

# COMMONWEALTH OF PENNSYLVANIA

## DEPARTMENT OF HUMAN SERVICES

### INFORMATION TECHNOLOGY STANDARD

Name Of Standard: <b>Cognos Reporting Development</b>	Number: <b>STD-EKMS004</b>
Domain: <b>Knowledge Management</b>	Category: <b>Data Warehouse/Business Intelligence</b>
Date Issued: <b>12/21/2007</b>	Issued By Direction Of:  Kevin Gray, Dir of Enterprise Apps
Date Revised: <b>02/18/2016</b>	

#### **Abstract:**

The purpose of this Standard is to establish enterprise-wide standards and guidance for the development of Cognos BI (business intelligence) applications that will reside on the production DHS Cognos BI web reporting site ([www.dpw rpt.state.pa.us](http://www.dpw rpt.state.pa.us)).

Cognos BI provides a variety of reporting, analysis, dashboard, and scorecard capabilities to provide the right amount of detail to the report consumer. Analytical, historical, and trend analysis reporting should be implemented using this toolset.

#### **General:**

This standard applies to all Department of Human Services Cognos developers, both Commonwealth and contractor. This standard applies best practices and enforces a common interface across the reporting applications implemented on the Cognos BI platform.

#### **Standard:**

##### **URLs/Links**

Cognos Connection provides the capability to provide links to documents or other websites within its folders. Links must adhere to the following standards:

1. Links to non-Commonwealth websites are not permitted.
2. Documents provided as links should be in PDF format.

## Report Development

Reports that will be deployed to production must adhere to the following standards:

1. The default report format should be PDF. This requirement may be waived for reports that will never be printed, are part of a dashboard or interactive reporting application, or where user specified reformatting or exporting is required.
2. Report permissions should be set and inherited from the folder in which they are placed.
3. The following prompt page formats should be used.
  - a. The report title must be included centered at the top of the prompt page.
  - b. The current date must be displayed right justified at the top of the prompt page.
  - c. Remove Back and Next buttons if there are not multiple prompt pages in the report.
  - d. Every prompt page should include Cancel and Finish buttons left justified at the bottom of the prompt page.
  - e. For date prompts, set the Select UI property to Edit Box.
  - f. All list prompts must be sorted.
  - g. For single selection list prompts, use the Value Prompt object with the Select UI property set to Drop Down List.
  - h. For multi-selection list prompts, use the Value Prompt object with the Select UI property set to List Box.
4. The following report page formats should be used.
  - a. The report title must be included centered at the top of the report page.
  - b. The current date must be displayed right justified at the top of the report page.
  - c. If the report includes prompts, the values selected must be displayed on the report page.
  - d. Page numbers with the label "Page" should be included centered within the report footer.
5. Queries utilized by the report must be developed using a Cognos Framework Manager package. Type-in SQL query subjects are prohibited.
6. All queries that result from each report must be reviewed from a performance standpoint and evaluated for tuning opportunities prior to deployment.
7. Reports that utilize images must acquire those images using the relative path of ..\images. Images should be standardized and reuse is encouraged.

## Active Report Development

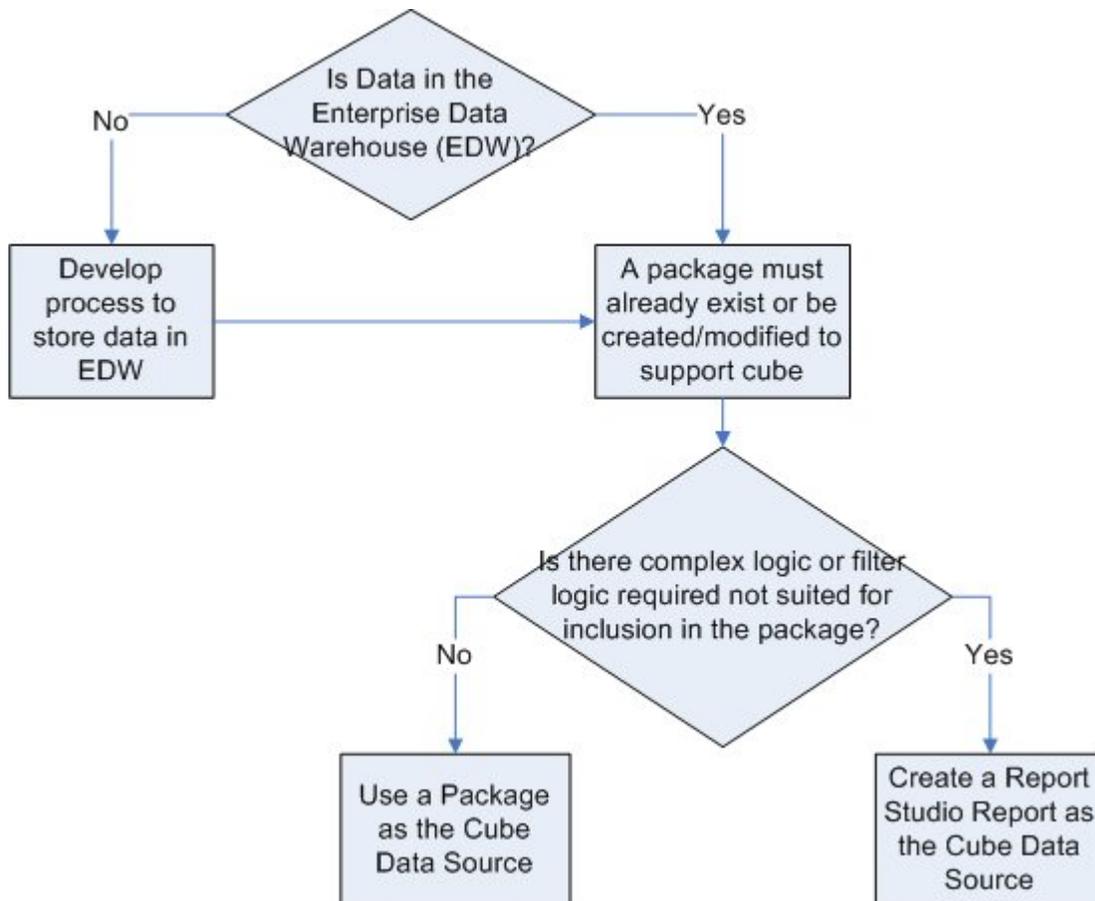
Active reports that will be deployed to production or distributed with production data must adhere to the following standards:

1. The acceptable file size for an IBM Cognos Active Report is no larger than 10 MB. If users are looking for a high level dashboard for a quick overview while on the go then smaller reports that load faster would be best.
2. **Keep Decks Simple** - Decks should only contain data that is unique to a card. Any common styling or static content should be placed outside of the deck in order to avoid it being unnecessarily duplicated. The end result will appear the same to the end user but the output file size will be reduced if the styling is placed outside the deck because the styling is only included once in the output file.

3. The target platform for the active report should be determined prior to development and the report should be written to take this into account to optimize the end user experience.
4. Active Reports should not be developed for mobile platforms (iOS, Android, Blackberry, Windows Mobile).
5. No PII, HIPAA, or other sensitive data is allowed in Active Reports or their underlying MHT files as it is not always obvious such data is present in the underlying MHT files. This must be evaluated during the Active Report development and prior to deployment.
6. Active reports should always be mocked up prior to any development. Such mockups should show the various objects in the report as well as their controls/interactivity and various state changes. These mockups must be reviewed by EKMS prior to any report development beginning.
7. Prior to the Active Report being made available for end-user UAT, the functioning report must undergo a review by EKMS. Sufficient time should be allowed in the development timeline for changes required by EKMS to be made.

### Cube Development

All data used to generate cubes must exist in the Data Warehouse and be accessible through a Framework Manager package as described in the diagram below.



*Develop process to store data in EDW* – See [Data Warehouse Standards](http://mydhs/oa/bis/busandtechstandards/knowledgemgmtdomain/index.htm) under the Data Warehouse portion of the Knowledge Management domain at <http://mydhs/oa/bis/busandtechstandards/knowledgemgmtdomain/index.htm> for details.

Use a Package as the cube data source – See [Cognos Model/Package Development](http://mydhs/oa/bis/busandtechstandards/knowledgemgmtdomain/index.htm) under the Business Intelligence portion of the Knowledge Management domain at <http://mydhs/oa/bis/busandtechstandards/knowledgemgmtdomain/index.htm> for details.

Create a Report Studio Report as the cube data source. – See Report Development portion of this standard for details.

### Cube Summary/Support Tables

When it is necessary to create new database tables to support a cube’s star-schema grouping the following standards apply.

1. When new subject areas are added to the Data Warehouse, any requirements for cubes associated with those subject areas should be considered. If this consideration is given in the requirements phase of a project there will be minimal need to create new tables/star-schema groupings in the Data Warehouse after the fact.
2. All cubes should be based around star-schema (snowflake) groupings with a central fact table surrounded by one or more dimension tables. This star-schema should be optimized to support cube builds. (This is in contrast to a more normalized relational model as would be found in a transactional system.)
3. The measures of a cube should be sourced from fields in the central fact table of the star-schema grouping. (Measures should not be derived from the dimension tables of the star-schema grouping.)

### Naming Conventions for Cube Summary/Support Tables

- Database tables and fields created to support cubes should follow BIS Data Domain standards.

### Location of Cube Summary/Support Tables

1. Summary tables created to support cube building should be owned by the ‘cube’ user and placed in the ‘cube’ schema of the EDWT environment.
2. If cube drill-through reports access tables not already in the EDWP environment those tables should receive database approval and exist in the EDWP environment. (This is in contrast to drill-through reports that access tables already existing in the production EDWP environment.) Provisions will need to be made to update these tables on a regular basis as required by the cube build schedule

### Cube Summary/Support Table Permissions

1. The ‘cube’ user should be granted SELECT privilege on tables created to support cubes.
2. The ‘impromptu’ user should be granted SELECT privilege on tables created to support cubes if those tables will be accessed through a Report Studio report.

### Transformer Data-Sources

The following guidelines should be used when determining the data-source to source cubes from:

Data Source	Guideline
Framework Manager Package	<ul style="list-style-type: none"> <li>• When a Framework Manager package is useable without the need for a Report Studio report (see below).</li> </ul>
Report Studio Report	<ul style="list-style-type: none"> <li>• When one or more of the following is required:               <ol style="list-style-type: none"> <li>1. The model query subject describing the cube(s) needs to be filtered in a way that cannot be performed in the package. (E.g. only a limited subset or range of the data found in the model query subject is used by the cube.)</li> <li>2. The model query subject describing the cube requires complex logic that cannot be implemented as part of a package. (In this situation justification must be provided why it</li> </ol> </li> </ul>

	is better to implement this logic in the report rather than in the Framework Manager package or the ETL/SQL process used to populate the cube's central fact table.)
File based format (fixed-length, delimited, CSV, etc.)	These will be addressed on a case-by-case basis and must be reviewed by EKMS.
Impromptu IQD Files	New cubes may not use IQD files as data-sources for a cube. (Impromptu is being deprecated and versions of Framework Manager greater than 8.3 will no longer allow the creation of IQD files from a Framework Manager model.)  All new additions, or major modification to existing cubes and Transformer Models, must abide by this standard.
Access Query or Excel Query	These should not be used as data sources for a cube.
Hard-Coded SQL	Hard coded SQL (in a Report Studio report or not) should not be used as a data source for a cube.

## Data-Source Permissions

1. Cognos packages and reports used as data-sources by cubes should only be accessible to the 'cognos' user within Cognos Connection.
2. Packages and reports used exclusively for cube builds should not be visible to general users within Cognos Connection.
3. Cognos Transformer should use the 'cognos' login when modeling/building cubes which use a Cognos package or report as their data-source.

## Framework Manager Models and Packages

1. Consult the Framework Manager modeling standards document for details on Framework Manager models used as data-sources.
2. Packages used as data-sources should be placed within the "Cube Packages" folder under the "Public Folders > Program Area" folder within Cognos Connection.

## Report Studio Reports

1. Report Studio reports used as cube data sources should, within Cognos Connection, be placed within the package they are derived from.
2. Report Studio reports used as a data source should be named "*Cube Name* Cube" where "*Cube Name*" is the business name of the cube as defined by the user. If multiple cubes will be derived from the same Report Studio report then an appropriately descriptive name should be chosen and "Cubes" substituted for "Cube." Example: LIHEAP Payments Cube, LIHEAP Recipient Cubes.
3. Report Studio reports used for a drill through should be named "*Cube Business Name: Descriptive* Details" where "*Cube Business Name*" is the business name of the cube as defined by the user and "*Descriptive*" describes the measure being drilled down on. Example: LIHEAP Payments: Payment Amount Details, LIHEAP Cases: Recipient Details.

## **Transformer Model Standards**

1. All Transformer models utilized by production cubes must be provided to BIS as part of a BI deployment release so they can be included in the DHS Transformer Model Library
2. If multiple, similar, cubes will be derived from the same data-source, it is preferable to have those cubes utilize the same Transformer model rather than having a separate, identical, model for each cube.
3. Transformer models should be named "*Cube Name* Model" where "*Cube Name*" is the business name of the cube as defined by the user. If multiple cubes will be derived from the same Transformer model then an appropriately descriptive name should be used. Example: LIHEAP Payments Model, LIHEAP Cubes Model.
4. Cubes will be named: "*Business Name* Cube", where "*Business Name*" is the business name as agreed upon or supplied by the end user. Example: LIHEAP Payments Cube.
5. The name and the file name of the Cube, as specified in its properties within the Transformer model, must match the title of the Cube as it will appear within Cognos Connection including proper capitalization and punctuation.
6. The names of all dimensions within a cube should be approved by the end-user and descriptive of the dimension being provided. Acronyms and abbreviations should not be used. Example: "Category of Assistance," "County," "Recipient Date of Birth."
7. Measure names should be in the format "*Measure Type* *Measure Name*" where "*Measure Type*" corresponds to the type of measure being given (total, count, distinct count, etc.) and "*Measure Name*"

is the business item being measured. “*Measure Name*” should be approved by the end-user and acronyms and abbreviations should be spelled out. Example: “Total Assistance Amount,” “Distinct Count of Recipients,” “Total Applications Processed.”

8. **No more than twelve dimensions and ten measures should be used in a single cube.** Limited exceptions may be granted with proper business justification and approval from EKMS. Any exceptions will require a build demonstration of the prospective cube. This demonstration must include the following items:
  - a. The cube must be built using the maximum projected data size and range it would encounter in the production environment. The time it takes to perform this build will be evaluated to ensure that the cube can be built in a timely fashion.
  - b. Access to the data used in the build test must be provided to EKMS.
  - c. Access to the completed cube (built as described above) must be provided to EKMS. This will allow EKMS to test the response-time of the cube from a user-perspective.
9. **If a dimension contains more than 200 category items, that dimension must be broken down into hierarchical levels.**
10. **No non-time dimension can be made on a set of data with more than 1,000 items, regardless of how many levels compose its hierarchy.**
11. **No non-time hierarchical dimension should ever contain more than five levels in its hierarchy.**
12. Data within a cube level should not be presented randomly. It should be sorted alphabetically, numerically, or in some other logical fashion that meets the business requirements.
13. Any measure or dimension in a cube which contains an empty or NULL value should have an appropriate default value set for that field.
14. **All queries that result from each cube must be reviewed from a performance standpoint and evaluated for tuning opportunities prior to deployment.**

## Naming Conventions:

- All OLAP cubes must follow the naming conventions defined below.
- *Italicized* text indicates a variable name. Normal text indicates a literal.

Naming Conventions			
Object	Naming Convention	Examples	Notes
Cube Dimension Names	<i>Dimension Name</i>	Categories of Assistance Counties	Dimension names should be approved by the end-user. Acronyms and abbreviations should not be used. See the rules for naming dimensions above.
Cube Measure Names	<i>Type of Measure Measure Name</i>	Distinct Count of Recipients	The Measure Name should be approved by the end user. Acronyms and abbreviations should not be used. See the rules for naming measures above.
Cube Name	<i>Business Name Cube</i>	LIHEAP Payments Cube	The Cube Name should be approved by the end user.
Data Sources			Reference Data Source Standard.
Database Table Field Names		CAT_CODE	Field names should follow BIS Data Domain standards

Database Table Names		T_ADR_DIM	Table names should follow BIS Data Domain standards
Package Names	<i>Business Name</i> OLAP Package	Expedited Medical Encounters OLAP Package	Business Name should be approved by the end user.
Report Names for Reports Used as Data Sources	<i>Cube Business Name</i> Cube <i>Cube Descriptor</i> Cubes	LIHEAP Payments Cube LIHEAP Recipients Cubes	The Cube Name should be approved by the end user. See the rules for naming cubes above.
Report Names for Drill Through Reports	<i>Cube Business Name: Descriptive</i> Details	LIHEAP Payments: Payment Amount Details LIHEAP Cases: Recipient Details.	“Descriptive” should describe the measure being drilled down on.
Transformer Model Names	<i>Cube Name</i> Model	LIHEAP Payments Model LIHEAP Cubes Model	The Cube Name should be approved by the end user. See the rules for naming Transformer models above.

## Object Description

The description is a property available under each folder and object within Cognos Connection. A description is required for every production folder and object. The description property must be set in the development staging area prior to submitting a request to deploy objects to staging and production.

Descriptions must adhere to the following standards:

### Folders

Name folders within the Public Folders tab for the specific project or program area. Acronyms should be avoided. Folder descriptions should describe the specific project or program area. Subfolders should provide a logical grouping under the specific project or program area and the description should explain that grouping.

### Application (Cube/Report/Link/Job)

The description should include a brief definition of the application and any special considerations. Any acronyms used in the object name must be spelled out here. The following sample description has both:

MR Consumer Eligibility Determination

The Mental Retardation (MR) Consumer Eligibility Determination Cube allows for the analysis of the Number of Active MR Consumers who an eligibility length of time can be calculated for. These consumers must have an MR Date of Registration and a Notification of Eligibility Date (date that the Eligibility Notification Document was printed) in order to be considered in this cube. In addition, only consumers with an Eligibility Begin Date and an Active record status are considered in this cube.

Additional description standards by application type:

1. Cube – Include as Title Text for each new cube: “Latest cube update: <var>MDC file date</var>”.
2. Report – If the report is a prompt report, include [Prompt Report] at the beginning of the description.
3. Link – If accessible only within the DHS network, include [Available to Intranet Users Only] at the beginning of the description.
4. PDF Document Link – Include [PDF Document] at the beginning of the description.

## Review for Compliance

All Cognos reports and cubes that will reside on the production DHS Cognos BI web reporting site must be available for a compliance review by BIS staff prior to the start of user acceptance testing phase or 3 weeks prior to implementation, whichever is earlier, for each development/enhancement project. Applications that fail this standard will not be deployed into production.

## Exemptions from this Standard:

All exemptions to this standard must be approved on a case-by-case basis by EKMS after appropriate justification for an exemption has been provided.

## Refresh Schedule:

All standards and referenced documentation identified in this standard will be subject to review and possible revision annually or upon request by the DHS Information Technology Standards Team.

## Standard Revision Log:

Change Date	Version	Change Description	Author and Organization
12/21/2007	1.0	Initial Creation	Larry Leitzel, EKMS
07/22/2008	1.1	Added language to allow review against standard	Larry Leitzel, EKMS
10/20/2008	1.2	Updated requirements for OLAP cubes that fail to meet standard	Larry Leitzel, EKMS
03/02/2010	2.0	Major revision to incorporate standards for Cognos 8 BI cube development.	Bryan Porter, EKMS
11/30/2013	2.1	Update report development standards and define data source naming conventions.	Larry Leitzel, EKMS
02/18/2016	2.2	Replaced DPW and Public Welfare with DHS and Human Services. Updated links to <a href="#">Data Warehouse Standards</a> and <a href="#">Cognos Model/Package Development</a> .	Joe Sweigard, EKMS