and hardware.

There are two types of standards, Government and Ministry, applicable to the services under the Contract. The Contractor will be responsible for adhering to the policies and procedures outlined in Government and Ministry Standards. This includes the Ministry SCM Methodology Guide, Source Material Management Policies and Procedures, Web Standards, as well as Oracle Designer standards. This includes development and/or transfer of all code in the Ministry's Oracle Repository and the Ministry's source code repository. The Ministry will conduct Quality Assurance (QA) and design reviews of the deliverables, in accordance with the SDLC standards of the Ministry.

Government and Ministry IM/IT standards may be updated at any time. The Contractor is required to keep up-to-date with the applicable standards in effect during delivery of the services under the Contract to ensure adherence to the most current one(s).

Under certain and appropriate circumstances exemption from individual policies or standards may be granted by the OCIO or MCIO. Any requests for policy or standards exemption should be raised with the Ministry Information Systems Branch and will require approval in writing.

- Government IM/IT Standards: <http://www.cio.gov.bc.ca/>
- Government information security policy: http://www.cio.gov.bc.ca/local/cio/standards/documents/standards/standards_manual.pdf
- Ministry IM/IT Standards: <http://www.cscd.gov.bc.ca/isbstandards>

7. CONTRAVENING THESE STANDARDS

If a developer wishes to contravene these standards, a written proposal must be submitted to the Ministry Information System Branch. **Managerial sign-off must be attained prior to developing** using non-standard technologies.