

Everything You Need to Know About the IBM i Administration Runtime Expert

Dawn May

DawnMay@dawnmayi.com

dawnmayi.com

@DawnMayiCan



What is the Administration Runtime Expert?

- The Administration Runtime Expert (ARE) allows you to
 - Identify an extensive set of attributes that you want to ensure don't change
 - Run a verification to ensure those attributes have not changed
 - Review reports on the results of the verification
 - Automatically correct a subset of errors
 - Distribute, and optionally apply, PTFs to groups of systems
 - Extend the IBM-provided functionality with your own custom plug-ins

Why use the Administration Runtime Expert (ARE)?

- Identify attributes that may have changed on a single partition
- Ensure consistency across multiple partitions
 - Environmental settings
 - Application attributes
 - Security settings
- Identify differences between test and production environments
- Track changes to show nothing has changed for audit and compliance requirements
- Ensure PTF consistency
- Distribute and optionally load and apply PTFs
- ... and many more

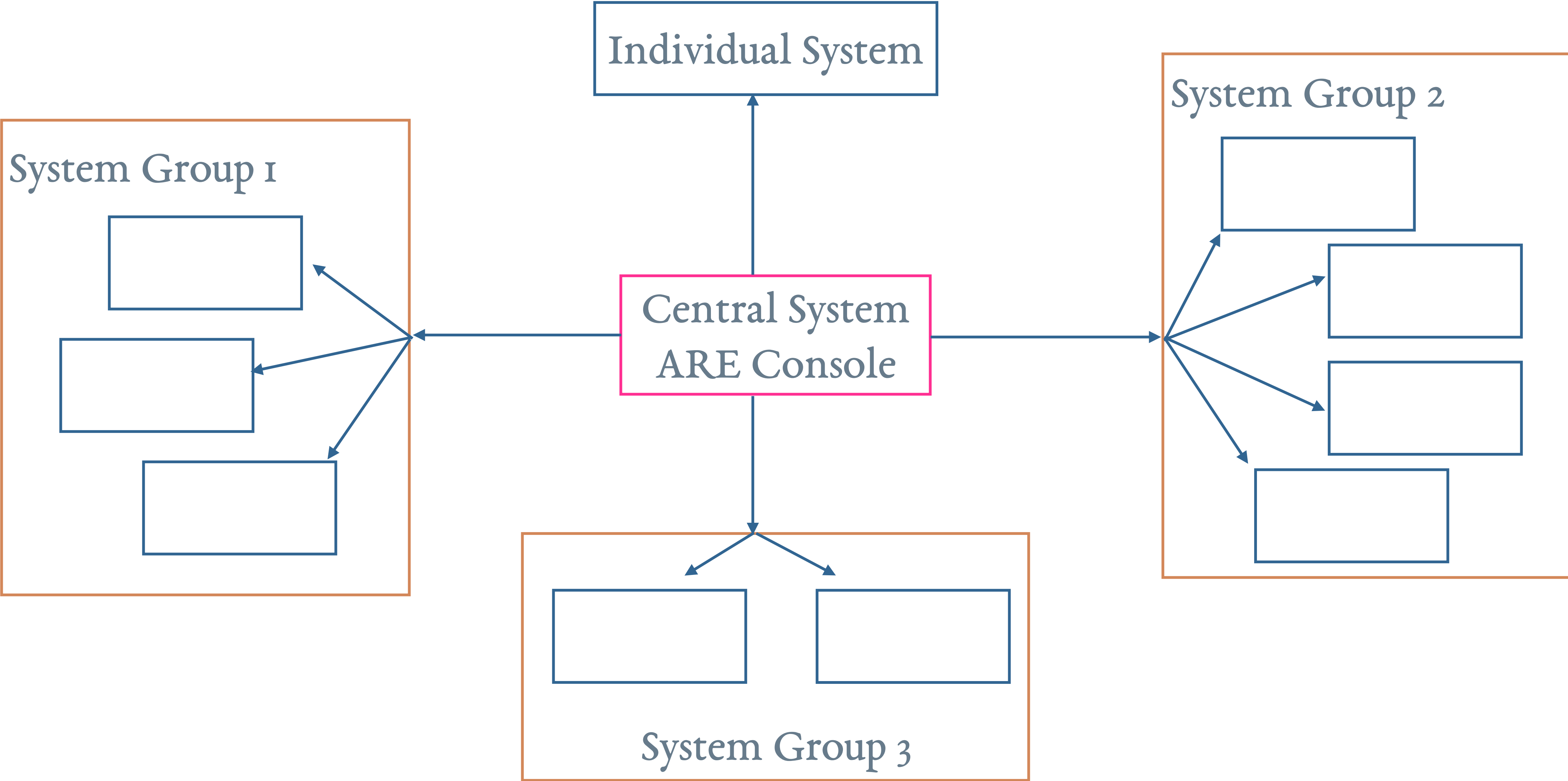
Attributes that can be Verified

- Application attributes
 - Existence, authorities, any attribute applicable to the object
 - Contents of configuration files
- Products and PTFs
- TCP/IP Configuration and ports
- System values and network attributes, system environment variables
- User Profiles

- Anything you can verify with SQL, CL, or Shell commands
- Anything else with custom plug-ins



Overview of ARE



ARE Installation

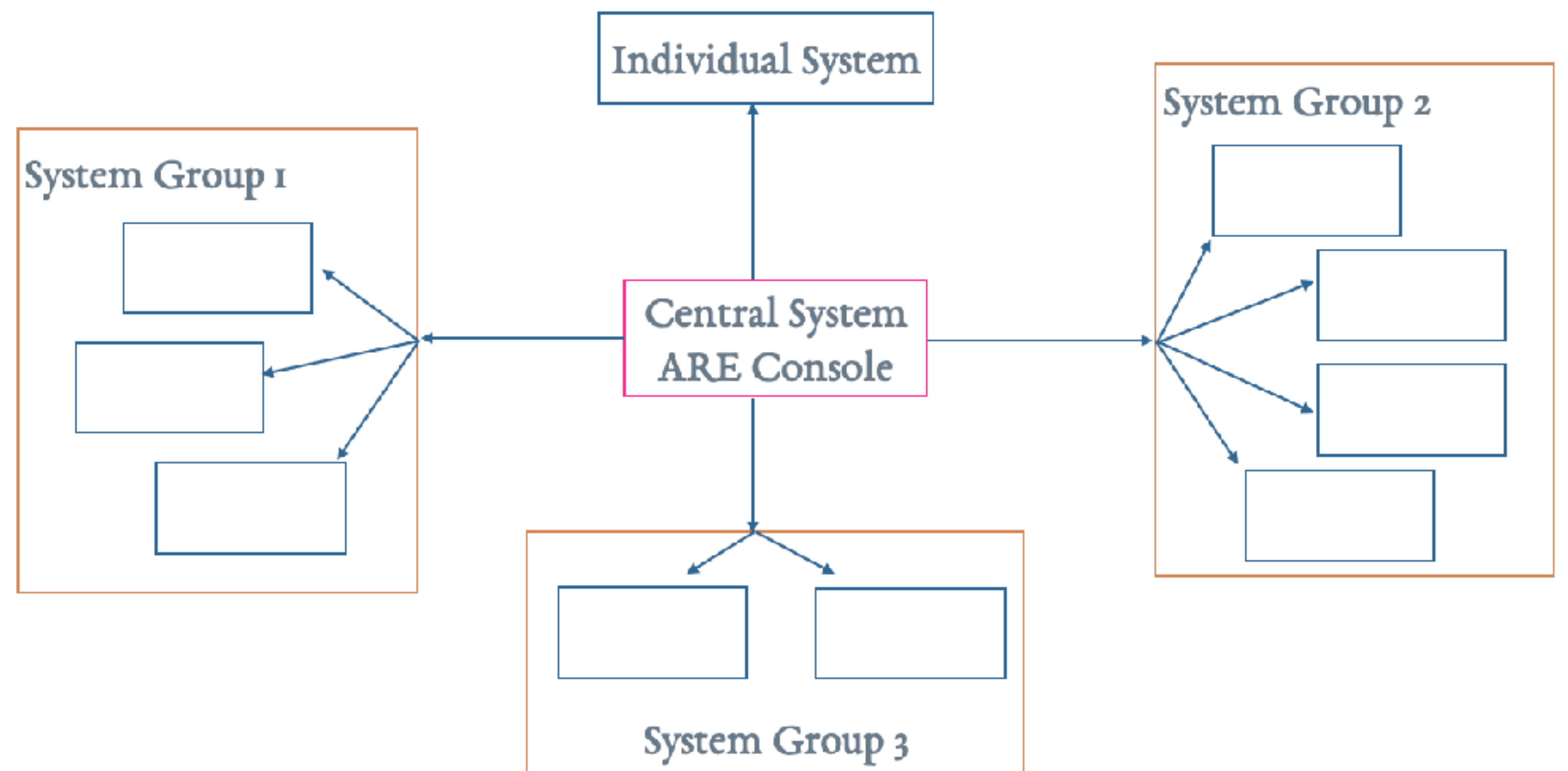
- ARE consists of two parts:
 - 5733-ARE
 - This product is required to be installed on the **central system**
 - The ARE LPP provides the graphical user interface
 - You can find the version of the console on the main web page
 - ARE runtime engine (also called the *ARE core*)
 - Shipped with the operating system
 - Used on the endpoints to run verifications



V 3.2.7

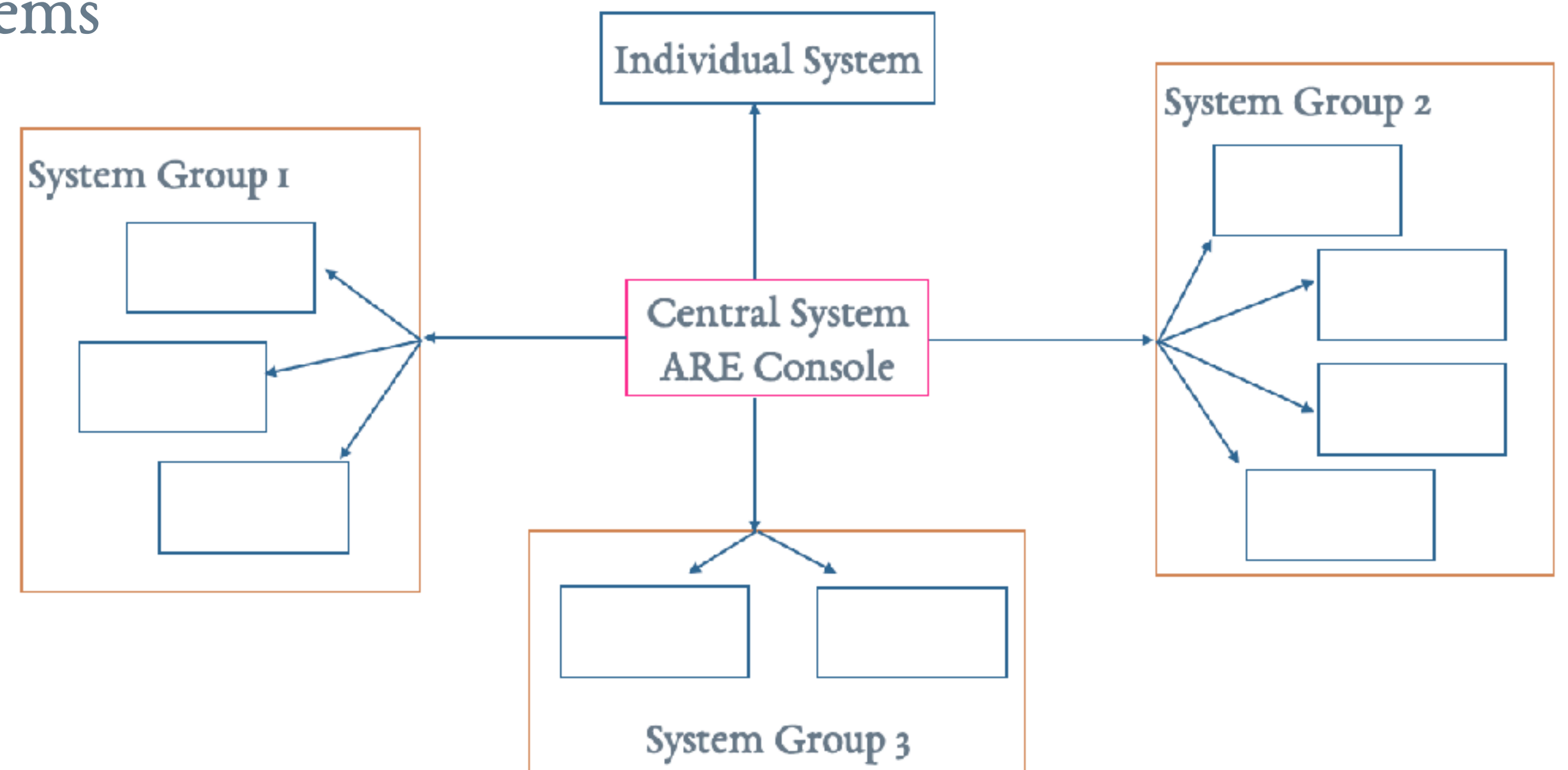
Central System: the ARE Template Editor and Console

- 5733-ARE only needs to be installed on partitions where the GUI will be used
 - Create and edit deployment templates
 - Define target systems and groups
 - Initiate manual verifications
 - Schedule automated verifications
 - Review reports
 - Execute fix actions



ARE Runtime Engine and Target Systems

- The ARE runtime engine is a set of Java classes used for doing the validation
 - IBM documentation refers to this runtime engine as the *ARE core*
- Shipped as part of the base operating system
 - *s733*-ARE is not required on target systems



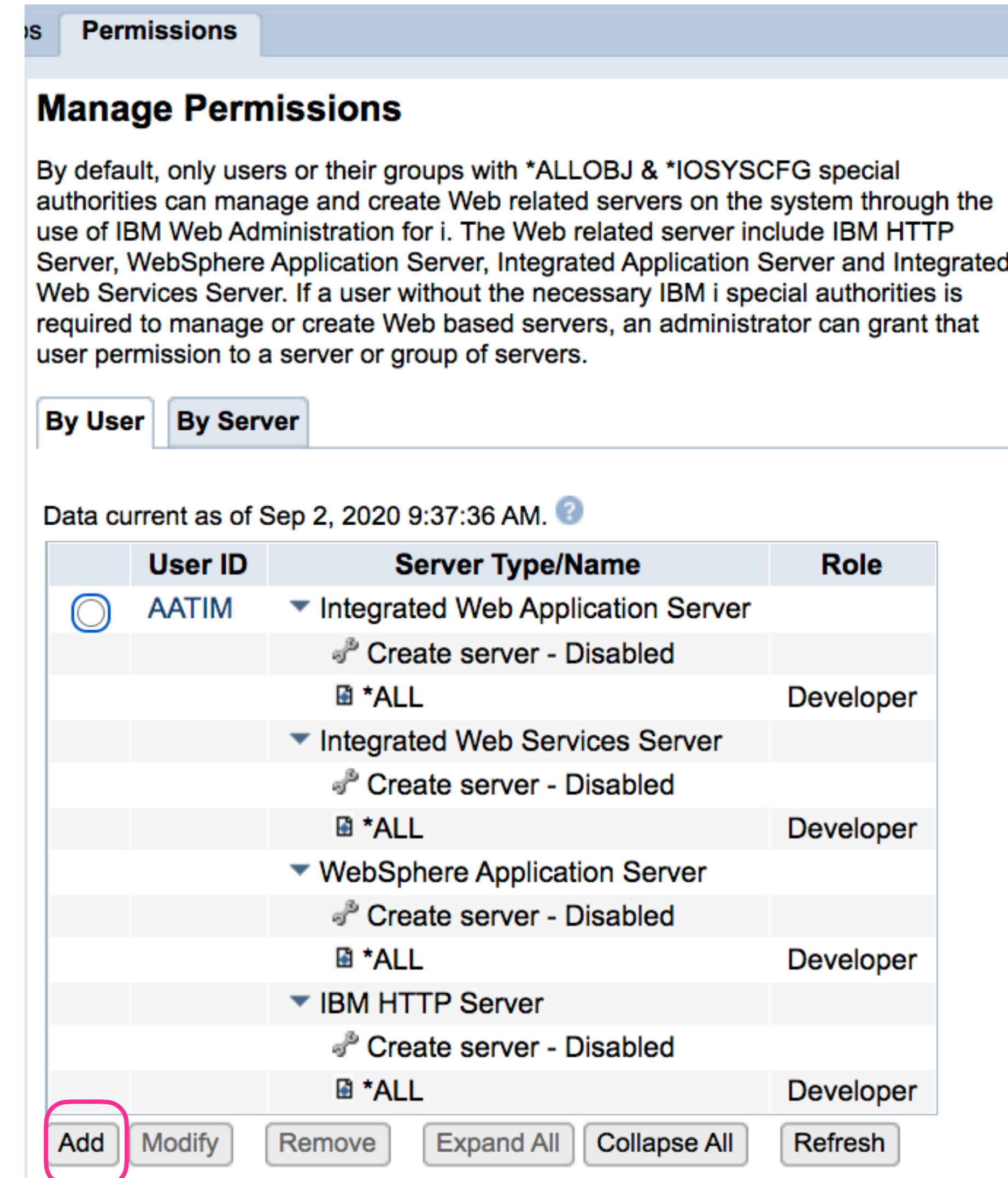
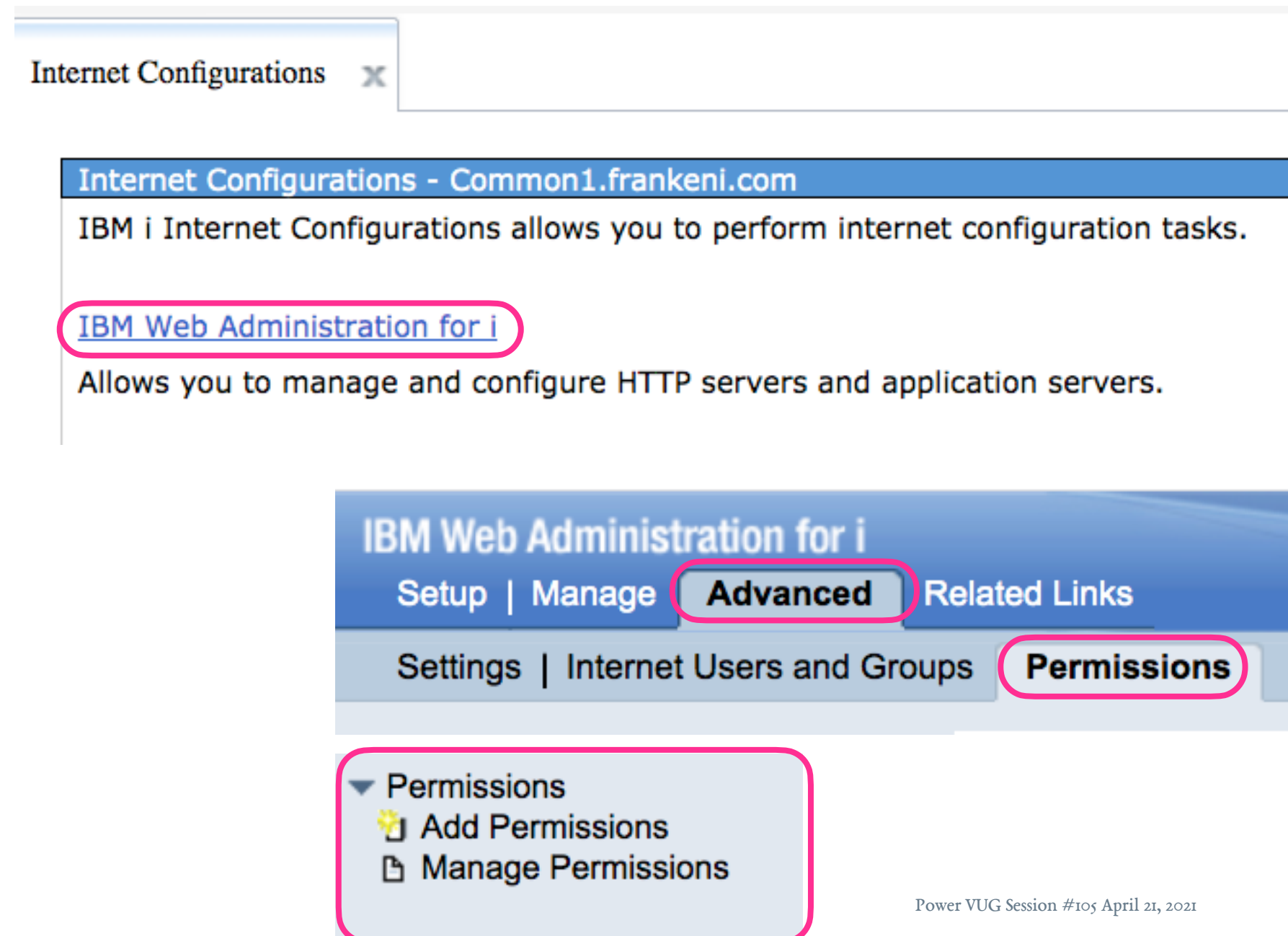
Installation and Setup of ARE

- Install 5733-ARE on the central system
- Ensure required ports are available
 - 12401 on the central system
 - Host servers on endpoint systems
- The ARE Console runs in the IBMARE web application server in the QHTTPSVR subsystem
 - **QSYS/STRTCPSVR SERVER(*HTTP) HTTPSVR(IBMARE)**
- Access the Web interface:
 - **http://system_name:12401/are**

- 5770SSI option 3 - Extended Base Directory Support
- 5770SSI option 12 - Host Servers
- 5770SSI option 30 - QShell
- 5770SSI option 33 - PASE
- 5779JVI option 16 - Java SE 8 32 bit
- 5770DGI - IBM HTTP Server for i

Authority for the ARE Web Console

- ARE user interface requires *ALLOBJ special authority
- Building a template requires access to many resources
- Using Web Administration for i, you can grant permission for any user to create templates or run verifications



Add Permissions

- Operator
- Basic capabilities: view, start and stop a server
- Developer
- Allowed to create, build, copy, delete, edit, export, import, rename a template
- Not allowed to test the template

Add Permissions

Choose User IDs - Step 1 of 3

Add users that have been granted permission to create and manage Web related servers. This allows users without the default special authorities *ALLOBJ & *IOSYSCFG, the ability to create and manage servers or server groups to which they have been granted permission within IBM Web Administration for I.

Choose the users who have permission to manage servers: ?

All User IDs on the system

DAWN
DAWNM
DAWNMAY
DAWNTEST
DAWNTWO
DAWNUSER
DBE_G21
DBE_G22
DBE_G25
DBE_G26

Previous Next

55/303

Position To: DAWN

Selected User IDs

DAWNMAY

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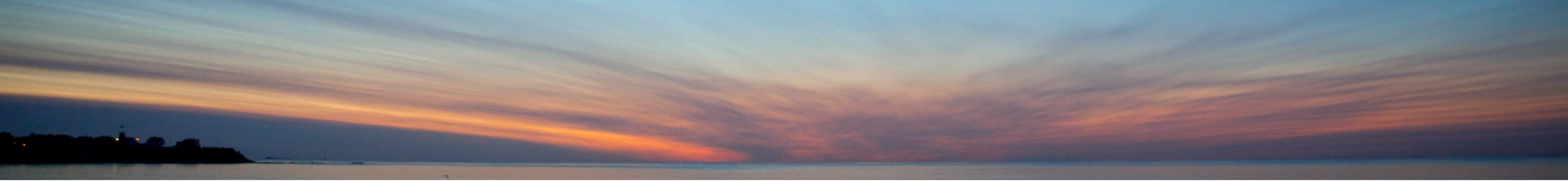
<<

Add Permissions

Specify Permissions for Servers - Step 2 of 3

Servers managed: ?

Server Type	
Integrated Web Application Server Servers: *NONE ▾	<input type="checkbox"/> Create server
Integrated Web Services Server Servers: *NONE ▾	<input type="checkbox"/> Create server
WebSphere Application Server Servers: *NONE ▾	<input type="checkbox"/> Create server
IBM HTTP Server Servers: *NONE ▾	<input type="checkbox"/> Create server
Administration Runtime Expert Role: <input checked="" type="checkbox"/> Developer Operator	<input checked="" type="checkbox"/> Grant permission



Creating Your First Template

Deployment Template Editor

The Deployment Template Editor allows users to create, edit, import and export deployment templates. The editor enables users to customize their templates. Templates created, imported, or edited using this editor can be used to verify systems using the 'Launch console' button below. [? Learn more...](#)

Manage templates:

Name	Last built by
<input checked="" type="radio"/> CWOODBURY	TIMMR
<input type="radio"/> Common	TIMMR
<input type="radio"/> Common19	TIMMR
<input type="radio"/> DawnDemo	DAWNM
<input type="radio"/> Dubai	TIMMR
<input type="radio"/> GuruDemo	DAWNM
<input type="radio"/> MyTemplate1	TIMMR
<input type="radio"/> Ocean	TIMMR
<input type="radio"/> OneThing	DAWNM
<input type="radio"/> SimpleTest	DAWNM
<input type="radio"/> Steve	TIMMR
<input type="radio"/> SystemHealth	DAWNM
<input type="radio"/> TechULasVegas	TIMMR
<input type="radio"/> VerifyInteractive	DAWNM
<input type="radio"/> data3	TIMMR
<input type="radio"/> mitec	TIMMR
<input type="radio"/> prague	TIMMR
<input type="radio"/> ptfs	TIMMR
<input type="radio"/> techuH	TIMMR
<input type="radio"/> testFix	TIMMR



V 3.2.7

Help is available throughout the GUI

[? Learn more...](#)

Name






New Template: Plugin Selection

[Home](#) > Plugin Selection and Customization

Plugin Selection and Customization

Select and Customize Plugins For Template

Template name: **ShowAndTell** [? Learn more...](#)



-  **Files and Directories**
-  **Software Requirements**
-  **Network**
-  **System Environment**
-  **Advanced**


Build template


Cancel


Template build options


Expand the desired section to access plugins

-  **System Environment**
 -  **System Values and Network Attributes**

Verify the settings of system values and network attributes.
 -  **Environment Variables**

Verify the existence and values of system-wide environment variables.
 -  **User IDs**

Verify attributes of IBM i user IDs.
 -  **Scripts and Commands**

Specify scripts and commands to run and verify on the remote system.
 -  **SQL Query Verifier**

Specify SQL to run and verify on the remote system.

File and Directory Attributes

File and Directory Attributes

Create Collections of Files, Directories, and Libraries

Files, directories, and libraries to collect information [? Learn more...](#)

Collection name	Exists	Type	Size	Last modified	CCSID	Creation time	Specific attributes
<i>Click one of the following buttons to add a collection.</i>							

Files and Directories

Legend

- The entire directory tree is selected
- Only the directory is selected
- The directory and/or some portions of its sub-tree are selected
- Directory is not selected

Collection name:

Attributes [? Learn more...](#)

- Exists
- Type
- Size
- Last modified
- CCSID
- Creation time

Filters: [? Learn more...](#)

Include:
Exclude:

Example: *.USRPRF; *USXA*

Libraries

Legend

- The entire library is selected
- Only the library is selected
- The library and/or some objects within it are selected
- Library is not selected

Collection name:

Attributes [? Learn more...](#)

- Exists
- Type
- Size
- Last modified
- CCSID
- Creation time

Filters: [? Learn more...](#)

Include:
Exclude:

Example: *.USRPRF; *USXA*

QSYS.LIB Additional Attributes

Additional attributes

- ALL
 - COMMON
 - LIB
 - PGM
 - SRVPGM
 - CMD
 - MODULE
 - JRN
 - JRNRCV
 - FILE
 - MBR

Additional attributes

- ALL
 - COMMON
 - Object name
 - Object library name
 - Return library
 - Object auxiliary storage pool (ASP) number
 - Object owner Offset
 - Object domain
 - Extended object attribute
 - Text description
 - Source file name
 - Source file library name
 - Source file member name
 - Source file updated date and time
 - Object saved date and time
 - Object restored date and time
 - Creator's user profile
 - System where object was created
 - Reset date
 - Saved size
 - Save sequence number
 - Storage
 - Save command
 - Save volume ID
 - Save device
 - Save file name

Additional attributes

- FILE
 - Type of file
 - File type (FILETYPE)
 - Access path
 - Record format level check (LVLCHK).
 - Select or omit
 - Double-byte character set (DBCS) or Graphic data
 - Double-byte character set (DBCS) or Graphic literals
 - Number of data members
 - Maximum key length for the file
 - Alternate collating sequence (ALTSEQ)
 - Force keyed access path (FRCACPTH)
 - Floating point key indicator.
 - Access path maintenance (MAINT)
 - Public authority (AUT)
 - Preferred storage unit (UNIT)
 - Maximum members (MAXMBRS)
 - Maximum file wait time (WAITFILE)
 - Records to force a write (FRCRATIO)
 - Number of members
 - Access path page size
 - Maximum record wait time (WAITRCD).
 - Program described file indicator.
 - Total number of record formats
 - Access path journaled
 - Allow read operation

Configuration Files

Configuration Files

Specify Configuration Files to Verify

Configuration files [? Learn more...](#)

Configuration file	Type
<input checked="" type="radio"/> /www/dawnmay/conf/httpd.conf	HTTP

Customize Configuration File

Select Configuration Values to Verify

Configuration file: /www/dawnmay/conf/httpd.conf

	Key	Expected value	Edit
<input checked="" type="checkbox"/>	Options	-FollowSymLinks	Edit
<input checked="" type="checkbox"/>	LogFormat	["%h %T %l %u %t \"%r\" %>s %b \"%{Referer}i\" \"%{User-Agent}i\" combined\" \"%{Cookie}n \"%r\" %t\" cookie\" \"%{User-agent}i\" agent\" \"%{Referer}i -> %U\" referer\" \"%h %l %u %t \"%r\" %>s %b\" common"]	Edit
<input checked="" type="checkbox"/>	SetEnvIf	["User-Agent" "Mozilla/2" nokeepalive' "User-Agent" "JDK/1\0" force-response-1.0' "User-Agent" "Java/1\0" force-response-1.0' "User-Agent" "RealPlayer 4\0" force-response-1.0' "User-Agent" "MSIE 4\0b2;" nokeepalive' "User-Agent" "MSIE 4\0b2;" force-response-1.0']	Edit
<input checked="" type="checkbox"/>	#	Configuration originally created by Create HTTP Server wizard on Mon Apr 01 10:09:43 EDT 2019	Edit
<input checked="" type="checkbox"/>	DirectoryIndex	index.html	Edit
<input checked="" type="checkbox"/>	DocumentRoot	/www/dawnmay/htdocs	Edit
<input checked="" type="checkbox"/>	Listen	*:80	Edit
<input checked="" type="checkbox"/>	HTTPSubsystemDesc	DAWNM/DAWNMAY	Edit
<input checked="" type="checkbox"/>	LogMaint	[logs/access_log 7 0' logs/error_log 7 0']	Edit
<input checked="" type="checkbox"/>	AccessFileName	.htaccess	Edit
<input checked="" type="checkbox"/>	CustomLog	logs/access_log combined	Edit
<input checked="" type="checkbox"/>	HTTPStartJobQueue	DAWNM/DAWNMAYJQBAD	Edit
<input checked="" type="checkbox"/>	[Directory /www/dawnmay/htdocs]:::Require	all granted	Edit
<input checked="" type="checkbox"/>	TraceEnable	Off	Edit
<input checked="" type="checkbox"/>	[Directory /]:::Require	all denied	Edit
<input checked="" type="checkbox"/>	HTTPStartJobDesc	DAWNM/HTTPJOBBD	Edit
<input checked="" type="checkbox"/>	HTTPRoutingData	HTTPSVR	Edit

Configuration Files: Edit Expected Values

Edit Expected Value

Key: HTTPSubsystemDesc

Report only
 Verify this value [? Learn more...](#)

Value type: **String** Comparison: **Equals**

Expected value:
DAWNM/DAWNMAY

Severity: **Error** Match case

Description
Equals
The actual value must equal the expected value.

Examples

Actual value	Comparison	Expected value	Result
mystring	Equals	mystring	True
mystring	Equals	somestring	False

OK **Cancel**

IBM i Products

IBM i Products

Select the IBM i Products to Verify

Products [? Learn more...](#)

Licensed program	Option	Release	Status
5770999	*BASE	V7R4M0	*INSTALLED
5770SS1	*BASE	V7R4M0	*INSTALLED
5770SS1	1	V7R4M0	*INSTALLED
5770SS1	2	V7R4M0	*INSTALLED
5770SS1	3	V7R4M0	*INSTALLED
5770SS1	7	V7R4M0	*INSTALLED
5770SS1	8	V7R4M0	*INSTALLED
5770SS1	9	V7R4M0	*INSTALLED
5770SS1	12	V7R4M0	*INSTALLED
5770SS1	13	V7R4M0	*INSTALLED
5770SS1	14	V7R4M0	*INSTALLED
5770SS1	18	V7R4M0	*INSTALLED
5770SS1	21	V7R4M0	*INSTALLED
5770SS1	22	V7R4M0	*INSTALLED

1/8

Position to:

Collection name:



Products to verify [? Learn more...](#)

Licensed program	Option	Release	CHKPRDOPT	Severity
5733ARE	*BASE	V1R1M0	<input type="checkbox"/>	Error <input type="button" value="v"/>
5770JV1	*BASE	V7R4M0	<input type="checkbox"/>	Error <input type="button" value="v"/>
5770JV1	16	V7R4M0	<input type="checkbox"/>	Error <input type="button" value="v"/>
5770JV1	17	V7R4M0	<input type="checkbox"/>	Error <input type="button" value="v"/>
5770PT1	*BASE	V7R4M0	<input type="checkbox"/>	Error <input type="button" value="v"/>
5770PT1	1	V7R4M0	<input type="checkbox"/>	Error <input type="button" value="v"/>
5770PT1	2	V7R4M0	<input type="checkbox"/>	Error <input type="button" value="v"/>
5770PT1	3	V7R4M0	<input type="checkbox"/>	Warning <input type="button" value="v"/>

Network Configuration and Ports

Network Configuration

Verify IBM i Network Configuration

Verify TCP/IP Configuration

- ✓ Domain information
- ✓ Host table entries
- ✓ Interfaces

Verify DNS Lookup Performance and Correctness

- ✓ Retrieve IP address for local host
- ✓ Retrieve IP address for loopback
- ✓ Retrieve the host name for IP address 127.0.0.1

Ports

Specify Ports to Verify

Port status: [? Learn more...](#)

	Port	Expected status	Severity
<input type="checkbox"/>	21	In Use ▾	Error ▾
<input type="checkbox"/>	22	In Use ▾	Error ▾
<input type="checkbox"/>	8470	In Use ▾	Error ▾
<input type="checkbox"/>	8471	In Use ▾	Error ▾

Add Remove all

Restricted port ranges: [? Learn more...](#)

	Starting port	Ending port	Severity
<input type="checkbox"/>			Error ▾

Add Remove all

System Values and Network Attributes

System Values and Network Attributes

Select System Values or Network Attributes to Verify

System values and network attributes to collect information [? Learn more...](#)

Collection name
<input checked="" type="radio"/> NetworkAttributes
<input type="radio"/> SystemValues

Add Remove Update Edit XML Test

System Values and Network Attributes

Select System Values or Network Attributes to Verify

System values and network attributes [? Learn more...](#)

ALRBCKFP
ALRCTLD
ALRDFTFP
ALRFTR
ALRHLCNT
ALRLOGSTS
ALRPRIFP
ALRRQSFP
ALRSTS
ALWADDCLU
ALWANYNET
ALWHPRTWR
ALWVRTAPPN
DDMACC
DFTCNLST

>
<
>>
<<

Previous Next

1/13

Position to:

Collection name:

Values to verify [? Learn more...](#)

QACTJOB	Edit
QADLACTJ	Edit
QADLTOTJ	Edit
QHSTLOGSIZ	Edit
QJOBMSGQMX	Edit
QMAXJOB	Edit
QMAXSPLF	Edit
QQRYDEGREE	Edit
QTOTJOB	Edit

System Values: Edit Expected Value

Edit Expected Value ✕

QLOGOUTPUT

Report only
 Verify this value [? Learn more...](#)

Value type: Comparison:

Expected value:

Severity: Match case

Description

Equals

The actual value must equal the expected value.

Examples

Actual value	Comparison	Expected value	Result
mystring	Equals	mystring	True
mystring	Equals	somestring	False

Environment Variables

Environment Variables

Specify the Environment Variables to Verify



System wide environment variables [? Learn more...](#)

	Environment variable	Value	Check type	Check CCSID	CCSID
<input checked="" type="radio"/>	QIBM_FTP_PORT_RANGE	54300-54399	Equal	Yes	37
<input type="radio"/>	QIBM_SVRMODE_SBS	*SAME	Equal	Yes	37
<input type="radio"/>	PASE_USRGRP_LIMITED	N			
<input type="radio"/>	QIBM_MULTI_THREADED	Y			
<input type="radio"/>	PATH	/usr/bin:./QOpenSys/usr/bin			

Add Environment Variable

Name:

- Do not verify the environment variable value, just include its current value in the report
- Verify the environment variable value

The values must: Equal any of the following values
 Not equal any of the following values

Value:

CCSID: Check CCSID

OK Cancel

User IDs

Edit User ID Collection

Select User IDs to Verify

All user IDs on the system [? Learn more...](#)

AARONC
AATIM
ACADMN01
ACADMN02
ACADMN03
ACADMN04
ACADMN05
ACADMN06
ACADMN07
ACADMN08

Previous

Next

1/302

Position to:

Collection name:

UserProfiles

User IDs to verify [? Learn more...](#)

DAWNM
DAWNMAY
DAWNUSER
DAWN
DAWNTEST

>

<

>>

<<

Attributes to verify:

- CCSID
- Special Authority
- Supplemental Group
- Character ID
- Country ID
- Group Authority
- Group Authority Type
- Group Profile
- Job Description
- Language ID
- Limit Capabilities
- Locale
- Message Queue
- Output Queue
- Owner
- Password is *NONE
- Special Environment
- Status
- User Class

Customize

Scripts and Commands: Shell Script

- Run a shell script in QShell
- Can verify information from stdout or stderr

Home > Plugin Selection and Customization > Scripts and Commands > Customize Script or Command

Scripts and Commands

Specify the Script or Command to be Run and Verified

Collection name:

Program to run and verify [? Learn more...](#)

Script command to run in QShell

Example: `system "WRKSYSSTS ASTLVL(*ADVANCED)"`

CL command to run

Print the result of the command to the verification report:

Result verification [? Learn more...](#)

Result verification details

Group	Severity	Source	Expected value
This table is empty.			

Add

Result verification group [? Learn more...](#)

Name:

Severity:

Type:

AND - All conditions in the group must be met for the verification to be successful

OR - Only one of the conditions in the group must be met for the verification to be successful

Script verification conditions [? Learn more...](#)

	Source	Expected value	Comparison	Match case
Example	Exit Code	0	Equals	
Example	Standard Output	Some example	Contains	False
Example	Exit code	Some value	Contains	True
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/> Standard output	<input type="text"/>	Contains substring	True
	<input type="checkbox"/> Standard error			

Add

Remove

Scripts and Commands: CL Command

- Run a CL Command
- Job will be submitted to batch using the JOBD associated with the user profile
- Can verify information from messages to the job log, information in a spooled file

Home > Plugin Selection and Customization > Scripts and Commands > Customize Script or Command

Scripts and Commands

Specify the Script or Command to be Run and Verified

Collection name:

Program to run and verify [? Learn more...](#)

- Script command to run in QShell
- CL command to run

Example: `STRTCPSVR *HTTP HTTPSVR(apachedft '-t -V')`

Print the result of the command to the verification report:

Result verification [? Learn more...](#)

Result verification details

Group	Severity	Source	Expected value
This table is empty.			

Add

CL Command verification conditions [? Learn more...](#)

	Source	Expected value	Comparison	Match case
Example	Exit Code	0	Equals	
Example	Message	MSG1234	Equals	False
Example	Exit code	Some text	Equals	False
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/> Message	<input type="text"/>	Contains substring	True
	<input type="checkbox"/> Spooled file			

Add

Remove

SQL Query Verifier

SQL Query Verifier

Create Collections of SQL to be Run and Verified

SQL query verifier collection information [? Learn more...](#)

Collection name
<input checked="" type="radio"/> CheckSubsystems
<input type="radio"/> DisabledUsers
<input type="radio"/> JobsInDawnMay
<input type="radio"/> PermanentJobStructuresAvailable
<input type="radio"/> SbsDawnMayActive
<input type="radio"/> VerifyPerfUsersDisabled
<input type="radio"/> VerifyScheduledJobs

A Single SELECT Statement

- Can verify information returned in any column

Customize SQL Query Verifier

Specify the SQL Query and Verifications Details



Collection name:

Select statement [? Learn more...](#)

```
select permanent_job_structures_available from qsys2.system_status_info
```

Example: `SELECT * FROM myDB.myTable`

Print the result set of SQL query to the verification report:

Check the number of records returned for the SQL query [? Learn more...](#)

Column value verification conditions [? Learn more...](#)

	Column name	Check class	Expected value	Comparison	Result type	Match case	Severity	Description
Example	id	Numeric	6	Equals	All	False	Error	All ids should equal to 6
Example	name	String	John	Contains substring	Any	True	Error	Names returned should contain 'John'
<input checked="" type="checkbox"/>	permanent_job_structur	Numeric <input type="text" value="Numeric"/>	<input type="text" value="10000"/>	Greater than <input type="text" value="Greater than"/>	<input type="text" value="Any"/>	<input type="text" value="False"/>	<input type="text" value="Warning"/>	<input type="text" value="Sufficient perm stucture:"/>

Add

Remove

Test a Plugin

- You can test a plugin without building and testing the entire template
- The test opens a new browser window with the results
- Includes links to the text reports

IBM i Products

Select the IBM i Products to Verify

Products to collect information [? Learn more...](#)

Collection name
<input checked="" type="radio"/> AllProducts
<input type="radio"/> InstalledProducts

Add Remove Update Edit XML **Test**

Administration Runtime Expert

Running command:

```
/usr/bin/qsh -c /QIBM/ProdData/OS/OSGi/healthcheck/bin/arePlugin.sh -pluginName com.ibm.ibm.i.are.plugin.ProductVerifier -pluginParameter file:/QIBM/UserData/ARE/workspace/templates/PTFDemo/work/xml/Prod_AllProducts.xml -outFile /QIBM/UserData/ARE/workspace/templates/PTFDemo/temp/areReport.txt
```

```
Öx~Öx~Öx~Öx~_Öx~Öx~Öx~Öx~ Öx~Öx~Öx~ Öx~Öx~ /Öx~OpÖx~Öx~Sys/  
Öx~Öx~Öx~Öx~/PrÖx~Öx~DaÖx~Öx~/JaÖx~Öx~Öx~Öx~/Öx~Öx~Öx~Öx~Öx~/  
Öx~2bit
```

!â(€
Administration Runtime Expert for i
Version 1.6.20
Fri Sep 04 08:45:45 EDT 2020
Searching for elements
Number of runtime elements: 25

Running plugin Product Verifier

Error occurred. Return code = 70

[Summary Report](#)
[Detailed Report](#)
[XML Report](#)
[Runtime Log](#)

Close window

Return code of 70 indicate an error was found

Administration Runtime Expert completed successfully.

Edit XML

- You can edit the XML for the validation
- If you edit the XML, you won't be able to edit the plugin in the GUI

Edit XML

OK Cancel **Edit view**

```
<?xml version="1.0" encoding="UTF-8"?><ptfLevelSet version="1.0">
  <ptfLevels>
    <ptfLevel type="Specific">
      <ptf description="" errorLevel="ERROR" name="SI71725" type="single">
        <check errorLevel="ERROR" status="installed"/>
      </ptf>
    <ptf description="" errorLevel="ERROR" name="SI72216" type="single">
      <check errorLevel="ERROR" status="installed"/>
    </ptf>
    <ptf description="" errorLevel="ERROR" name="SI72224" type="single">
      <check errorLevel="ERROR" status="installed"/>
    </ptf>
    <ptf description="" errorLevel="ERROR" name="AB98765" type="single">
      <check errorLevel="ERROR" status="installed"/>
    </ptf>
    <ptf description="" errorLevel="Warning" name="SF99653" type="group">
      <check errorLevel="Warning" status="installed"/>
      <check errorLevel="Warning" minimumLevel="6"/>
      <check errorLevel="Warning" recommendedLevel="9"/>
    </ptf>
    <ptf description="" errorLevel="Error" name="SF99661" type="group">
      <check errorLevel="Error" status="installed"/>
      <check errorLevel="Error" minimumLevel="1"/>
      <check errorLevel="Error" recommendedLevel="1"/>
    </ptf>
    <ptf description="" errorLevel="Error" name="SF99662" type="group">
      <check errorLevel="Error" status="installed"/>
      <check errorLevel="Error" minimumLevel="7"/>
      <check errorLevel="Error" recommendedLevel="7"/>
    </ptf>
    <ptf description="" errorLevel="Error" name="SF99663" type="group">
      <check errorLevel="Error" status="installed"/>
      <check errorLevel="Error" minimumLevel="3"/>
      <check errorLevel="Error" recommendedLevel="3"/>
    </ptf>
    <ptf description="" errorLevel="Error" name="SF99664" type="group">
      <check errorLevel="Error" status="installed"/>
      <check errorLevel="Error" minimumLevel="14"/>
      <check errorLevel="Error" recommendedLevel="14"/>
    </ptf>
  </ptfLevels>
</ptfLevelSet>
```


Advanced

- You can create your own custom plugins
- Add additional resources that are sent to the endpoint system within the template
 - Generally used for additional jar files your custom plugin may need
- Plugin Configuration allows you to pass parameters to custom plugins



▼ Advanced



Custom Plugins

Manage custom plugins included in the deployment template.



Other Resources

Manage other resources included in the deployment template.



Plugin Configuration

Advanced configuration options for plugins.

Build Template

- You must build the template once you have finished editing the plugins
 - If you do not build the template and exit the template editor, all changes are lost
 - Don't let your ARE session timeout when working a template!

Build Template Summary

- Review all your plugins prior to building the template

Summary

Deployment Template Build Summary

Environment Variables	User IDs	Ports	PTFs	Scripts
Other Resources	Plugin Configuration	SQL Query Verifier		
File and Directory Authorities	Configuration Files	IBM i Produ		
System Values and Network Attributes				

Generated template file name: /QIBM/UserData/ARE/workspace/template:

Version: 1.0.43

Description: Template created by the IBM Administrator

Runtime core version must be at or higher than: 1.6.15

Features enabled:

- ✓ Capability to fix detected problems

Build integrated template:

- No - (The template requires ARE core PTF on the target system to ru

Summary

Deployment Template Build Summary

Environment Variables	User IDs	Ports	PTFs	Scripts and Commands	Resource Collector	Custom Plugins
Other Resources	Plugin Configuration	SQL Query Verifier	Template Summary	File and Directory Attributes		
File and Directory Authorities	Configuration Files	IBM i Products	Network Configuration			
System Values and Network Attributes						

NetworkAttributes

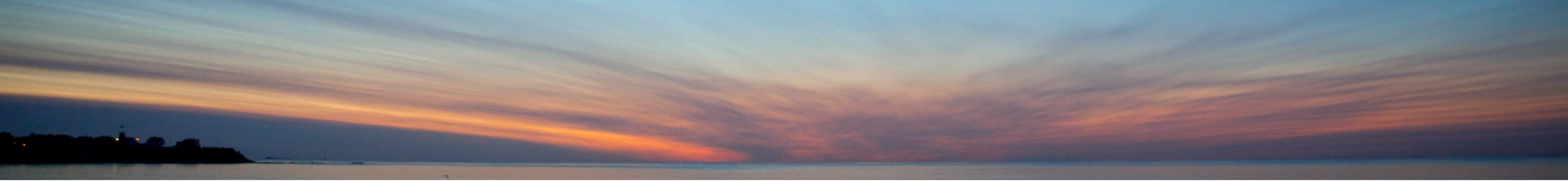
Value	Value type	Check type	Expected value	Severity	Match case	Description
ALWANYNET	string	equals	*YES	Error	No	Allow AnyNet support
SYSNAME	string	equals	COMMON1	Error	No	Current system name

SystemValues

Value	Value type	Check type	Expected value	Severity	Match case	Description
QACTJOB	numeric	equals	200	Error	No	Initial number of active jobs
QADLACTJ	numeric	equals	30	Error	No	Additional number of active jobs
QADLTOTJ	numeric	equals	30	Error	No	Additional number of total jobs
QHSTLOGSIZ	numeric	equals	-1	Error	No	Maximum history log records
QJOBMSGQMX	numeric	lessThan	16	Error	No	Maximum size of job message queue
QMAXJOB	numeric	equals	163520	Error	No	Maximum number of jobs
QMAXSPLF	numeric	equals	9999	Error	No	Maximum number of spooled files
QTOTJOB	numeric	equals	200	Error	No	Initial total number of jobs
QQRYPDEGREE	string	equals	*OPTIMIZE	Error	No	Parallel processing degree

Template Considerations

- Iterative process to develop templates
- Start simple
 - Add attributes as identified by day-to-day systems management or problem determination
- Develop custom plugins to verify attributes not supported by ARE template editor
- Some examples:
 - Check NetServer file shares
 - Check Collection Services configuration
 - Prestart job statistics versus prestart job tuning parameters
 - The possibilities are endless
- Templates are never done
 - Like performance tuning, review your templates and modify as the environment or applications change



Verifying Systems

Launch Console

Create ▾

Import ▾

Actions ▾

Launch console

Operations ▾

- Add
- Delete
- Rename
- Copy

Console

The IBM Administration Runtime Expert for i is capable of verifying multiple IBM i systems using a deployment template created or imported using the deployment template editor. [? Learn more...](#)

Groups:

Default

DawnGroup

DawnNoEmail

Operations ▾

Systems to verify:

	System name	User ID	Password	Template
<input checked="" type="checkbox"/>	common1.frankeni.com	dawnm	OneThing ▾
<input type="checkbox"/>	DEV740.RZKH.DE	dawnmay		OneThing ▾

Add

Remove

Select all

Deselect all

Runtime properties

Note: Only selected systems are verified. Schedule runs only if IBMARE is running.



[Schedule](#)
No schedule.

Verify systems

View previous results

Launch deployment template editor

Import and view report

Runtime Properties

Console Runtime Properties

Default user ID

Specify individual user ID and passwords [? Learn more...](#)

Use default user ID and password for all systems

Store the console password

Number of systems to verify at the same time:

Logging level:

Input properties for the Administration Runtime Expert:

Properties specified here are provided as input to the Administration Runtime Expert when it is run to verify each system using the specified deployment template. Each property should be in the format *key=value* and only one property can be specified per line.
Example: *my.property.key=myValue*

Enable email notifications

*SMTP server name:

Port:

*From:

*To: *(use comma to separate addresses)*

Send on:

Schedule



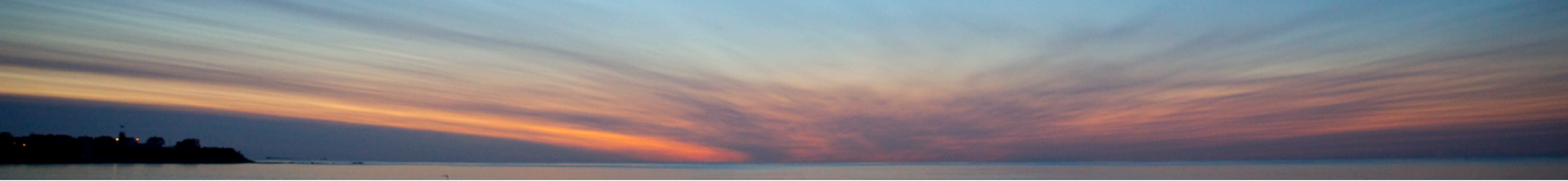
Schedule
No schedule.

Schedule Setting ✕

- No schedule
- Daily
- Weekly
Every At :
- Monthly

Note: Only selected systems are verified. Schedule runs only if IBMARE is running. [? Learn more...](#)

OK Cancel



Understanding the Reports

Summary Report

Summary Report








System name: common1.frankeni.com

Remote core version: 1.6.20










Template: OneThing

User ID: DAWNM

Summary details [? Learn more...](#)

Plugin name	Attributes verified	Error	Warning	Info	Fix actions
▶  Authority Verifier	40	3	0	0	None
▶  Command Verifier	4	0	0	0	None
▶  DisabledUserProfiles	0	162	0	0	None
▶  NetServerFileShares	0	1	0	0	None
▶  TunePrestartJobEntries	0	0	0	0	None
▶  VerifyCacheBatteries	0	0	0	0	None
▶  VerifyWebSettings	0	1	0	0	None

Summary details [? Learn more...](#)

Plugin name	Attributes verified	Error	Warning	Info	Fix actions
▶  Authority Verifier	40	3	0	0	None
▶  Command Verifier	4	0	0	0	None
▶  DisabledUserProfiles	0	162	0	0	None
▶  NetServerFileShares	0	1	0	0	None
Description					
 /ifslab06 has incorrect permissions /ifslab06 should be READ ONLY					
▶  TunePrestartJobEntries	0	0	0	0	None
▶  VerifyCacheBatteries	0	0	0	0	None
▶  VerifyWebSettings	0	1	0	0	None
Description					
 PHP_FCGI_CHILDREN is not set correctly. It is set to 10.					

Detailed Report

Detailed Report

File: /QIBM/UserData/ARE/workspace/console/temp/DawnNoEmail/20200805142013.

IBM Administration Runtime Expert for i

Version 1.6.20

Wed Aug 05 14:20:15 EDT 2020

Using template: file:template.jar (1.0.70)

Number of runtime elements: 30

Running with user: DAWNM

User DAWNM has *ALLOBJ authority

Running plugin Authority Verifier

- > A total of 1 XML rule file will be processed
- > Processing XML rule file (xml/Auth_Collection1.xml) for object authority
 - o Checking authority for /home/DAWNM/1.test
 - OK: Owner of /home/DAWNM/1.test is DAWNM
 - OK: Primary group for /home/DAWNM/1.test is *NONE
 - OK: Authorization list set to *NONE for /home/DAWNM/1.test
 - OK: User DAWNM has *RWX data authority to /home/DAWNM/1.test
 - OK: User DAWNM has *ALL object authority to /home/DAWNM/1.test
 - OK: User *PUBLIC has *RWX data authority to /home/DAWNM/1.test
 - OK: User *PUBLIC has *ALL object authority to /home/DAWNM/1.test
 - o Checking authority for /home/DAWNM/2.test
 - OK: Owner of /home/DAWNM/2.test is DAWNM
 - OK: Primary group for /home/DAWNM/2.test is *NONE

XML Report




XML Report

File: /QIBM/UserData/ARE/workspace/console/temp/DawnNoEmail/20200805142013_M/common1.frankeni.com_On

```
<?xml version="1.0" encoding="UTF-8"?><applicationRuntimeExpertReport version="1.0">
  <generalInfo>
    <info name="IBM Administration Runtime Expert for i">1.6.20</info>
    <info name="verification time">Wed Aug 05 14:20:15 EDT 2020</info>
    <info name="Runtime element jars">file:template.jar (1.0.70); </info>
    <info name="Number of runtime elements">30</info>
    <info name="userName">DAWNM</info>
    <info name="userProfile.specialAuth">[*ALLOBJ' *SECADM' *JOBCTL' *SPLCTL' *SAVSYS' *SERVICE' '
  </generalInfo>
  <reportBody>
    <elementReport className="com.ibm.ibm.iare.plugin.AuthorityVerifier" commonName="Authority Verifier" succ
      <report/>
      <report message="A total of 1 XML rule file will be processed"/>
      <report/>
      <report message="Processing XML rule file (xml/Auth_Collection1.xml) for object authority">
        <report message="Checking authority for /home/DAWNM/1.test" target="/home/DAWNM/1.test">
          <report message="OK: Owner of /home/DAWNM/1.test is DAWNМ"/>
          <report message="OK: Primary group for /home/DAWNM/1.test is *NONE"/>
          <report message="OK: Authorization list set to *NONE for /home/DAWNM/1.test"/>
          <report message="OK: User DAWNМ has *RWX data authority to /home/DAWNM/1.test"/>
          <report message="OK: User DAWNМ has *ALL object authority to /home/DAWNM/1.test"/>
          <report message="OK: User *PUBLIC has *RWX data authority to /home/DAWNM/1.test"/>
          <report message="OK: User *PUBLIC has *ALL object authority to /home/DAWNM/1.test"/>
        </report>
      </report>
    </report>
  </reportBody>
</applicationRuntimeExpertReport>
```


Previous Results

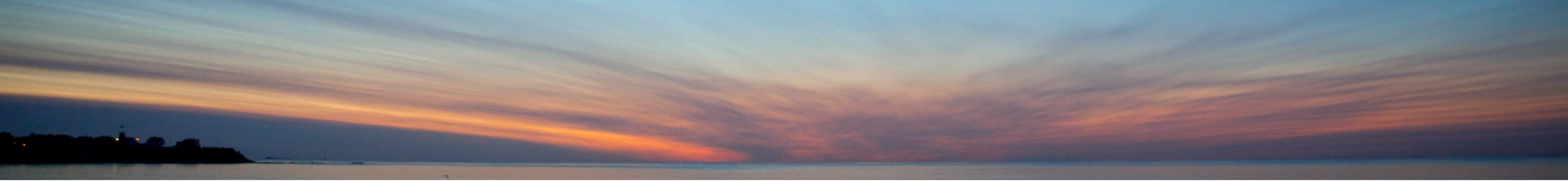
 Refresh

	History	Run By	Item	Status
<input type="checkbox"/>	2020/08/05/14:20	Manually	1	 Error
	System	Template	User ID	Status
	common1.frankeni.com	OneThing	dawnm	 167 error(s), 0 warning(s), 0 info(s)
<input type="checkbox"/>	2020/08/05/13:21	Manually	1	 Error

Status
 167 error(s), 0 warning(s), 0 info(s)
 Error

- [Summary Report](#)
- [Detailed Report](#)
- [XML Report](#)
- [Download Archive](#)

- [Runtime Log](#)
- [Remote runtime log](#)
- [Remote stdout](#)
- [Remote stderr](#)



Using ARE for Products and PTFs

Verify Installed Products

- You can verify the installed products
- The list of products to verify is taken from the products installed on the central system

IBM i Products

Select the IBM i Products to Verify

Products [? Learn more...](#)

Licensed program	Option	Release	Status
5770999	*BASE	V7R4M0	*INSTALLED
5770SS1	*BASE	V7R4M0	*INSTALLED
5770SS1	1	V7R4M0	*INSTALLED
5770SS1	2	V7R4M0	*INSTALLED
5770SS1	3	V7R4M0	*INSTALLED
5770SS1	7	V7R4M0	*INSTALLED
5770SS1	8	V7R4M0	*INSTALLED
5770SS1	9	V7R4M0	*INSTALLED
5770SS1	12	V7R4M0	*INSTALLED
5770SS1	13	V7R4M0	*INSTALLED
5770SS1	14	V7R4M0	*INSTALLED
5770SS1	18	V7R4M0	*INSTALLED
5770SS1	21	V7R4M0	*INSTALLED
5770SS1	22	V7R4M0	*INSTALLED

>
<
>>
<<

Products to verify [? Learn more...](#)

Licensed program	Option	Release	CHKPRDOPT	Severity
5733ARE	*BASE	V1R1M0	<input checked="" type="checkbox"/>	Warning ▾
5770PT1	*BASE	V7R4M0	<input checked="" type="checkbox"/>	Error ▾
5770PT1	1	V7R4M0	<input checked="" type="checkbox"/>	Error ▾
5770PT1	2	V7R4M0	<input checked="" type="checkbox"/>	Error ▾
5770PT1	3	V7R4M0	<input checked="" type="checkbox"/>	Warning ▾
7PHPZND	*BASE	V7R1M0	<input type="checkbox"/>	Info ▾

Filter Option to Select from Installed Products or All Products

- Default list is the products installed on the central system
- Filter option to show all products supported by IBM i
- Add option to add other products to the list



All Products

- Shows products from all supported releases
- Helpful to build templates when the central system does not have the product installed

Select the IBM i Products to Verify

Products [? Learn more...](#)

Licensed program	Option	Release	Status
5770999	*BASE	V7R2M0	
5770999	*BASE	V7R3M0	
5770999	*BASE	V7R4M0	*INSTALLED
5770SS1	*BASE	V7R2M0	
5770SS1	*BASE	V7R3M0	
5770SS1	*BASE	V7R4M0	*INSTALLED
5770SS1	1	V7R2M0	
5770SS1	1	V7R3M0	
5770SS1	1	V7R4M0	*INSTALLED
5770SS1	2	V7R2M0	
5770SS1	2	V7R3M0	
5770SS1	2	V7R4M0	*INSTALLED
5770SS1	3	V7R2M0	
5770SS1	3	V7R3M0	

Check Product Option Command

- Can optionally run the CHKPRDOPT command during the verification
- Note that if a problem is found, the product option is put into an *ERROR state
- The problem is logged to the reports

```
IBM Administration Runtime Expert for i
Version 1.6.20
Fri Sep 04 08:45:45 EDT 2020
Number of runtime elements: 25

Running plugin Product Verifier
ERROR! Product 57330PS option 0004 (V1R1M0) status is not what was expected. Expected: installed Actual: Installed
      (but in *ERROR state)
ERROR! CHKPRDOPT failed for product 57330PS option 0004 (V1R1M0)
Details:          : ERROR GETTING STATS FOR '/QOpenSys/usr/bin/python': No such path or directory.
Details: CPF3D98  : Exit program processing found error in product.
Details: CPD0C2B  : Product 57330PS release V1R1M0 option 0004 load 5050 not correctly installed.
Details: CPF0C20  : Errors found by CHKPRDOPT.
ERROR! Product 5770MG1 option *BASE (V7R4M0) is not installed
      > Total number of product items checked: 4

-----
Administration Runtime Expert completed with:
  Plugins run: 1
  Items checked: 4
  Error: 3
  Warning: 0
  Info: 0
  Fix actions: 0
-----
```


Summary Report

- In this example, the products are not installed on the system

Products to verify [Learn more...](#)

Licensed program	Option	Release	CHKPRDOPT	Severity
5770MG1	*BASE	V7R4M0	<input type="checkbox"/>	Error
5770RD1	*BASE	V7R4M0	<input type="checkbox"/>	Warning
5770SM1	*BASE	V7R4M0	<input type="checkbox"/>	Info

Product Verifier 4

Description

- Product 5770PT1 option 0003 (V7R4M0) is not installed
- Product 5770PT1 option 0001 (V7R4M0) is not installed
- Product 5770PT1 option 0002 (V7R4M0) is not installed

ARE and PTFs

- ARE can verify install PTFs or PTF Groups
- When doing verification on PTFs, the PTF Groups and PTFs installed on the central system are used as the comparison
- Critical that your central system be correct and clean with PTFs
- PTF comparisons are release-specific

Types of PTF Verifications with ARE

- There are three types of PTF verifications supported by ARE
 - PTF Group Currency
 - PTF Groups
 - Specific PTFs

[Home](#) > [Plugin Selection and Customization](#) > PTFs

PTFs

Create Collections of PTFs to be Run and Verified

PTF verifier collection information [? Learn more...](#)

Collection name	Verification against
<i>Click the Add button to add a collection.</i>	

Add

Verification against:

- Groups from Preventive Service Planning (PSP)
- PTFs or groups installed on central system
- A list of specific PTFs or groups

OK

Validate PTF Groups Compared with PTF Groups Available from IBM

- Preventive Service Planning PTF Groups
 - All or a selected set of PTF groups compared with
 - Can specify a timeframe
 - Requires an Internet connection

IBM Administration Runtime Expert for i

Home > Plugin Selection and Customization > PTFs > Preventive Service Planning (PSP)

Preventive Service Planning (PSP)

Select PTF groups to verify on target system against IBM PSP. Internet connectio

All PTF groups:
 Select PTF groups to verify:

PTF groups [? Learn more...](#)

PTF group	Description
SF99653	DB2 WEB QUERY FOR I V2.2.1
SF99661	UNASSIGNED
SF99662	IBM HTTP SERVER FOR I
SF99663	PERFORMANCE TOOLS
SF99664	BACKUP RECOVERY SOLUTIONS
SF99665	JAVA
SF99666	HIGH AVAILABILITY FOR IBM I
SF99667	740 TCP/IP PTF
SF99668	IBM DB2 MIRROR FOR I
SF99675	HARDWARE AND RELATED PTFS
SF99704	DB2 FOR IBM I
SF99737	TECHNOLOGY REFRESH
SF99739	GROUP HIPER
SF99740	CUMULATIVE PTF PACKAGE C9304740

Disregard groups released in prior days

Collection name:

- ✓ 0 days
- 30 days
- 60 days
- 120 days
- 1 year

PTF Group Currency

Preventive Service Planning (PSP)

Select PTF groups to verify on target system against IBM PSP. Internet connection required.



- All PTF groups:
- Select PTF groups to verify:

PTF groups [? Learn more...](#)

PTF group	Description
SF99653	DB2 WEB QUERY FOR I V2.2.1
SF99661	UNASSIGNED
SF99662	IBM HTTP SERVER FOR I
SF99663	PERFORMANCE TOOLS
SF99664	BACKUP RECOVERY SOLUTIONS
SF99665	JAVA
SF99666	HIGH AVAILABILITY FOR IBM I
SF99667	740 TCP/IP PTF
SF99668	IBM DB2 MIRROR FOR I
SF99675	HARDWARE AND RELATED PTFS
SF99704	DB2 FOR IBM I
SF99737	TECHNOLOGY REFRESH
SF99738	GROUP SECURITY
SF99739	GROUP HIPER
SF99740	CUMULATIVE PTF PACKAGE C0121740



PTF groups to verify [? Learn more...](#)

PTF group	Description
-----------	-------------

Add ▾

Disregard groups released in prior: ▾

Collection name:

Validate PTF Groups Compared to Central System

- Compare PTF groups installed against the central system
 - By PTF Groups
 - By Products
- Central system and target systems must be on the same release
- Best choice if you want all target systems to be identical to the central system

Add Remove Update Edit XML Test

Verification against:

- Groups from Preventive Service Planning (PSP)
- PTFs or groups installed on central system
- A list of specific PTFs or groups

OK

Central System

Select PTFs to verify on target system against Central System. This is where local host runs from.

- PTF groups:
 - All PTF groups
 - Select PTF groups to verify:

PTF groups [Learn more...](#)

PTF group	Description
SF99653	DB2 WEB QUERY FOR I V2.2.1
SF99661	UNASSIGNED
SF99662	IBM HTTP SERVER FOR I
SF99663	PERFORMANCE TOOLS
SF99664	BACKUP RECOVERY SOLUTIONS
SF99665	JAVA
SF99666	HIGH AVAILABILITY FOR IBM I
SF99667	740 TCP/IP PTF
SF99668	IBM DB2 MIRROR FOR I
SF99675	HARDWARE AND RELATED PTFS
SF99704	DB2 FOR IBM I
SF99737	TECHNOLOGY REFRESH
SF99739	GROUP HIPER
SF99740	CUMULATIVE PTF PACKAGE C9304740

>
<
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PTF groups to verify [Learn more...](#)

PTF group	Description
-----------	-------------

Add ▾

- Products PTFs belong to:

- All
- Specific products:

Product [Learn more...](#)

Product	Description
5770999	Licensed Internal Code
5770SS1	IBM i
INFCAS4	Information APARs
INFCDSL	Information APARs
1ZENDDB	ZendDBI for IBM i 10.1.21
5722IA1	Software Integration Assistant
5722IP1	IBM Infoprint Server for iSeries
5722V11	IBM Content Manager for i
5724H72	IBM MQ for IBM i
5724L26	IBM MQ Java Messaging and Web Services
5733ICC	IBM Cloud Storage Solutions for i
5733OPS	IBM i Open Source Solutions
5733SC1	IBM Portable Utilities for i
5733WQX	IBM DB2 Web Query for i
5761AP1	Advanced DBCS Printer Support
5761CM1	IBM Communications Utilities for System i

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Products to verify [Learn more...](#)

Product	Description
5770PT1	IBM Performance Tools for i
5770QU1	IBM Query for i
5770SM1	IBM System Manager for i
5733ARE	IBM Application Runtime Expert for i
5770DG1	IBM HTTP Server for i

Add ▾

Collection name:

PTF Groups

Central System

Select PTFs to verify on target system against Central System. This is where local host runs from.

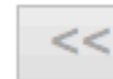
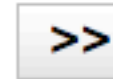
PTF groups:

All PTF groups

Select PTF groups to verify:

PTF groups [? Learn more...](#)

PTF group	Description
SF99653	DB2 WEB QUERY FOR I V2.2.1
SF99661	UNASSIGNED
SF99662	IBM HTTP SERVER FOR I
SF99663	PERFORMANCE TOOLS
SF99664	BACKUP RECOVERY SOLUTIONS
SF99665	JAVA
SF99666	HIGH AVAILABILITY FOR IBM I
SF99667	740 TCP/IP PTF
SF99668	IBM DB2 MIRROR FOR I
SF99675	HARDWARE AND RELATED PTFS
SF99704	DB2 FOR IBM I
SF99737	TECHNOLOGY REFRESH
SF99738	GROUP SECURITY
SF99739	GROUP HIPER
SF99740	CUMULATIVE PTF PACKAGE C0121740



PTF groups to verify [? Learn more...](#)

PTF group	Description
-----------	-------------

Add Your Own PTFs

PTF groups to verify [? Learn more...](#)

PTF group	Description
SF99653	DB2 WEB QUERY FOR I V2.2.1
SF99661	UNASSIGNED
SF99662	IBM HTTP SERVER FOR I
SF99663	PERFORMANCE TOOLS
SF99664	BACKUP RECOVERY SOLUTIONS
SF99665	JAVA
SF99666	HIGH AVAILABILITY FOR IBM I
SF99667	740 TCP/IP PTF
SF99668	IBM DB2 MIRROR FOR I
SF99675	HARDWARE AND REL
SF99704	DB2 FOR IBM I
SF99737	TECHNOLOGY REFRE
SF99738	GROUP SECURITY
SF99739	GROUP HIPER
SF99740	CUMULATIVE PTF PACKAGE C0121740

Add ▾

Input Name:

SF99653	DB2 WEB QUERY FOR I V2.2.1
SF99661	UNASSIGNED
SF99662	IBM HTTP SERVER FOR I
SF99663	PERFORMANCE TOOLS
SF99664	BACKUP RECOVERY SOLUTIONS
SF99665	JAVA
SF99666	HIGH AVAILABILITY FOR IBM I
SF99667	740 TCP/IP PTF
SF99668	IBM DB2 MIRROR FOR I
SF99675	HARDWARE AND RELATED PTFS
SF99704	DB2 FOR IBM I
SF99737	TECHNOLOGY REFRESH
SF99738	GROUP SECURITY
SF99739	GROUP HIPER
SF99740	CUMULATIVE PTF PACKAGE C0121740
AB12345	== PTF group added by user ==

PTF Groups by Product

- Check on PTF Groups for Navigator for i / PDI / ARE

Products PTFs belong to:

All

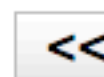
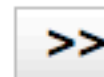
Specific products:

Product [? Learn more...](#)

Product	Description
INFOAS4	Information APARs
INFODSL	Information APARs
1ZENDDB	ZendDBI for IBM i 10.1.21
5722IA1	Software Integration Assistant
5722IP1	IBM Infoprint Server for iSeries
5722VI1	IBM Content Manager for i
5724H72	IBM MQ for IBM i
5724L26	IBM MQ Java Messaging and Web Services
5733ICC	IBM Cloud Storage Solutions for i
5733OPS	IBM i Open Source Solutions
5733SC1	IBM Portable Utilities for i
5733WQX	IBM DB2 Web Query for i
5761AP1	Advanced DBCS Printer Support
5761CM1	IBM Communications Utilities for System i
5761DB1	System/38 Utilities

Products to verify [? Learn more...](#)

Product	Description
5770999	Licensed Internal Code
5770SS1	IBM i
5770JV1	IBM Developer Kit for Java
5770PT1	IBM Performance Tools for i
5770DG1	IBM HTTP Server for i
5733ARE	IBM Application Runtime Expert for i



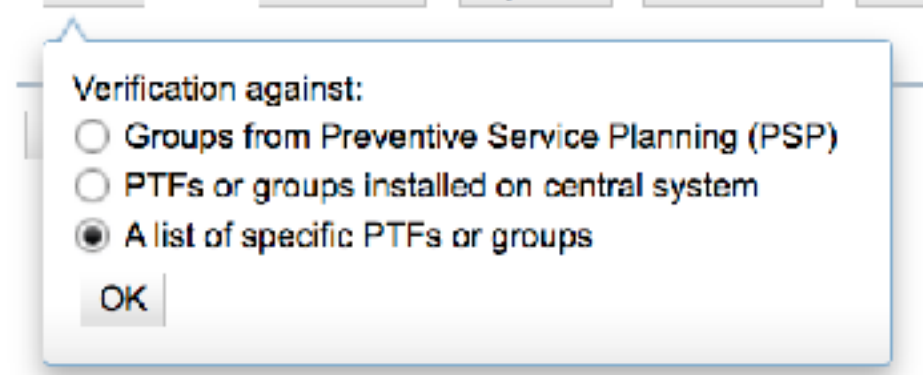
Add ▼

Input Name:

Add

Validate Specific PTFs or PTF Groups Compared to Central System

- Compare PTF groups installed against the central system
- Can specify minimum and recommended levels
- Compare specific PTFs installed against the central system
- Expected status of installed or not installed
 - “Not installed” verifies a specific PTF is not installed
- Used to verify specific PTFs on target systems
- Central system and target systems must be on the same release



Specific PTFs or groups

Select the group and Individual PTFs to verify on target system.

List all PTF groups on the system

PTF groups to verify [Learn more...](#)

PTF group	Minimum level	Recommended level	Severity	Description
<input type="radio"/> SF99653	8	8	Error	DB2 WEB QUERY FOR I V2.2.1
<input type="radio"/> SF99661	1	1	Error	UNASSIGNED
<input type="radio"/> SF99662	5	5	Error	IBM HTTP SERVER FOR I
<input type="radio"/> SF99663	3	3	Error	PERFORMANCE TOOLS
<input type="radio"/> SF99664	11	11	Error	BACKUP RECOVERY SOLUTIONS
<input type="radio"/> SF99665	6	6	Error	JAVA
<input type="radio"/> SF99666	3	3	Error	HIGH AVAILABILITY FOR IBM I
<input type="radio"/> SF99667	1	1	Error	740 TCP/IP PTF
<input type="radio"/> SF99668	6	6	Error	IBM DB2 MIRROR FOR I
<input type="radio"/> SF99675	2	2	Error	HARDWARE AND RELATED PTFS
<input type="radio"/> SF99704	7	7	Error	DB2 FOR IBM I
<input type="radio"/> SF99737	1	1	Error	TECHNOLOGY REFRESH

PTFs to verify [Learn more...](#)

PTF	Expected status	Severity
<input type="checkbox"/> 5770999 -- Licensed Internal Code		
<input type="checkbox"/> 5770SS1 -- IBM i		
<input type="checkbox"/> 5770SS1 -- Extended Base Directory Support		
<input type="checkbox"/> 5770SS1 -- Example Tools Library		
<input type="checkbox"/> 5770SS1 -- System Openness Includes		
<input type="checkbox"/> 5770SS1 -- Extended NLS Support		
<input type="checkbox"/> 5770SS1 -- Domain Name System		
<input type="checkbox"/> 5770SS1 -- Portable App Solutions Environment		
<input type="checkbox"/> 5770SS1 -- Digital Certificate Manager		
<input type="checkbox"/> 5722IP1 -- IBM Infoprint Server for iSeries		
<input type="checkbox"/> 5733ARE -- IBM Application Runtime Expert for i		
<input type="checkbox"/> 5733ICC -- IBM Cloud Storage Solutions for i		
<input type="checkbox"/> 5733OPS -- IBM i Open Source Solutions		
<input type="checkbox"/> 5733OPS -- Node.js v0 (deprecated)		
<input checked="" type="checkbox"/> 5770XH2 -- IBM i Access for Web		
<input type="checkbox"/> RS00109	Installed	Error
<input type="checkbox"/> SI51046	Installed	Error
<input type="checkbox"/> SI52768	Installed	Error
<input type="checkbox"/> SI53292	Installed	Error
<input type="checkbox"/> SI54619	Installed	Error
<input type="checkbox"/> SI56123	Installed	Error
<input type="checkbox"/> SI56971	Installed	Error
<input type="checkbox"/> SI60257	Installed	Error
<input type="checkbox"/> SI61021	Installed	Error
<input type="checkbox"/> SI62710	Installed	Error
<input type="checkbox"/> SI66718	Installed	Error
<input checked="" type="checkbox"/> Other PTFs		
<input checked="" type="checkbox"/> AB12345	Installed	Error

Specific List of PTFs

- You can check on specific PTFs
- E.g., upgrading endpoint systems to the next release
 - Ensure all the prerequisite PTFs are installed prior to the upgrade

Validate Specific Levels of Group PTFs

- You can validate minimum and recommended levels of group PTFs
- The minimum and recommended levels are pre-filled with the installed levels of the group PTFs

Specific PTFs or groups

Select the group and individual PTFs to verify on target system.

List all PTF groups on the system

PTF groups to verify [? Learn more...](#)

<input type="radio"/>	PTF group	Minimum level	Recommended level	Severity	Description
<input type="radio"/>	SF99653	9	9	Error	DB2 WEB QUERY FOR I V2.2.1
<input type="radio"/>	SF99661	1	1	Error	UNASSIGNED
<input type="radio"/>	SF99662	7	7	Error	IBM HTTP SERVER FOR I
<input type="radio"/>	SF99663	3	3	Error	PERFORMANCE TOOLS
<input type="radio"/>	SF99664	14	14	Error	BACKUP RECOVERY SOLUTIONS
<input type="radio"/>	SF99665	7	7	Error	JAVA
<input type="radio"/>	SF99666	4	4	Error	HIGH AVAILABILITY FOR IBM I
<input type="radio"/>	SF99667	1	1	Error	740 TCP/IP PTF
<input type="radio"/>	SF99668	7	7	Error	IBM DB2 MIRROR FOR I
<input type="radio"/>	SF99675	2	2	Error	HARDWARE AND RELATED PTFS
<input type="radio"/>	SF99704	7	7	Error	DB2 FOR IBM I
<input type="radio"/>	SF99737	2	2	Error	TECHNOLOGY REFRESH
<input type="radio"/>	SF99738	10	10	Error	GROUP SECURITY
<input type="radio"/>	SF99739	29	29	Error	GROUP HIPER
<input type="radio"/>	SF99740	20121	20121	Error	CUMULATIVE PTF PACKAGE C0121740

Customize Minimum and Recommended Levels and Severity

✓ List all PTF groups on the system

PTF groups to verify [? Learn more...](#)

	PTF group	Minimum level	Recommended level	Severity	Description
<input type="radio"/>	SF99653	6	9	Warning ▾	DB2 WEB QUERY FOR I V2.2.1
<input type="radio"/>	SF99661	1	1	Error ▾	UNASSIGNED
<input type="radio"/>	SF99662	7	7	Error ▾	IBM HTTP SERVER FOR I
<input type="radio"/>	SF99663	3	3	Error ▾	PERFORMANCE TOOLS
<input type="radio"/>	SF99664	14	14	Error ▾	BACKUP RECOVERY SOLUTIONS
<input type="radio"/>	SF99665	7	7	Error ▾	JAVA
<input type="radio"/>	SF99666	4	4	Error ▾	HIGH AVAILABILITY FOR IBM I
<input type="radio"/>	SF99667	1	1	Error ▾	740 TCP/IP PTF
<input type="radio"/>	SF99668	6	7	Info ▾	IBM DB2 MIRROR FOR I
<input type="radio"/>	SF99675	2	2	Error ▾	HARDWARE AND RELATED PTFS
<input type="radio"/>	SF99704	7	7	Error ▾	DB2 FOR IBM I
<input type="radio"/>	SF99737	2	2	Error ▾	TECHNOLOGY REFRESH
<input type="radio"/>	SF99738	10	10	Error ▾	GROUP SECURITY
<input type="radio"/>	SF99739	29	29	Error ▾	GROUP HIPER
<input checked="" type="radio"/>	SF99740	20121	20121	Error ▾	CUMULATIVE PTF PACKAGE C0121740

Verify Specific PTFs by Product

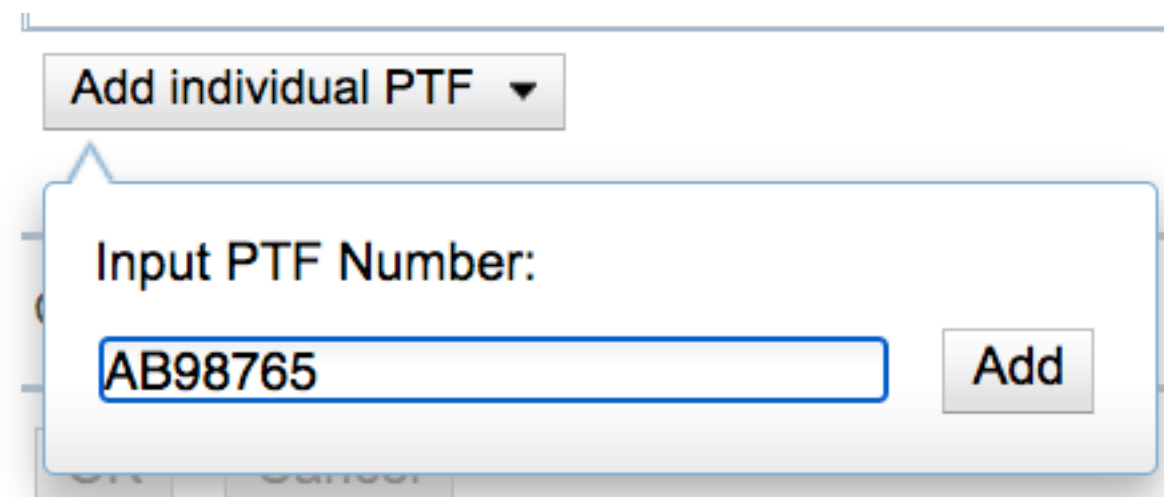
- Lists the installed PTFs for each product
- Can select specific PTFs that you want to verify are on the endpoint systems

PTFs to verify [? Learn more...](#)

PTF	Expected status	Severity
<input type="checkbox"/> 5770999 -- Licensed Internal Code		
<input type="checkbox"/> 5770SS1 -- IBM i		
<input type="checkbox"/> 5770SS1 -- Extended Base Directory Support		
<input type="checkbox"/> 5770SS1 -- Example Tools Library		
<input type="checkbox"/> 5770SS1 -- System Openness Includes		
<input type="checkbox"/> 5770SS1 -- Extended NLS Support		
<input type="checkbox"/> 5770SS1 -- Domain Name System		
<input checked="" type="checkbox"/> 5770SS1 -- Portable App Solutions Environment		
<input checked="" type="checkbox"/> SI71725	Installed <input type="button" value="v"/>	Error <input type="button" value="v"/>
<input checked="" type="checkbox"/> SI72216	Installed <input type="button" value="v"/>	Error <input type="button" value="v"/>
<input checked="" type="checkbox"/> SI72224	Installed <input type="button" value="v"/>	Error <input type="button" value="v"/>

Add Specific PTF

- Add a specific PTF to check
- You can ensure a PTF is NOT Installed
 - For example, unlikely event that you installed a defective PTF



Add individual PTF ▾

Input PTF Number:

AB98765 Add



▶ <input checked="" type="checkbox"/> Other PTFs		
<input checked="" type="checkbox"/> AB98765	✓ Installed	Error ▾

Add individual PTF ▾

Not installed

PTF Summary Report

Console

System verification status: 1/1 complete [Refresh](#)

System name	Template	Status	Result
common1.frankeni.com	PTFDemo	● Complete	✘ 3 error(s), 0 warning(s), 0 info(s)

- [Summary Report](#)
- [Detailed Report](#)
- [XML Report](#)
- [Download Archive](#)

- [Runtime Log](#)

[Back](#) [Stop all](#)


Summary Report

















System name: common1.frankeni.com
Remote core version: 1.6.20
Template: PTFDemo
User ID: DAWNM

Summary details [? Learn more...](#)

Plugin name	Attributes verified	Error	Warning	Info	Fix actions
✘ PTF Verifier	39420	3	0	0	Fix actions (1)
Description					
✘ Product (unknown) PTF AB98765 status is not what is expected					
✘ PTF AB98765 does not exist on the system					
✘ Group PTF SF99661 - SF99661 740 WebSphere App Server V8.5 level does not meet group level. Group level: 3 Current level: 1					
✔ Product Verifier	4	0	0	0	None


Summary Report

Plugin name	Attributes verified	Error	Warning
 PTF Verifier	39420	1564	1

Description
 Product 5770SS1 PTF SI72224 status is not what is expected
 Product (unknown) PTF AB98765 status is not what is expected
 Group PTF SF99653 - status is not what is expected. Expected: installed Actual: Related group
 Group PTF SF99653 - level does not meet recommended level. Recommended level: 9 Current level: 8
 Group PTF SF99662 - status is not what is expected. Expected: installed Actual: Not Installed
 Group PTF SF99664 - status is not what is expected. Expected: installed Actual: Not Installed
 Group PTF SF99665 - status is not what is expected. Expected: installed Actual: Not Installed
 Group PTF SF99666 - level does not meet minimum level. Minimum level: 4 Current level: 3
 Group PTF SF99666 - level does not meet recommended level. Recommended level: 4 Current level: 3
 Group PTF SF99667 - could not be found on the system
 Group PTF SF99668 - level does not meet recommended level. Recommended level: 7 Current level: 6
 Group PTF SF99704 - status is not what is expected. Expected: installed Actual: Not Installed
 Group PTF SF99737 - status is not what is expected. Expected: installed Actual: Not Installed
 Group PTF SF99738 - level does not meet minimum level. Minimum level: 10 Current level: 8
 Group PTF SF99738 - level does not meet recommended level. Recommended level: 10 Current level: 8
 Group PTF SF99739 - status is not what is expected. Expected: installed Actual: Not Installed

PTF Fix Actions

- Errors found in PTF validation have the ability to be corrected

PTF Verifier		59	1	0	0	 Fix actions (1)
Description						
 Group PTF SF99739 - level does not meet recommended level. Recommended level: 25 Current level: 23						

Options to Control PTF Fix Actions

- By default, the fix action is Load and Apply
 - Manual options in the GUI for
 - Delayed apply
 - Save file only

Console > Result > Summary Report > Fix Problems

Fix Problems

System name: common1.frankeni.com
Problems found by: PTF Verifier

Delayed apply - The PTF will be set as delayed apply.
 Save file only - Just send save files from source system to endpoint system without load and apply. If this option checked, image catalog will be disabled.

Select	Description
<input type="checkbox"/>	<input checked="" type="checkbox"/> Group PTF SF99739 - level does not meet recommended level. Recommended level: 25 Current level: 23

Select all Deselect all

▼ Processed problems

Result	Description
<i>This table is empty.</i>	

Fix Back

Fix Actions in XML Report

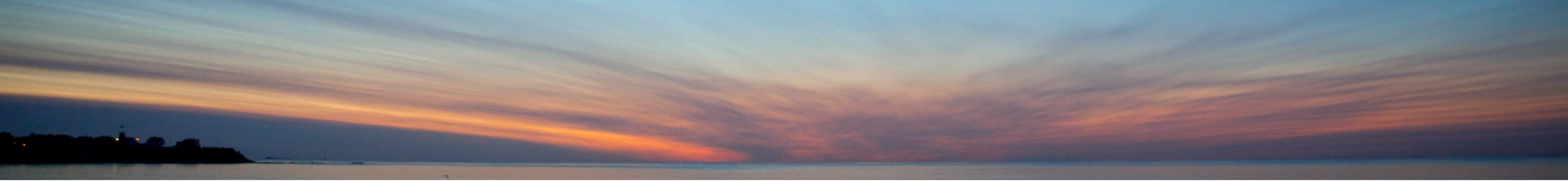
```
<report message="OK: Group PTF SF99739 - meets minimum level. Group PTF level is 23"/>
  <problem message=" Group PTF SF99739 - level does not meet recommended
level. Recommended level: 25 Current level: 23" severity="error">
  <fixAction
className="com.ibm.ibm.ibm.xml.rules.ptf.GroupPtfStatusRule$GroupPTFFixAction"
fixMethodReference="_REFERENCE_0" isLocal="true" problemName="GroupPTF"
uniqueId="areFixAction0">
    <description/>
    <defineReference
className="com.ibm.ibm.ibm.xml.rules.ptf.GroupPtfStatusRule$GroupPTFFixAction"
methodName="loadAndApplyGroupPTF" name="_REFERENCE_0"
type="com.ibm.xml.MethodReference">
      <parameters>
        <parameter type="literal" value="SF99739"/>
      </parameters>
    </defineReference>
  </fixAction>
</problem>
```

Central System and PTF Images

- Central System can distribute PTFs via save files or image catalog
 - Save files require the central system only distribute PTFs to target systems at the same release
- With an image catalog, the Central System can distribute PTFs to groups of systems of different releases

PTF Fix Actions

- The fix action will try to do one of these things:
 - Load and apply the fix from a special device name `QIBMAREPTF`
 - The `QIBMAREPTF` device needs to be manually created when the virtual optical device is setup on the target system
 - Send and apply the fix from a central system through use of `*SAVF`
 - The save files are located in `QGPL/Q<ptf_id>` and PTF save files remain on the target system after the PTF is installed
 - For Group PTFs, the save files are located in `QGPL/Q<group_ptf_id>` and Group PTF save files are deleted after they have been installed on the target system as they don't need to exist long term
- Neither of these requires Internet access



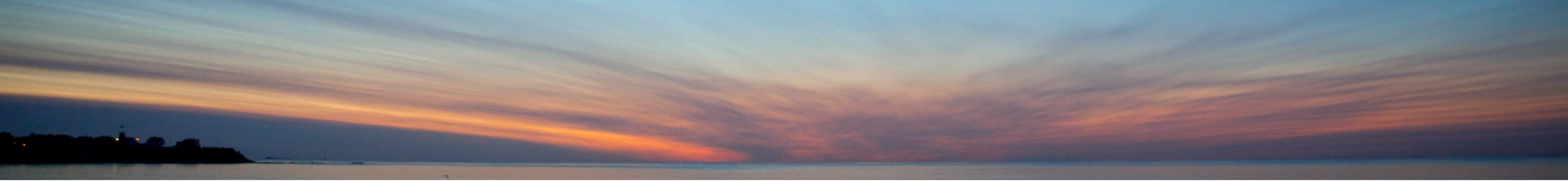
Custom Plug-ins

Custom Plugins

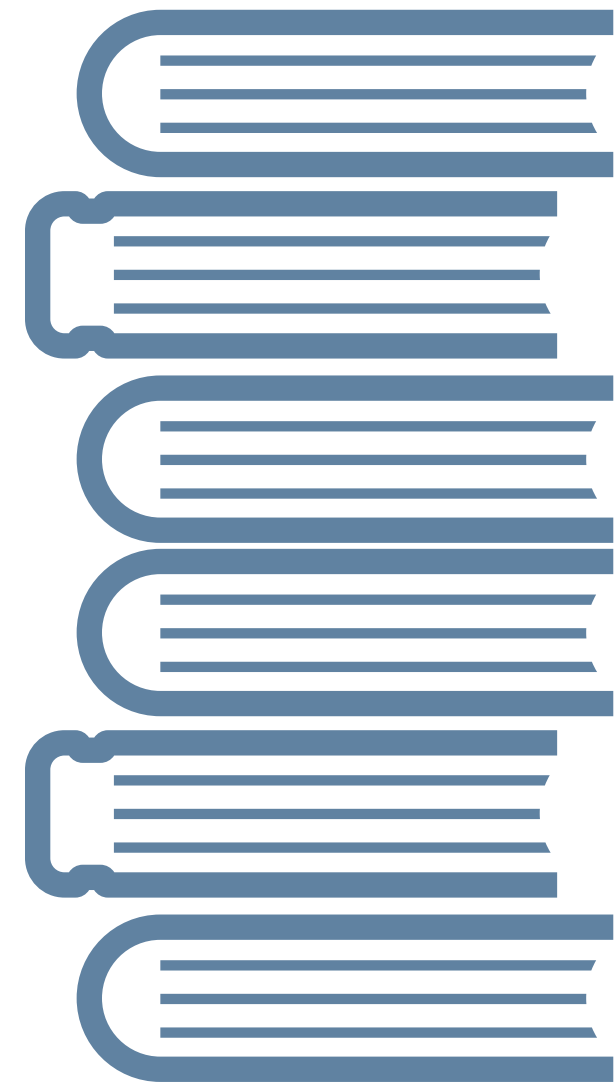
- Built-in features of ARE are very powerful
- But you may need to write your own custom plugins for unique verifications
 - Can also build in your own fix actions
- ARE plugins are written in Java
- ARE provides sample plugins at
 - `/QIBM/UserData/ARE/samples/sample.jar`
 - `sample.jar` is a valid deployment template
 - Source is included in the jar file

Example Plugins

- Check on NetServer File Shares
 - Report shares and permissions and flag errors if root or /QIBM are shared
 - Java Toolbox: ISeriesNetServer and ISeriesNetServerFileShare
 - IBM i Service QSYS2.SERVER_SHARE_INFO
- Tune Prestart Job Entries
 - Adjust the INLJOBS parameter on prestart job entries dynamically to reflect actual workloads
 - Use QSYS2.PRESTART_JOB_INFO and QSYS2.PRESTART_JOB_STATISTICS



References



Articles and Blog Posts

- Introduction to the Administration Runtime Expert
 - <https://www.itjungle.com/2020/06/01/guru-introduction-to-the-administration-runtime-expert/>
- Use the Administration Runtime Expert to Validate Your System Configuration
 - <https://www.itjungle.com/2020/06/22/guru-use-the-administration-runtime-expert-to-validate-your-system-configuration/>
- Use the Administration Runtime Expert to Validate Your Application Attributes
 - <https://www.itjungle.com/2020/08/10/guru-use-the-administration-runtime-expert-to-validate-your-application-attributes/>
- Manage PTFs with the Administration Runtime Expert
 - <https://www.itjungle.com/2020/11/09/guru-manage-ptfs-with-the-administration-runtime-expert/>
- Overview of the IBM i Administration Runtime Expert
 - <https://techchannel.com/Trends/03/2021/ibm-i-administration-runtime-expert>
- Extend the IBM i Administration Runtime Expert with Custom Plug-ins
 - <https://techchannel.com/SMB/03/2021/ibm-i-administration-runtime-expert-plugins>
- Managing PTFs with ARE
 - <https://dawnmayi.com/2015/09/21/ibm-application-runtime-expert-for-i-managing-ptfs/>
- Network Health Checker
 - <https://dawnmayi.com/2013/09/04/application-runtime-expert-network-health-checker/>
- The Story of Administration Runtime Expert
 - <https://dawnmayi.com/2011/11/09/the-story-of-application-runtime-expert/>

Documentation

- ARE Web Site
 - Many PDF files with documentation can be found on this web site
 - <https://www.ibm.com/support/pages/ibm-administration-runtime-expert-i>

Resources

Getting started

- PDF Getting started guide
- PDF Creating your first template
- PDF Using the console to verify a system (1.38MB)
- PDF Understanding the ARE reports (32.5KB)
- PDF How to automatically fix problems
- PDF Frequently asked questions
- Redbook - Uncovering Application Runtime Expert

Advanced topics

- PDF Damage Detection Tool (324KB)
- PDF Scripts and Commands plugin (378KB)
- PDF Resource Collector plugin (161KB)
- PDF Replacement variables: What they are and how to use them (837KB)
- PDF Script interfaces to ARE (150KB)
- PDF Edit and Rebuild Template (0.98MB)
- PDF Using Integrated Template (228KB)
- PDF Introducing SQL Verifier Plugin (240KB)
- PDF How to Enable Low Authority Users to Build Templates (721KB)
- PDF How to Enable SSL connection (32KB)

Custom plugins

- PDF Writing a custom plugin (1.43MB)
- PDF Adding a custom plugin to a template (253KB)
- PDF Adding other resources to a template (98KB)
- ↓ ARE class javadoc (ZIP, 364KB)
- ↓ Rule Map Interface (ZIP, 425KB)

- Uncovering Application Runtime Expert Redbook
 - <http://www.redbooks.ibm.com/redpapers/pdfs/redp4805.pdf>



ithankyou

<https://www.ibm.com/it-infrastructure/power/os/ibm-i>



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- [IBM i 7.3 TR10 and IBM i 7.4 TR4 Offer a New Query Supervisor Feature](#)
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- [Systems Management with IBM i Services](#)
- [Navigator for i Graph History: Review Historical Data](#)
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- [Awesome Run SQL Scripts Enhancements](#)
- [IBM i Technical Resources Roadmap](#)

About Dawn May



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@ IBM // Rochester, MN
January 2018*

Dawn May Consulting, LLC

Customized education

- General IBM i
- Systems Management
- Performance tools and management
- Work management
- Administration Runtime Expert

Performance Consulting

- System performance review
- Recurring performance assessments
- Performance diagnostics

Administration Runtime Expert Implementation

 dawnmay@dawnmayi.com
DawnMayi.com

 <https://twitter.com/DawnMayiCan>
@DawnMayiCan

 <https://www.linkedin.com/in/dawnmay/>

 <http://ibmsystemsmag.com/blogs/i-can/>