



Cisco Information Server Environments KPI

Functional Requirements

Data Virtualization Business Unit Advanced Services

January 2015

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DOCUMENT CONTROL

Version History

Version	Date	Author	Description
1.0	June 2014	Scott Neustein	Initial revision
1.1	June 2014	Scott Neustein	Updated car file names, added SQL Server specific install instructions, and fixed the path for KPI.
1.2	July 2014	Scott Neustein	Created upgrade path, fixed the cache times and the load script times for Performance and updated documentation for clarity, documented how to upgrade from 1.0/1, and documented how to configure the long running queries feature.
1.2.1	August 2014	Scott Neustein	Updated documentation and code for allowing a different schema and/or catalog in MS SQL Server and Oracle
2014.08	August 2014	Scott Neustein	Changed version to reflect all other open sourced projects, added automation for installations that have different Schemas and/or catalogs, and updated documentation.
2014.12	December 2014	Scott Neustein	Complete rewrite of KPIs to be cluster safe.
2015.01	January 2015	Scott Neustein	Added Support for SQL Server for the December 2014 release

Related Documents

Document	Date	Author

Data Virtualization Business Unit (DVBU) Products Referenced

DVBU Product Name	Version
Cisco Information Server (CIS)	6.2.x
AS Utilities	2013Q402 or later

Supported Database Platforms

The majority of metrics discussed in the previous sections are generated using custom aggregation procedures. Because CIS does not retain the system metrics data needed to generate KPI data long enough for historical reporting, the KPI module must store this cached data to a dedicated database in order to retain the generated results.

The KPI module only supports the following database platforms at this time as incremental caching targets.

1. Oracle 11g or later
2. MySQL 5.0 or later
3. SQL Server 2008 or later

Support for additional platforms would require customization of the KPI module by a dvbu solutions consultant. Please contact Cisco's dvbu advanced service group for details.

Prerequisite

Install the latest AS Utilities, from <http://github.com/cisco>. This is required for the KPI's to work.

New Installation

This version of KPIs does NOT allow for upgrading from a prior version.

Import the KPI components to your CIS instance

You must deploy the KPI components to your CIS instance in order to use the KPI module.

Complete the following steps to deploy the KPI components

1. Sign into Studio and connect to your target CIS instance as a user with administrator privileges.
2. In the repository tree, right click on the "Desktop (username)" folder icon at the top left and select Import. This is done here, as this will also create a database object.
3. Import the file `Kpi_for_CIS_major_minor.car` with the overwrite checkbox enabled. The folder `/shared/ASAssets/KPI` should appear after the import completes. (This may need to be done twice to resolve impacted items. After import NO objects should be impacted.)

Create and Configure the KPI data source

The KPI module makes use of several custom tables to store logging and metrics data. You must configure a data source connection in order to view KPI data.

1. Create the database
2. Initialize the Composite KPI database
 - a. MYSQL:
 - i. From the file system where Composite is installed:
 - ii. `cd to $CIS_HOME/apps/mysql-5_0_72/bin`
 - iii. `mysqladmin --user=root --port=<port#> --password=<password> --host=localhost create COMPOSITE_KPI`
e.g. `mysqladmin --user=root --port=9408 --password=admin --host=localhost create COMPOSITE_KPI`
 - b. ORACLE:
 - i. Have the customer DBA create the CIS_KPI schema and provide connection information
 - c. SQL Server

- i. Have a DBA create a CIS_KPI database and give a user dbo rights to create tables and insert, read, and delete data.
- 3. Locate and configure the data source for your KPI database.
 - a. If using a MySQL database, configure the data source /shared/ASAssets/KPI/Physical/Metadata/KPI_mysql
 - b. If using an Oracle database, configure the data source /shared/ASAssets/KPI/Physical/Metadata/KPI_oracle
 - c. If using a SQL Server database, configure the data source /shared/ASAssets/KPI/Physical/Metadata/KPI_sqlserver

Modify Common Values for your installation

The KPI module uses several constant values that are set with in the procedure /shared/ASAssets/KPI/constance/commonValues. You will need to update some of these constants with values for your environment to ensure that KPI functions correctly. Complete the following steps to proceed.

1. Open the procedure /shared/ASAssets/KPI/constance/commonValues and modify the following properties:
 - a. defaultDomainName – Provide the domain name of the ldap domain used for authentication
 - b. memoryCheckerCommandPath – Provide the absolute path to the shell script FreeMemCommand.sh. Do not change this value if deploying KPI on a windows server.
 - c. CpuCheckerCommandPath - Provide the absolute path to the shell script TopCommandGrepCpu.sh. Do not change this value if deploying KPI on a windows server.
 - d. dataSourceName – Provide the name of the data source used to store KPI data. Valid values are KPI_mysql, KPI_oracle or KPI_sqlserver.
 - e. If your installation has a different schema and/or catalog than the default, then update the appropriate property:
 - i. dataSourceSchemaPath_sqlserver
 - ii. dataSourceSchemaPath_oracle
 - iii. dataSourceScheamPath_sqlserver

Please Note this is the minimum that you need to modify. Other settings may need to be modified for additional functional to perform as expected; these should be reviewed to ensure that they are correct.

Create or Configure the Composite KPI database tables

The KPI module requires several tables in the KPI data source database in order to store metrics data for reporting. You must create these storage

tables using the provided DDL in order for the KPI module to function correctly

1. Create the KPI storage tables
 - a. If you choose to create the tables from within Studio, execute the packaged queries under
/shared/ASAssets/KP/Physical/Metadata/DDL for your data source. These are numbered for ease of deployment.
 - b. If you choose to execute the DDL externally. Copy the DDL from the packaged queries for your database, modify them as needed, execute them in your external tool, and then introspect the tables under your data source.
2. Reintrospect the KPI data source to confirm that the tables are visible. (Required if you used Oracle or SQL Server and did not use the schema or database of CIS_KPI.)
 - i. *Please note: If you had to change the schema or catalog of the database, then you will need to update the table creation DDL in the packaged queries before they are executed.*
 - ii. *Also note that if you changed the schema or catalog, you will need to reintrospect all tables into your data source, and reconfigure view caches and views. This step is no longer optional if you used a schema different than CIS_KPI.*
3. If you have changed the default schema and/or catalog then you MUST do the following:
 - a. Make sure the following are set correctly in the
/shared/ASAssets/KPI/constants/commonValues sql script.
 - i. physicalPhysicalPath (This should not need to be modified.)
 - ii. dataSourceName
 - iii. The correct one of these:
 1. dataSourceSchemaPath_mysql
 2. dataSourceSchemaPath_oracle
 3. dataSourceSchemaPath_sqlserver
 - b. Then run the following utility:
/shared/ASAssets/KPI/Utilities/updatePhysicalSchemaCatalog

OR
 - c. Change all of the views manually to the correct data source:
/shared/ASAssets/KPI/Physical/Physical/KPI_{DATABASE}
4. If the installation does not use MySQL as the KPI database, you MUST do the following step.

Update the KPI system settings the in the directory,
/shared/ASAssets/KPI/Physical/Metadata/System

- a. Make sure the following are set correctly in the
/shared/ASAssets/KPI/constants/commonValues sql script.
 - i. basePath
 - ii. dataSourceName
 - iii. The correct one of these:
 1. dataSourceSchemaPath_mysql
 2. dataSourceSchemaPath_oracle
 3. dataSourceSchemaPath_sqlserver

- b. Run this utility:
/shared/ASAssets/KPI/Utilities/updateCacheDS

OR

- a. The cache data source should be your database
- b. The results should be the correct table in the database.

Storage

☐ Automatic ☒ Single Table ☐ Multi-table

Data Source: /shared/ASAssets/KPI/Physical/Metadata/KPI_mysql Browse... Open Data Source

Table for caching

result: /shared/ASAssets/KPI/Physical/Metadata/KPI_mysql/all_users Browse...

5. Execute the procedure if you are not using MySQL with the schema of
CIS_KPI:

/shared/ASAssets/KPI/Utilities/rebindPhysicalAbstraction

This will rebind all KPI abstraction layer views to the appropriate data
source. Provide the following input values appropriate to your data
source

- a. MySql: Rebinding not needed
- b. Oracle:

oldDatasourceFolderName: KPI_mysql,
newDataSourceFolderName: KPI_oracle

c. SQL Server

oldDataSourceFolderName:KPI_mysql
newDataSourceFolderName: KPI_sqlserver

Configure Resource Usage Data Source

Configure the KPI data source
/shared/ASAssets/KPI/Physical/Metadata/CIS_Resource_Usage to point to your CIS server's logs directory to allow the KPI module to successfully load resource usage data. DO NOT reintrospect the data source after updating the configuration settings.

Please note that the following instructions assume that your CIS server is configured to use the default log directory. If you have configured your server to use a different logs directory, you will need to update the data source with the correct path.

1. Update the Root Path property of the data source
/shared/ASAssets/KPI/Physical/Metadata/CIS_Resource_Usage to point to <CIS Install Directory>/logs.

Update CIS Logging settings

You will need to enable additional logging functionality on the Composite server in order for the KPI module to collect system metrics needed for reporting.

1. Sign into Composite studio with admin rights
2. Execute the procedure /shared/ASAssets/KPI/Utilities/initializeCISLogs
3. Restart your CIS instance to make sure the settings are applied completely

If the system has a high number of requests, another setting may need to be updated to a higher number.

1. Sign into Composite studio with admin rights
2. Go to Administration → Configuration
3. Navigate to Server > Runtime Processing Information > Requests > Request Purge Period.
4. The default is 5, increase this number to same as the refresh of the incremental cache on sys_requests.

Deploy CPU and Memory Checker shell scripts (Linux installs only)

When deploying the KPI module to a CIS instance running on Linux, you must also deploy the shell scripts FreeMemCommand.sh and TopCommandGrepCpu.sh to your CIS server in a location that they can be executed by the user account that CIS is running under. Take note of where the scripts have been deployed, you will need to provide the path to the scripts when configuring the KPI module.

Please note that you do not need to complete this step if deploying the KPI module onto a CIS instance hosted on Windows.

Configuration

Update Common Values

The KPI module uses several constant values that are set with in the procedure `/shared/ASAssets/KPI/constance/commonValues`. You will need to update some of these constants with values for your environment to ensure that KPI functions correctly. Complete the following steps to proceed.

1. Open the procedure `/shared/ASAssets/KPI/constance/commonValues` and modify the following properties:
 - a. `defaultDomainName` – Provide the domain name of the ldap domain used for authentication
 - b. `memoryCheckerCommandPath` – Provide the absolute path to the shell script `FreeMemCommand.sh`. Do not change this value if deploying KPI on a windows server.
 - c. `CpuCheckerCommandPath` - Provide the absolute path to the shell script `TopCommandGrepCpu.sh`. Do not change this value if deploying KPI on a windows server.
 - d. `dataSourceName` – Provide the name of the data source used to store KPI data. Valid values are `KPI_mysql`, `KPI_oracle`, `KPI_sqlserver`.

Configure LDAP data source (if applicable)

The KPI module is designed to retrieve user data from an LDAP directory server in order provide additional detail on which users are making use of a monitored CIS environment. You must configure the LDAP datasource provided with the KPI module to connect to your corporate LDAP directory server.

1. Sign into Cisco Information Server studio with admin rights
2. Configure the LDAP data source
`/shared/ASAssets/KPI/Physical/Metadata/LDAP`
3. If necessary, modify the view
`/shared/ASAssets/KPI/Physical/Formatting/requestMonitoring/vLdapPerson` to correctly map to your LDAP directory structure

Please note that you may need to modify the formatting layer view `/shared/ASAssets/KPI/Physical/Formatting/requestMonitoring/vLdapPerson` if your LDAP server's structure differs from the base LDAP implementation used by KPI.

Data Loading and Transformations

The KPI system uses a combination of caching and SQL Scripts, run via triggers to be cluster enabled, to collect the raw data for KPI and to then transform the raw data into usable information.

Raw Data Capture

The raw data is captured two (2) ways. The first is by the use of caching within CIS. This is for data that can be taken by any server. The second is by having sql scripts that are called on each server by a trigger. This will allow the system to be installed on a cluster.

Enable Incremental Caches

The KPI module makes use of incremental caches in order to retain CIS metrics for a longer period than supported by the base CIS logging functionality.

Please note that incremental caches should only be enabled after all other deployment and configuration steps have successfully completed.

Enable Cache

Execute the procedure
/shared/ASAssets/KPI/Utilities/updateCachedViews with the input value
'E' to enable all incremental caches on KPI views.
Cache and Load Script Configurations

Cache Setup

Caches are run incrementally at regular intervals to get data from the system database and put it in a long-term storage solution.

Name	Cache Type	Frequency
ALL_USERS	Full	Every Hour
SYS_CACHES	Incremental	Every Hour
Ldap_person (not required)	Full	Once a day

Enable Triggers

Execute the procedure /shared/ASAssets/KPI/Utilities/updateTriggers with the input of 1 to enable the triggers.

Trigger Setup

The triggers are run at regular intervals to migrate the data from each server into the KPI database.

Triggers in .../KPI/Business/KPILoad/LoadScripts/pPurgeData

Name	Frequency
kpiTrig_CIS_RESOURCE_LOGS_Cache	Every hour
kpiTrig_CPU_MEMORY_CHECKER_Cache	Every 15 Minutes
kpiTrig_LOG_DISK_Cache	Every 10 Minutes
kpiTrig_LOG_EVENTS_Cache	Every Minute
kpiTrig_LOG_IO_Cache	Every 10 Minutes
kpiTrig_LOG_MEMORY_Cache	Every 10 Minutes
kpiTrig_SYS_DATASOURCES_Cache	Every 15 Minutes
kpiTrig_SYS_REQUESTS_Cache	Every 10 Minutes
kpiTrig_SYS_SESSIONS_Cache	Every 10 Minutes

Triggers in .../KPI/Utilities/Triggers

Name	Frequency
kpiTrig_CheckLongRunningRequests	Not enabled by default, Every 10 Minutes
kpiTrig_initializeCISLogs	Not enabled by default, Once a day @ 1:00 am

Transformations

Load Scripts

Load scripts are run by system triggers. They will aggregate and enhance the data that has been incrementally loaded and transform it into more useful data than just the raw data. For example the log_disk, log_io, log_memory and cpu_memorychecker are summarized into 15 minute averages for a better understanding of how the load of your system is effecting performance.

Triggers in .../KPI/Business/KPILoad/Triggers

Name	Frequency
kpiTrig_LoadLogEvents	Once a day @ 3:30 am
kpiTrig_PurgeHistoryData	Once a day @ 8:00 pm
kpiTrig_UpdateDatasourceUsage	Every 6 hours, Midnight, 6am, Noon, 6pm
kpiTrig_UpdateEventRequests	Once a day @ 4:00 am
kpiTrig_UpdateSystemResources	Once a day @ 3:15 am

Long Running Queries

There is a way to monitor long running queries as they are happening. The default configuration for this feature is for the query to run every 10 minutes, and to check for all queries still running after 30 minutes. Note: this will run against the sys_request table in the system database and is not subject to the 24 hour delay.

To make this work, the server will need to have email enabled and some configuration setup.

1. Administration → Configuration set up Server/Configuration/Email.
2. In commonValues put valid values in the following:
 - a. replyTo
 - b. sendTo



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Appendix

KPI Install Checklist

This is a quick start install checklist and is by no means a complete list.

Pre-Installation Database

1. Database identified (MySQL or Oracle)
2. Connection information is available and valid.
Username/Password _____ / _____
Server Name/IP Address _____
Port _____
Database Name _____
3. Permissions (These are the general ones needed, they may differ in your database.)
 - a. Connection
 - b. Read
 - c. Write
 - d. Delete
 - e. Update
 - f. Create Table
 - g. Create Index

Software Installation

To be done after the pre-installation is complete

1. Verify that all prerequisites are meet, (ASUtilities) See Page 5	
2. Import the car file See Page 5	
3. Open the database connection and update the settings See Page 5	
4. Update the system configuration See Page 6	
5. Run the correct DDL in the numbered order. See Page 5	
6. Initialize the CIS Logs See Page 9	
7. Initialize the Cache Settings See Page 12	
8. Enable Cache See Page 12	
9. Enable Triggers See Page 12	