

AVEVA PI WORLD

AVEVA Software - Best Practices for Upgrading

Optional Subtitle

Presented By:

AVEVA



Beth Conn

Sr. Technical Account Manager

- AVEVA
- beth.conn@aveva.com



Daniel Soh

Sr. Customer Support Engineer

- AVEVA
- daniel.soh@aveva.com



Jerry Lau

Sr. Principal Technical Support Engineer

- AVEVA
- jerry.lau@aveva.com



Manal Hany Aly Fawzy

Regional Technical Support Consultant

- AVEVA
- manal.hany@aveva.com



Pete O'Connell

Principal Tech Support Specialist

- AVEVA
- pete.oconnell@aveva.com



Rich Liddell

Principal Technical Account Manager

- AVEVA
- rich.liddell@aveva.com



Siddharth Nagaria

Senior Application Consultant

- AVEVA
- siddharth.nagaria@aveva.com



Introduction

Overview

First thing to do

System Architecture

Operating System

Network

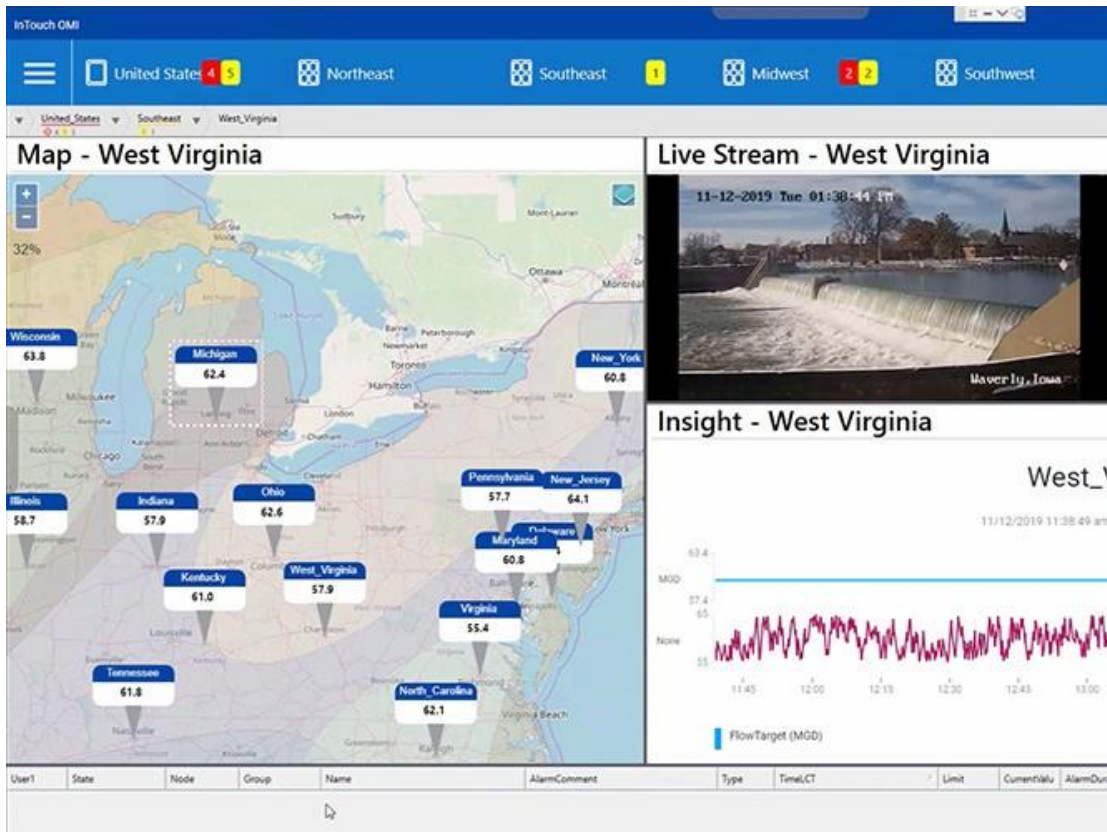
Security

Licensing

Parallel System / In-place Upgrade

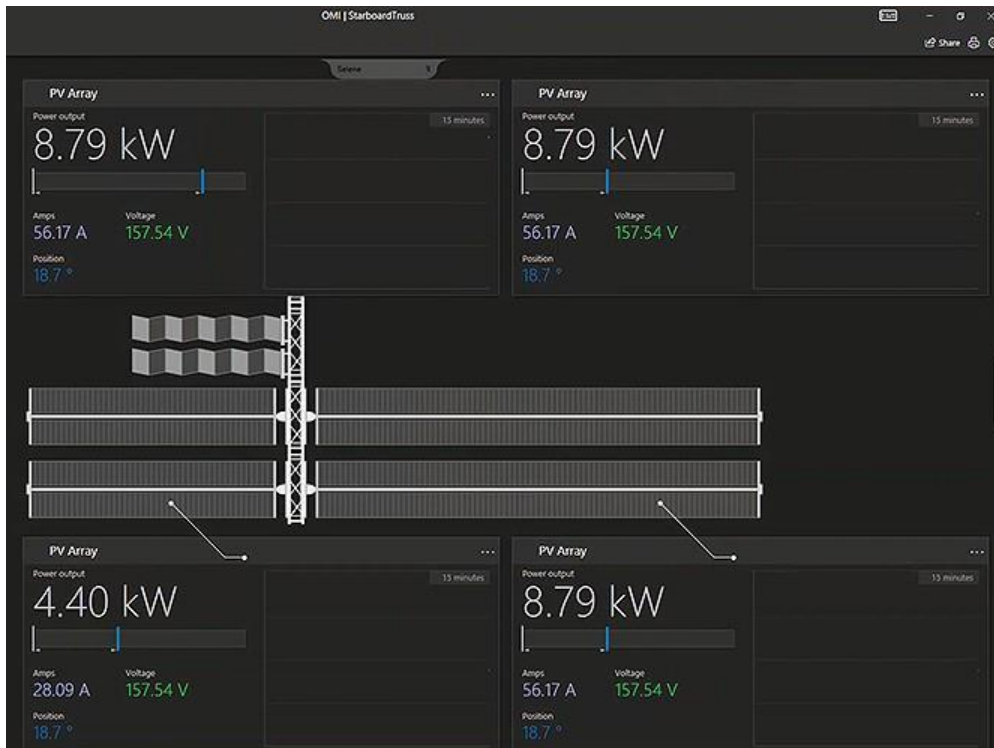
Workflow

Introduction



- AVEVA System Platform with Operations Management Interface (OMI) is the world's only responsive, scalable solution for supervisory, Enterprise SCADA, MES, and IIoT applications that contextualizes operations processes across the organization. System Platform provides a collaborative, standards-based foundation that unifies people, processes, and assets across all facilities for continuous operational improvement and real-time decision support.

Introduction



- With AVEVA System Platform you can securely visualize enterprise-wide operations using an asset model to apply context to real-time processes, alarms, events, and archived historical data – creating a single, common information stream that makes system design and maintenance more efficient, flexible, and provides operators with greater situational awareness for improved effectiveness.

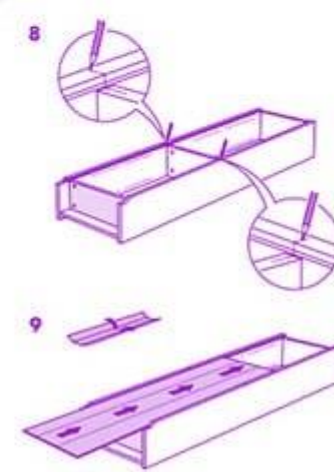
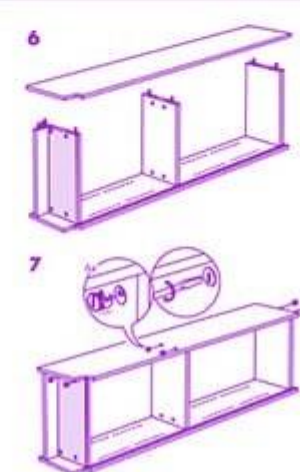
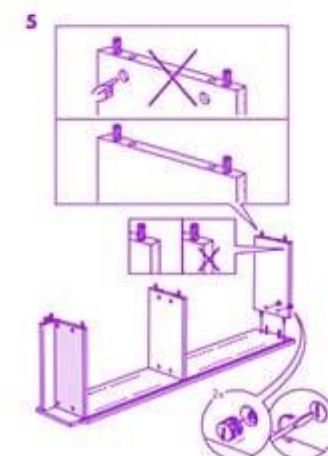
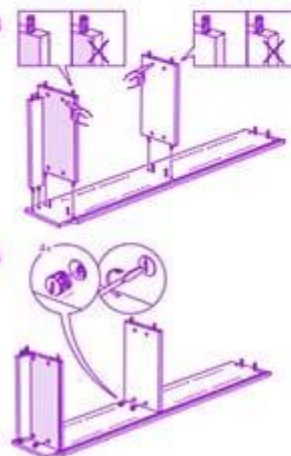
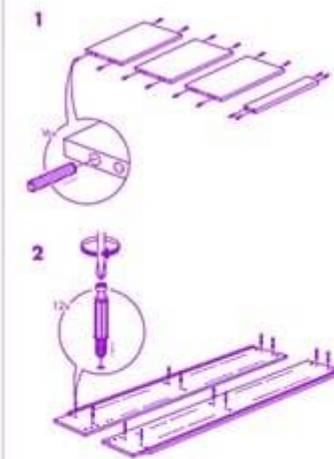
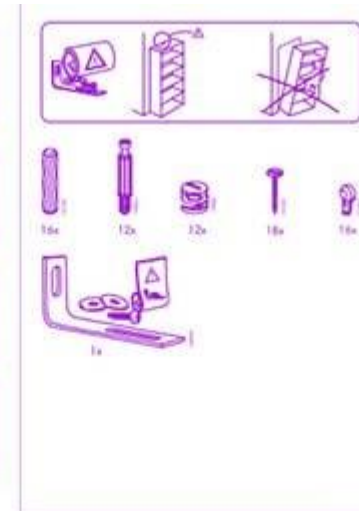
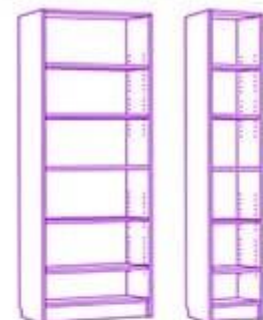
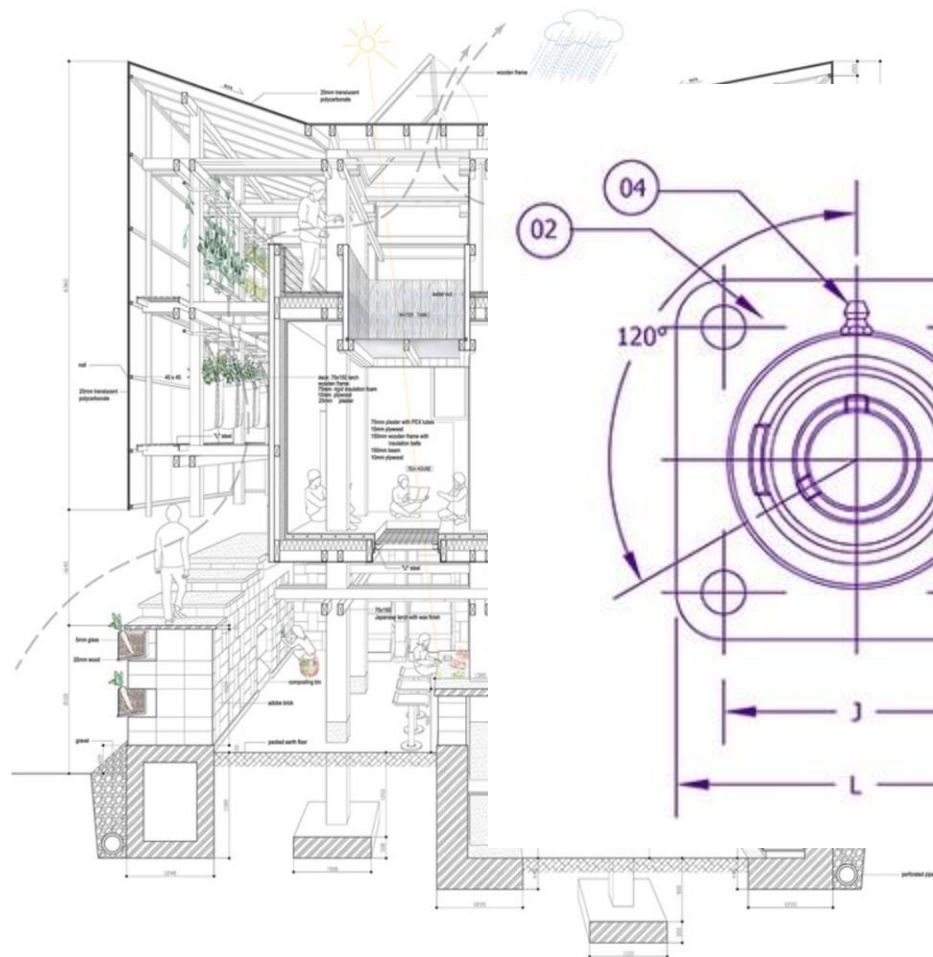


Overview

Factors to be considered when upgrading a system

- System architecture / application design / network / security / licensing / backup
- Provide a logical flow and step-by-step assessment of the system before the actual upgrade so that it can complete successfully
- The best practice could also be applied to other product line

Planning / Planning / Planning



Upgrade Workflow

- Planning \ Preparation
 - Review\Document current architecture including current software version information
 - Understand software upgrade requirements
 - Test Galaxy migration\shadow test system
 - Backup applications
- Execution
 - Install\Activate proper licensing
 - Upgrade Order: Historian, GR, AOS, Visualization
- System Validation
 - Verify data and system functionality including redundancy, data collection\storage, visualization and that it is consistent when compared to pre-migration
 - Review Logger



Planning / Preparation



Prepare Upgrade Planning

System Architecture

- Prepare the System Architecture diagram
- Provides a good high-level overview
- Also provides a good drill-down view
- Helps to understand how the machines / system are interlinked
- Provides quick assessment as to how the system is interconnected when a problem arises
- Helps the user have a better understanding of how to upgrade the system

Collect System Details

- Collect Existing Product Versions for Upgrade Evaluation
 - Application Server Version
 - Historian Version
 - InTouch Version
 - OI Server Version
 - (WIS, MES, InBatch, Orchestra Workflow etc. & third party software)
 - Operating Systems
 - SQL Version

Upgrade Preparation

- Update system topology to include all computers involved
- Review Product Readme and Installation Guides
- Determine if a hardware platform change or a virtual environment is part of the plan
- SQL Server or operating system updates
- OI Server updates
- Download any necessary Wonderware patch updates
- Obtain license upgrades

System Architecture

- Should include the following :
 - Machine Names
 - CPU / RAM
 - IP Address(es)
 - OS version
 - SQL Server version (if installed)
 - AVEVA software installed and the version
 - Physical or Virtual environment

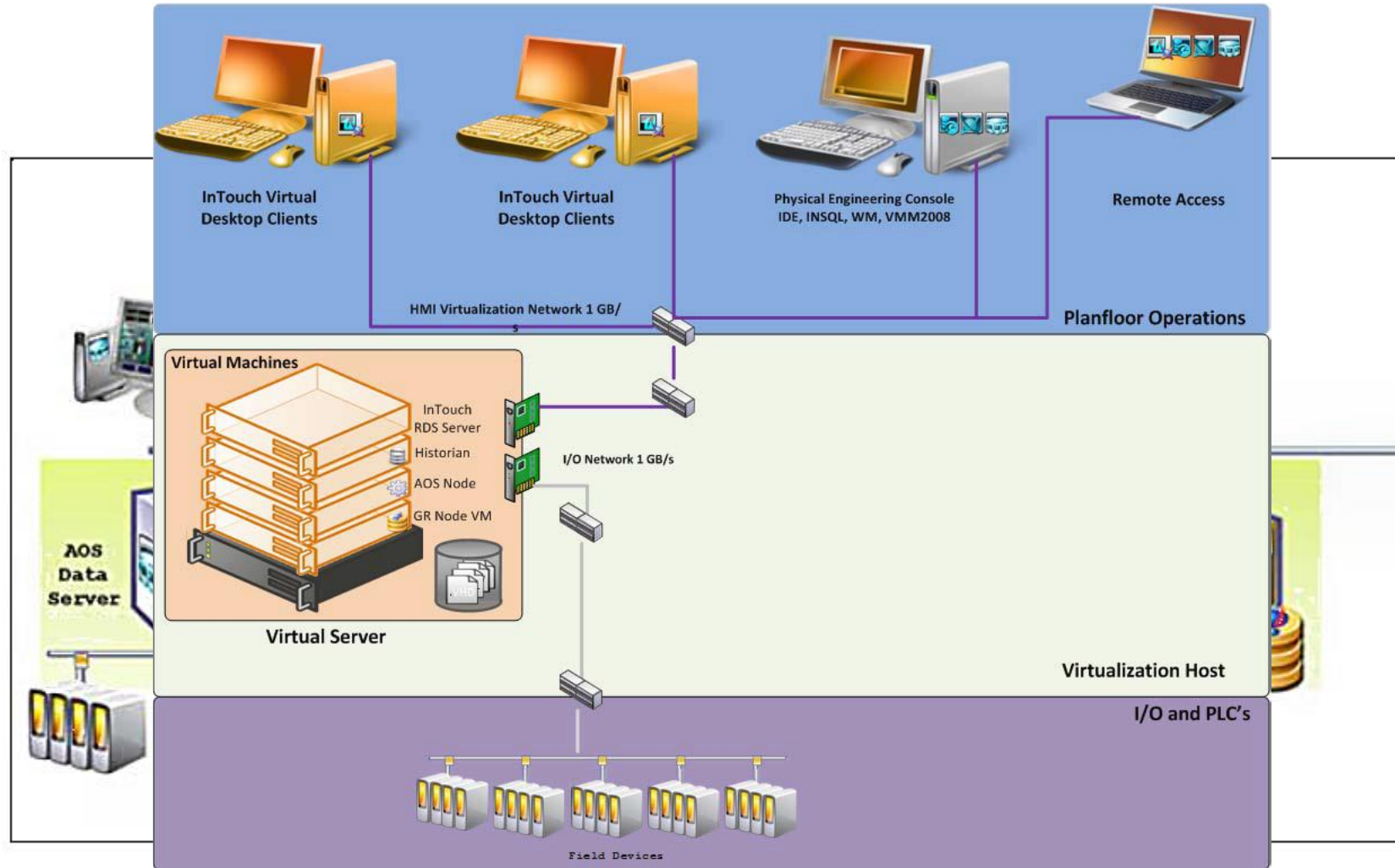


Server Checklist

Excel sheet

- Server name
- Software to be installed
- RAM
- CPU sockets and cores
- Drive space
- Hotfixes to install

System Architecture Diagram



System Architecture

AVEVA System Platform - Galaxy Database

- Review the Galaxy
- Convert Field Attributes to Attributes
- Make sure that the Galaxy database is in a good state
- Can all the objects\scripts be validated without errors / warnings ?
- Check if the entire Galaxy Database is validated
- Check to see if the Galaxy contains any 3rd party add-on
- See if there are any .NET Controls (imported AVEVA, Microsoft or 3rd Party)
- Verify if these add-on can be upgraded to the desired version successfully



System Architecture

AVEVA System Platform - Galaxy Database

- To keep the same Galaxy design or to improve on the design prior to the upgrade
- Improve on the Template design or to maintain it
- Schedule and plan for a test environment for the Galaxy DB
- Migrate the database on a test system prior to upgrade
- **Remember to back up** the Galaxy



System Architecture

AVEVA InTouch HMI Applications

- Review the InTouch application
- Make sure that the InTouch application is in a good state
- Check if the InTouch application can be opened from another machine
- Check to see if the InTouch application contains any 3rd party add-on
- Verify if these 3rd party add-on can be upgraded to the desired version successfully
- If it cannot be upgraded, check to see if they can be replaced by built-in functionalities
- Otherwise, look for other newer 3rd party add-on to replace them



System Architecture

AVEVA InTouch HMI Applications

- Use standalone (Legacy), Modern, Managed, Published
- **Remember to back up** the InTouch application



System Architecture

AVEVA Historian

- Review the Historian setup and configuration
- Make sure that the Historian is in a good running state
- Export the Historian configuration and check if that same configuration can be imported successfully on another similar installation
- Check on the History Blocks, Storage, Replication Server, Summary Tags, Replicated Tags
- **Remember to back up** the Historian configuration and History Blocks

System Architecture

AVEVA Historian Clients

- Check on the Trend / Query files to make sure they open in the current version
- Check on the compatibility of the Microsoft Office it is compatible with
- Continue with using Historian Client Trend / Query or to move to Historian InSight
- Does InSight meet your requirements?
- Easier to manage the configuration with InSight or Historian Clients?
- **Remember to back up** the Historian Client saved files



System Architecture

IO Server / DAS Server / OI Server

- Check on the compatibility of the product in the newer OS
- If they are not compatible, is there a newer version (DA / OI) that can be used to replace the old version
- Check on the compatibility of the DA / OI server with your existing or new PLCs / RTUs
- <https://softwaresupportsp.aveva.com/#/connectivityhub>
- **Remember to back up** the configuration files



System Architecture

Other products

- Follow the same rule as the other products listed previously
- Check on the following (acronym **BUCKI**) :
 - **B**ack up product
 - **U**pgradability
 - **C**ompatibility with other products
 - **K**nowledge of the new product
 - **I**ntegrity/stability



Critical Hotfixes

- Try to have all Hotfixes installed before go live.
- Maybe make a list of the ones for 2017 / 2020 / 2020 R2
- Document Hot Fixes
- Verify the issue is resolved in the upgraded version

Operating System

- Review which OS is supported with the new product version
- Check if your company uses the verified OS
- Microsoft Updates:
 - Double check regarding which KB(s) needs to be applied due to CyberSecurity.
 - Make sure to apply it on the test system before applying them in Production.
- If it is absolutely necessary, always check the Security Central site if the KB had been verified before applying the Microsoft Updates
 - <https://softwaresupportsp.aveva.com/#/securitycentral>

Operating System

GCS Technology Matrix Online searchable database that contains the latest product information.

- Enter the product name in the search bar, then select the current release to view:
 - **Product Information:** version name, number, release date, etc.
 - **Product Notes:** key release information, new features, and updates
 - **OS Compatibility:** list of compatible Windows and Windows Server versions
 - **Database Compatibility:** list of compatible SQL Server and other database product versions
 - **Virtualization Compatibility:** list of compatible virtualization software products and versions
 - **Product Coexistence:** list of products that can be installed on the same computer
 - **Product Compatibility and Interoperability:** list of products that can operate together and communicate with each

Operating System

GCS Technology Matrix - <https://gcsresource.aveva.com/TechnologyMatrix>

AV

Techno

AVEVA recognizes our other products. Please note the

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Grid of pro

Name

Discrete L

OS Environment Compatibility

- Windows 10 1803 SAC Enterprise
- Windows 10 1809 SAC Enterprise
- Windows 10 1903 SAC Enterprise, Professional
- Windows 10 1909 SAC Enterprise, Professional
- Windows 10 2004 SAC Enterprise, Professional
- Windows 10 2016 LTSC Enterprise, IoT Enterprise
- Windows 10 2019 LTSC Enterprise, IoT Enterprise
- Windows 10 20H2 SAC Enterprise
- Windows 8.1 Enterprise, Professional
- Windows Server 2012 Data Center, Embedded !
- Windows Server 2012 R2 Data Center, Embedded ! , Standard
- Windows Server 2016 Data Center, Standard
- Windows Server 2019 LTSC Data Center - Desktop Experience, IoT - Desktop Experience, Standard - Desktop Experience

Database Environment Compatibility

- SQL Server 2012 Enterprise, Express-SSMSE ! , Standard SP4
- SQL Server 2014 Enterprise, Express-SSMSE, Standard SP3
- SQL Server 2014 Enterprise
- SQL Server 2016 Enterprise, Express-SSMSE ! , Standard SP2
- SQL Server 2017 Enterprise, Express-SSME ! , Standard
- SQL Server 2019 Enterprise, Express-SSME, Standard

☑ ☐

☐ ☑

Technology Matrix

both flexible with your plant architecture elements.

acts, [click here.](#)

AVEVA™

SQL Server

Technology Matrix - <https://gcsresource.aveva.com/TechnologyMatrix>

- Always
- Check
- If pe
- Rem

SQL Server 2019 Standard x64

By Microsoft

Product Information

Vendor	Microsoft
Name	SQL Server
Market Version	2019
Architecture	x64
Release Date	2019-11-05
Locale	en-us

Report Legend

! Notes are available for an entry.

Definitions

Environment Compatibility: Ability for an AVEVA product to operate with a technology on the system

Product Coexistence: Ability for two AVEVA Products to be installed, configured and run on the same machine

Product Interoperability: Ability for two AVEVA products to communicate through a common message protocol

Product Environment Compatibility

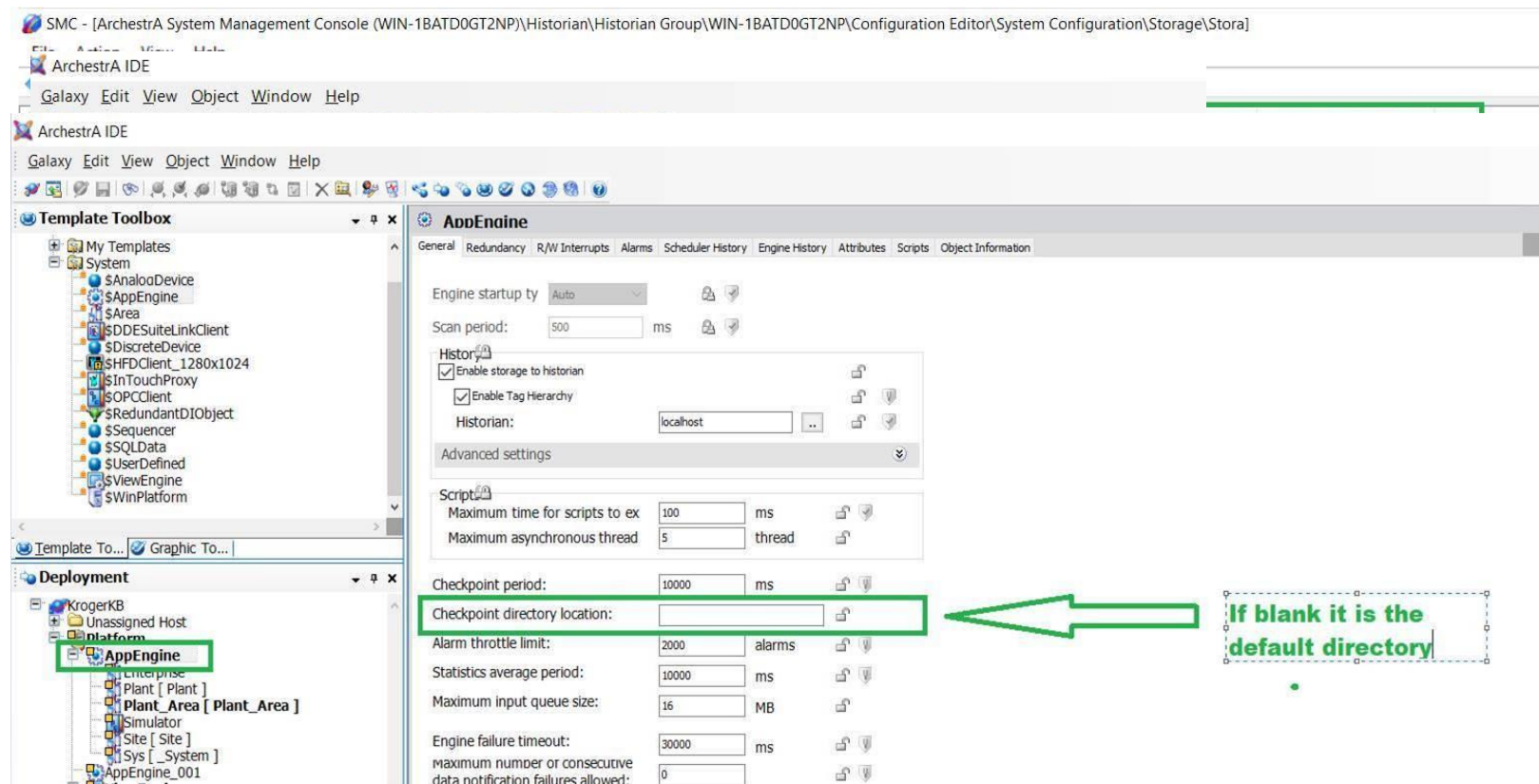
- Ampla Operations Management 2020
- Ampla Production Management 2020 U1
- AVEVA Enterprise Data Management Client (eDNA) 2021 !
- AVEVA Enterprise Data Management Services (eDNA) 2021
- AVEVA System Monitor (Previously Sentinel System Monitor) 2020
- AVEVA Work Tasks 2020 Update 1 !
- AVEVA Work Tasks 2020 !
- Discrete Lean Management 2022
- Wonderware Application Server 2020 R2 P01
- Wonderware Application Server 2020 R2
- Wonderware Application Server 2020
- Wonderware Batch Management Server 2020
- Wonderware BI Gateway 2021
- Wonderware EI 2017 R2
- Wonderware EI 2020
- Wonderware Historian Server 2020 R2
- Wonderware Historian Server 2020
- Wonderware InTouch 2020 R2
- Wonderware InTouch 2020
- Wonderware MES Database 2017 R2
- Wonderware MES Database 2020

with the OS

Virus Software Exclusions

TN10567 AVEVA System Platform 2020 (formerly Wonderware) AntiVirus Exclusions

- Check Historian Storage locations are excluded
- Verify Historian Store and Forward location excluded
- Verify Engine Checkpoint locations are excluded





Execution

End Of Life (EOL) – OS and SQL Server

Consider the EOL for the OS / SQL Server used in your architecture

Consider Windows 7 and 2008 / 2008 R2

- <https://www.microsoft.com/en-us/microsoft-365/windows/end-of-windows-7-support>
- <https://www.microsoft.com/en-ca/cloud-platform/windows-server-2008>
- <https://support.microsoft.com/en-ca/help/4456235/end-of-support-for-windows-server-2008-and-windows-server-2008-r2>

End Of Life (EOL) – OS and SQL Server

Search for other OS / SQL Server

- Search for other OSes and SQL Servers
 - <https://support.microsoft.com/en-ca/lifecycle/search/1163>



Network

- This info should also be made available in the Architecture Diagram
- Easier to work with if all the machines are configured in the same subnet
- Using a Segregated network / subnet?
- Firewall
- Security ports to be opened for the respective machines or software

Security

- Using a workgroup setup?
- Using a domain setup?
- How is your OS Security setup? Is it very locked down?
- Proper permission for the OS Security group
- Domain policies



Backup / backup / backup

- Always remember to *back up everything* before proceeding with the upgrade
- It will be your insurance to revert to a point where the system can continue running
- It will also help to understand why after upgrading the system, certain functionalities are not working correctly

Backup Applications

- Create snapshot of VMs of all nodes of the production system, if running in a Virtual Environment.
- Create a ghost image/backup of all nodes of the production system, if running on physical machines.
- Upload runtime changes, if any runtime data needs to be persisted.
- Create a backup of galaxy
 - Create CAB file from SMC (System Management Console)
 - CAB file is complete backup of galaxy.

Backup Applications

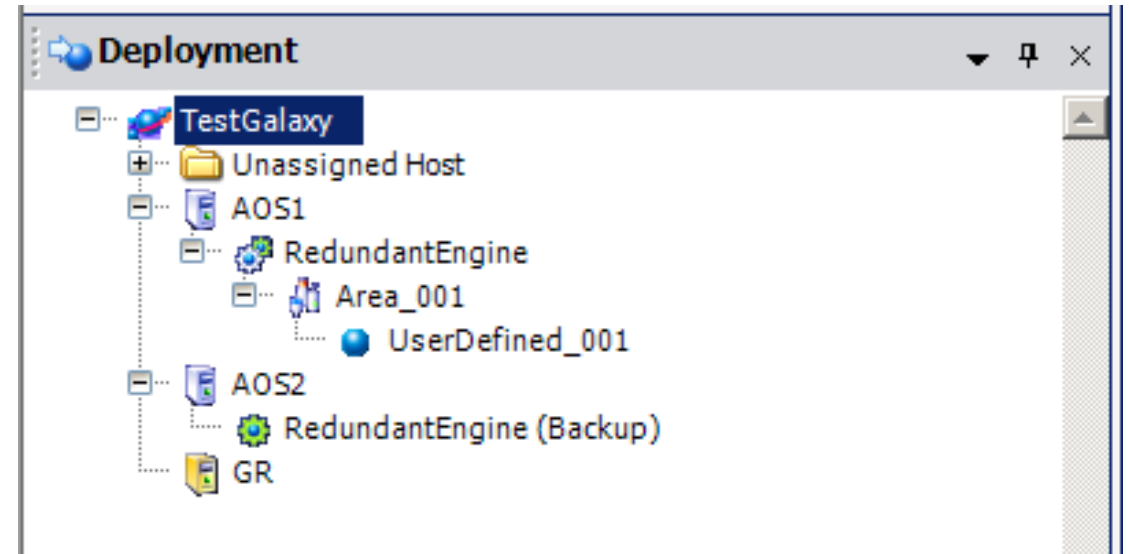
- Export all Automation Objects
 - Secondary backup
 - Object exports DO NOT contain following:
 - ArchestrA Security information
 - Third party libraries that were imported into Galaxy
 - Object history, changes that were made to objects (change log)
- Exporting/Importing objects to a new galaxy is the cleanest way of building a galaxy. The size of Galaxy is less than size of the restored Galaxy from a cab file. Draw back is, you have to reconfigure security and re-import libraries.

Backup Applications

- Take a backup of Alarm Database wwAlmDB
- Take a backup of all History blocks on Historian Node
- Take a backup of Runtime database for Historian.
- Add example of automating back ups? Contact support
- Back up other product databases
 - MES
 - InBatch
 - Workflow
 - Custom Databases

Upgrade and Migration Options

- Parallel Galaxy
- In-place upgrade
- Node replacement upgrade



Parallel System

- Setup new nodes for GR, Application Object Servers (AOS)
- Node names and IP addresses should be different to avoid conflict with existing platforms.
- Create a new Galaxy from the backup CAB file on the new GR Node and migrate the Galaxy.
- Change the network address of the GR, AOS Platform objects to match the new node names.
- Deploy the GR Platform.
- Deploy AOSes without selecting the cascade Deploy option.
- Deploy redundant engine, including the partner engine.
- Ensure that new Galaxy is operational similar to the currently running Galaxy.
- Decommission the old Galaxy platform nodes by undeploying the entire Galaxy.

Parallel System

Pros

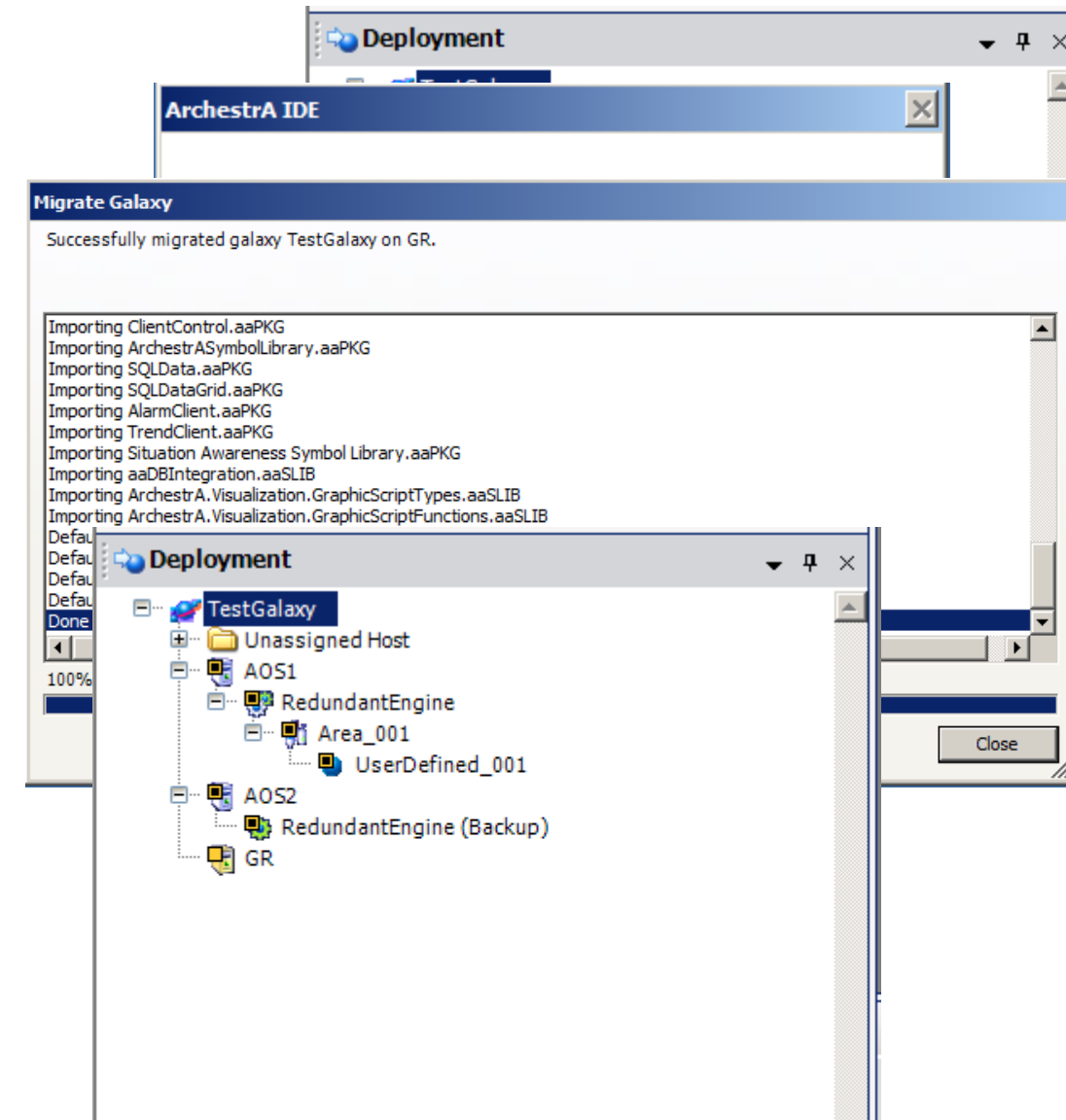
- Additional hardware needed
- Ideal for situations where hardware and operating system as well need an upgrade.
- Gives an opportunity to compare the old and new Galaxy operations, side by side.
- No downtime, old Galaxy can be decommissioned only after ensuring that new Galaxy is completely operational.

Cons

- As the node names get changed for the platform nodes, scripts that referenced the nodes by name, need to be updated in the new system.
- If a same PLC is referenced by both the Galaxies, objects in both Galaxies may write to the PLC items.

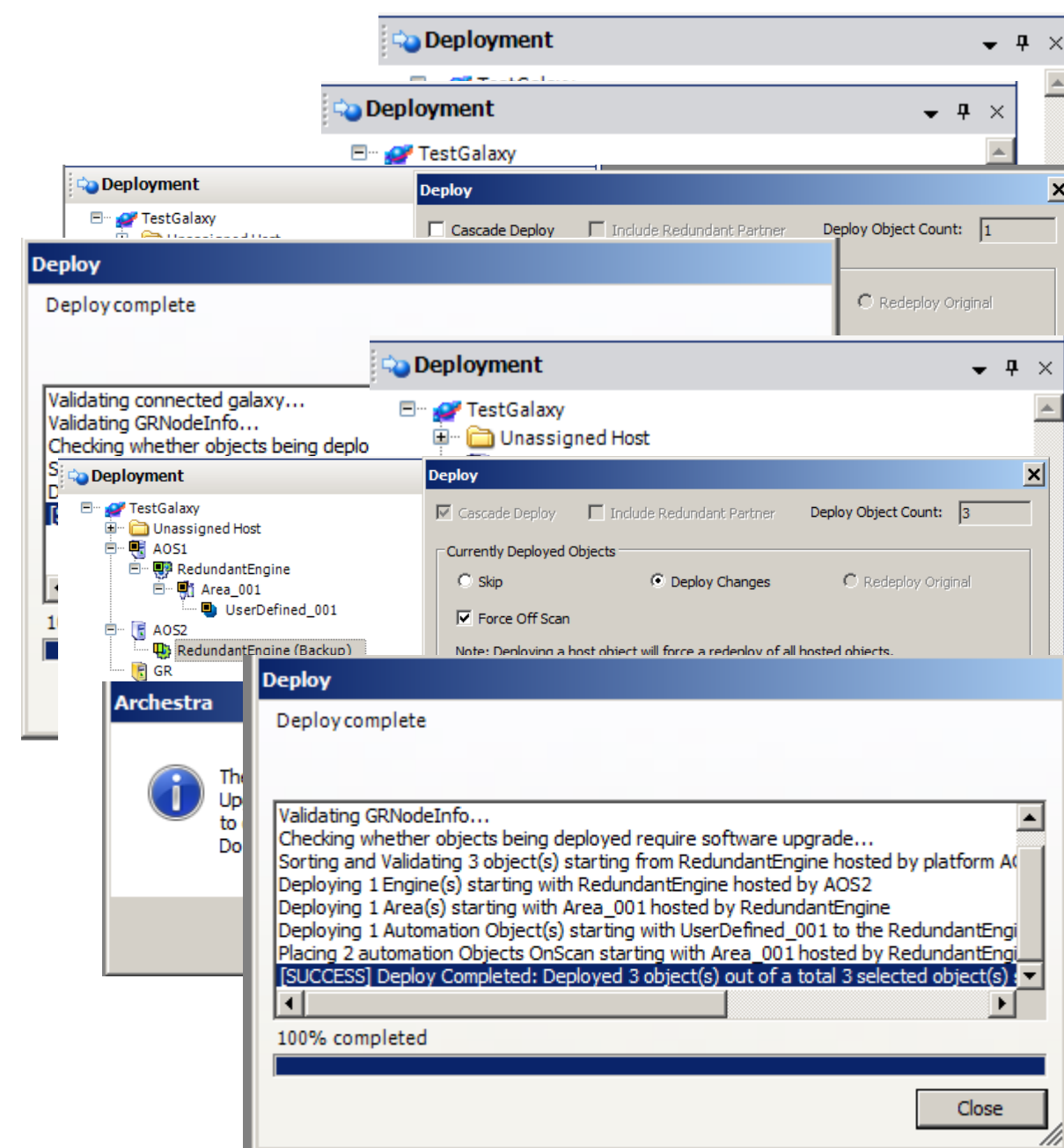
In-Place Rolling Upgrade

- Upload Run-time Changes
- Undeploy the GR Platform
- Upgrade the GR Node by installing higher version of the Application Server software.
- Launch IDE and migrate the Galaxy.
- Ensure that all the other deployed instances on AOS1 and AOS2 are flagged as Software Update Pending (SUP).



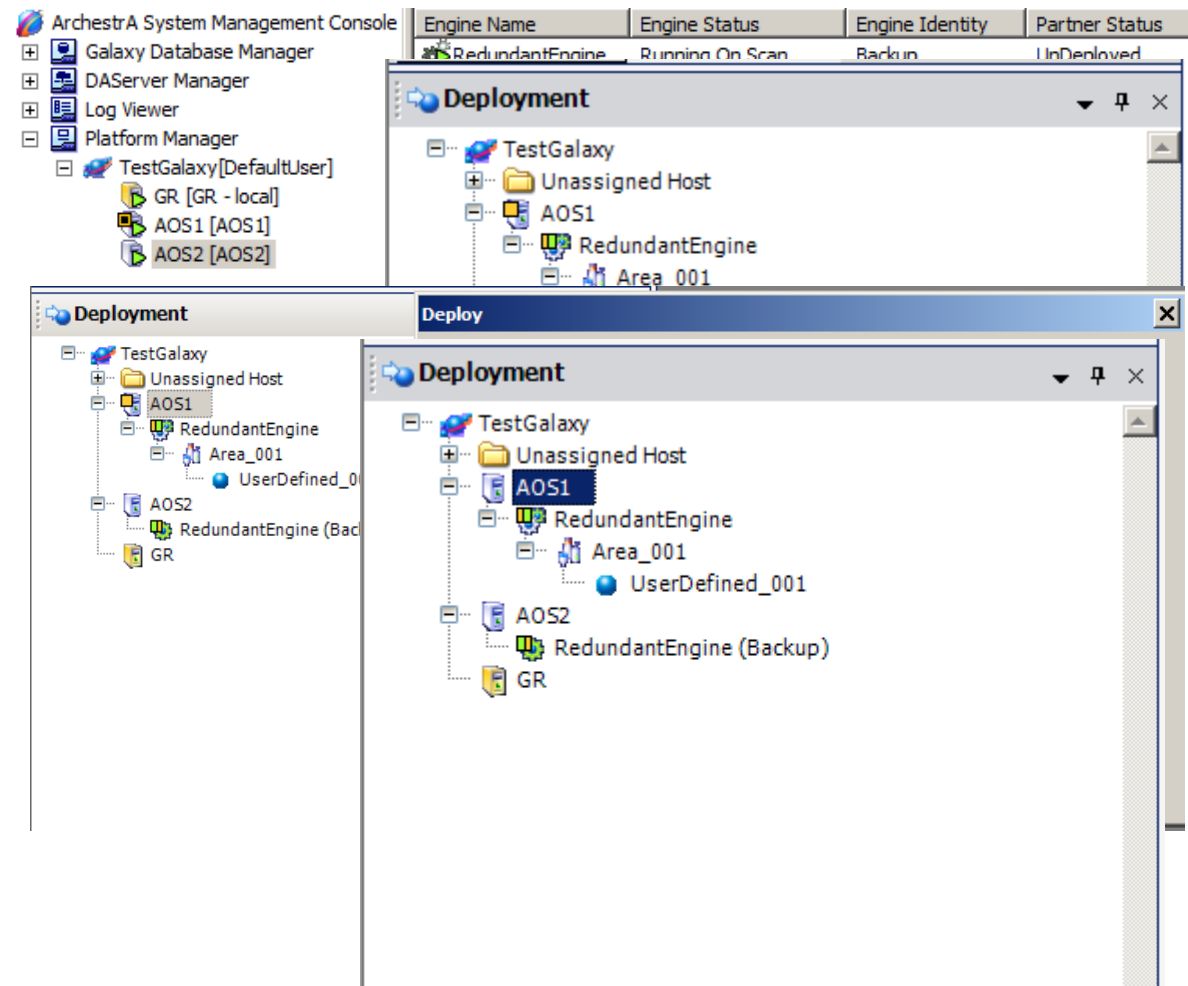
In-Place Rolling Upgrade

- Deploy the GR Platform.
- Upgrade the AOS2 platform which is running the standby engine with higher version of the Application Server software.
- Verify all the objects under AOS2 are in the undeployed state in the deployment tab.
- Deploy the AOS2 platform; unselect the “Cascade Deploy” option.
- Deploy the backup engine with “Cascade Deploy” option.



In-Place Rolling Upgrade

- Ensure that the engine is listed as “Running On Scan” under AOS2 in SMC Platform Manager
- Upgrade the AOS1 Platform Node with higher version of the Application Server software.
- Ensure that all the objects under AOS1 are in the undeployed state in the Deployment tab in IDE.
- Deploy the AOS1 platform with no Cascade Deploy option.



In-Place Rolling Upgrade

- Deploy the primary engine under AOS1 with cascade deploy option.
- Ensure that the partner engine already running on AOS2 recognized the just deployed engine on AOS1 with its partner status as “Standby-Ready”.
- Force failover the engine from AOS2 to AOS1 so that it moves back to the original state.

The screenshot displays the Archastra System Management Console interface. On the left, a tree view shows the hierarchy: TestGalaxy > Unassigned Host > AOS1 > RedundantEngine. The main pane shows a 'Deploy' dialog box with 'Deploy complete' and a list of 'Currently Deployed Objects' including AOS1, RedundantEngine, Area_001, and UserDefined_001. Below the dialog, a table shows the status of the engines:

Engine Name	Engine Status	Engine Identity	Partner Status	Partner Platform
RedundantEngine	Running On Scan	Backup	Standby - Ready	AOS1
RedundantEngine	Running On Scan	Primary	Standby - Ready	AOS2

The bottom left pane shows the 'Archastra System Management Console' menu with options like Galaxy Database Manager, DAServer Manager, Log Viewer, and Platform Manager.

In-Place Rolling Upgrade

Pros

- Seamless upgrade of the Galaxy.
- No additional hardware.
Consideration - Will hardware need replacement in the near future ?
- Operators at HMI stations continue to visualize the plant data while the upgrade is in progress in the background.

Cons

- In case the systems need hardware and OS upgrade as well, it is risky to perform an in-place upgrade of hardware and operating system.
- Need to be very careful as any step not taken correctly in the workflow can result in downtime.
- Rollback will be difficult.



SP2020 R2 SP1 - Special Attention

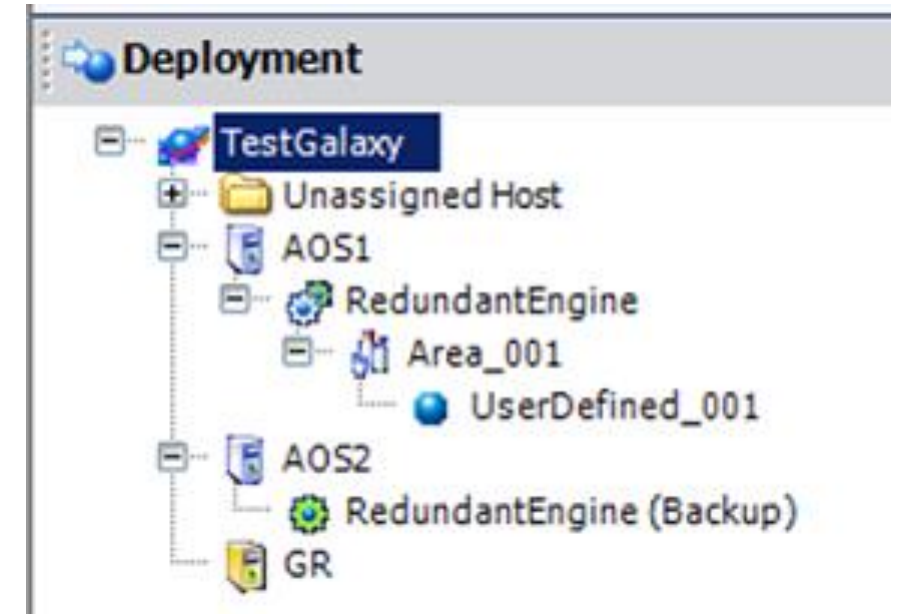
- MES & RMP co-existence. This is documented during the installation and the patches are on the install media.
 - Not patching them before opening the Galaxy could result in corruption!
- Application Object Toolkit (AOT) objects
 - Replaced the underlying C++ libraries as Microsoft will soon stop supporting them. This may break AOT objects.
 - A new toolkit is under development and will hopefully be available early next year allowing users to recompile AOT code to run in SP1 and later.

Node Replacement Upgrade

1. Setup new nodes for GR, Application Object Servers (AOS)
2. Node names and IP addresses can be the same as existing platforms but the new machines ***must not*** be connected to the network.
3. In the new GR, create (***not restore***) a new Galaxy from the backup CAB file. Migrate the Galaxy to the new version.
4. Once all the new machines are available, undeploy the GR node. Disconnect the old GR from the network.
5. Connect the ***new*** GR machine to the network. In a Command Prompt, run 'ipconfig /flushdns' and 'ipconfig /renew'. Deploy the GR Platform.

Node Replacement Upgrade

6. On both AOS1 and AOS2, under the SMC \ Platform Manager, remove the platforms for both nodes.
7. Connect the new AOS1 and AOS2 to the network. In a Command Prompt, run 'ipconfig /flushdns' and 'ipconfig /renew'.
8. Deploy just the platform for both AOSes without selecting the cascade Deploy option. Make sure the platforms are showing correctly in the Platform Manager on all the machines.
9. Cascade deploy the redundant engine, including the partner engine.
10. Ensure that new Galaxy is operational similar to the previously running Galaxy.



Node replacement upgrade

Pros

- Machine and networking setup is straightforward.
- No changing of scripts due to node / host name changes.
- Possible to upgrade hardware and OS of platform nodes with slight downtime.

Cons

- Need to be very careful as any misstep in the workflow can result in downtime.
- HMI stations will experience some disconnection during the upgrade of the AOSes.

Recommendation

- See "AVEVA Application Server Upgrade" in Chapter 4 of the *System Platform Installation Guide* (SP_Install_Guide.pdf)
- PDF located at the root of the System Platform Installation DVD / ISO.
- Check what the current system architecture consists of.
- Each system architecture has different merits and may be suitable with the different type of upgrade methods.
- Understand the requirements before proceeding with a certain type of upgrade method.
- Best to use the Parallel upgrade method as the machines will be in a cleaner state with no remnant files from the older version. Node replacement would also provide clean state machines but there is some downtime.

Important Note Regarding Upgrading

- Do not upgrade as a method to resolve technical problems.
 - Understand the issue(s) before deciding on using the upgrade option.
- Known bugs are indeed resolved in the newer version.
- **Plan** and **test** the entire upgrade procedure before touching the production system.
- Do not simply jump in headfirst into an upgrade without the planning stage.



Licensing

- Upgrading from the old licensing (.LIC) to new licensing (.XML)
- New licensing subsystem (.XML) provides **centralized license management** and replaces the file-based licensing system that was used in prior releases.
- Which mode to setup the License Server ?
 - Single, Redundant or Standalone
- What works best : Redundant pair or Redundant pairs ?

New AVEVA Enterprise License Server

- Install and configure a license server node. Activate the licenses to ensure continuous plant operation.
- The license server can typically be installed on the Galaxy Repository node, but a dedicated license server is recommended.
- License Server is an independent component and can be upgraded without upgrading the other products.
- See the "***License Installation and Activation***" section of the *System Platform Installation Guide* (SP_Install_Guide.pdf), located at the root of the DVD.
- Get the latest version (3.7.002) of AVEVA Enterprise Licensing from GCS website.

AVEVA Enterprise Licensing

Version
3.7.002

Release Date
17 Jun 2021

Recommendation

- If installing an older version of the License Server, check if there are any applicable Hotfix(es).
- Before attempting the upgrade, obtain all new XML license(s) from distributor.
- How many Runtime licenses to purchase or to get upgraded ?
 - Work with distributor / SI to get the license(s) sorted out.
- Licenses must be activated before use.

Session O-2 : 60 tips in 60 mins for AVEVA Enterprise Licensing



System Validation





Good time to take backups

- Use our Galaxy backup Utility to schedule regular backups
- Back up the Historian Database
- MES Databases, plus take advantage to rebuild indexes, and purge/archive.

Galaxy completed the migration. What next?

All InTouch applications must be opened individually for the windows to be converted

- If the InTouch application keeps failing on opening or saving a window, make sure you have the Antivirus exclusions set.
 - In the past, seen the application *Cybereason Sensor* which has a process called MinionHost.exe that causes the InTouch application to fail.
 - Stopping the process once is not enough; it keeps coming back. Used **taskkill /f /t /im minionhost.exe** from the Cmd prompt - Run as Administrator. I had to kill it about 20 times before it took the hint.
 - It is better to uninstall Cybereason Sensor, if possible, until the migration is complete.
-
- TN10567 AVEVA System Platform 2020 (formerly Wonderware) AntiVirus Exclusions

Validation

Verify...

- All Platform Engines and App Engines are Running On Scan.
- Partner Status is “Standby Ready” for all the redundant engines.
- All DI objects (DDESL, OPCClient) are connected to the DAServers.
- Redundant DI Objects are connected to both primary and backup DI sources.
- All InTouch HMI screens are updated with data.
- All AppEngines configured for Historization are connected to the Historian.
- Historian Collecting and Storing Data.
- All the ArchestrA services that are supposed to start automatically are in the Running state in the Services console.
- Node to Node communication still works in the Galaxy.
- No continuous critical errors \ warnings reported in the SMC Logger.



Verify Platform manager

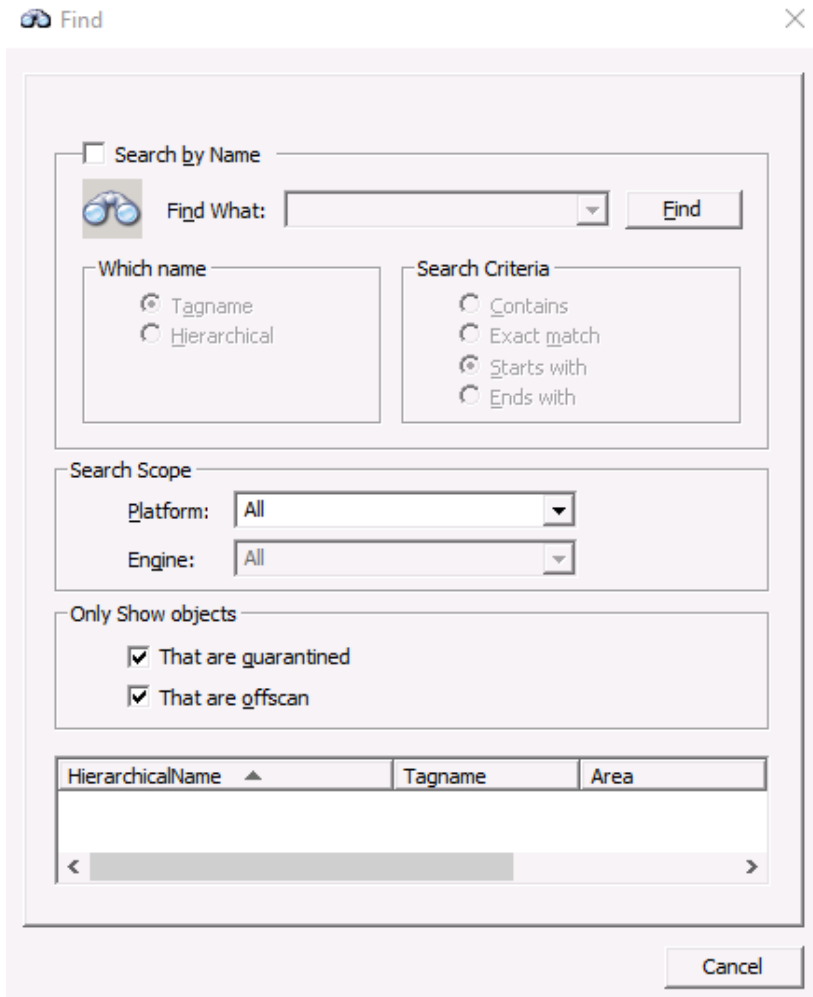
Select each platform to see a view of all engines and current state

Platform Manager

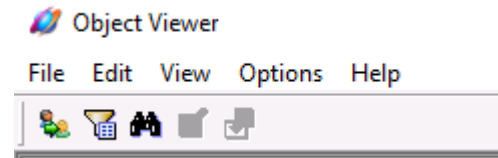
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- USFTSL0048 [USFTSL0048]
- USFTSL0024 [USFTSL0024]
- USFTSL0025 [USFTSL0025]
- USFTSL0036 [USFTSL0036]
- USFTSL0045 [USFTSL0045]
- USFTSL0046 [USFTSL0046]
- USFTSL0022 [USFTSL0022]
- USFTSL0023 [USFTSL0023]
- USFTSL0031 [USFTSL0031]
- USFTSL0032 [USFTSL0032]
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- USFTSL0034 [USFTSL0034]
- USFTSL0039 [USFTSL0039]

Engine Name	Engine Status	Engine Identity	Partner Status	Partner Platform	Engine ID
AAEng_DRX20_01	Running On Scan	Primary	Standby - Ready	USFTSL0023	2
AAEng_FRT00_01	Standby - Ready	Backup	Active	USFTSL0023	3
AAEng_DRY11_01	Running On Scan	Primary	Standby - Ready	USFTSL0023	4
AAEng_PCW00_01	Standby - Ready	Backup	Active	USFTSL0023	5
AAEng_DRX10_01	Running On Scan	Primary	Standby - Ready	USFTSL0023	6
AAEng_DRY14_01	Running On Scan	Primary	Standby - Ready	USFTSL0023	7
AAEng_CHE10_01	Standby - Ready	Backup	Active	USFTSL0023	8
AAEng_Common_01	Running On Scan	Primary	Standby - Ready	USFTSL0023	9
AAEng_HWT00_01	Running On Scan	Primary	Standby - Ready	USFTSL0023	10
AAEng_OIL00_01	Standby - Ready	Backup	Active	USFTSL0023	11
AAEng_HRD00_01	Running On Scan	Primary	Standby - Ready	USFTSL0023	12

Open Object Viewer and search for Quarantined or Offscan



1) Select the Edit menu “Find Object” or click the Binoculars



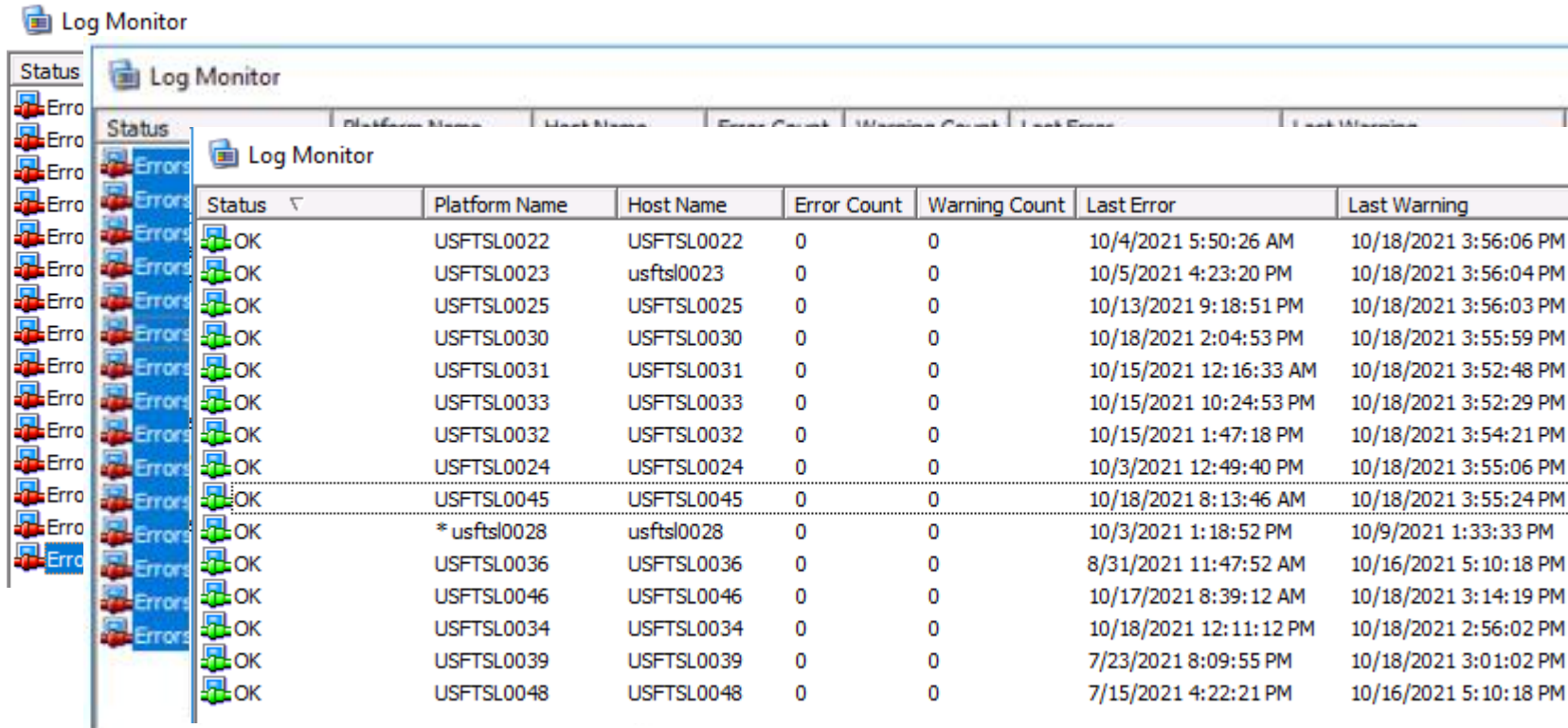
2) Uncheck Search by tagname

3) Search scope set to all

4) Check both boxes for Quarantined and Offscan

Use Log Monitor to View the Whole Galaxy

C:\Program Files (x86)\ArchestrA\Common\aaLogMonitor.exe



The screenshot shows the Log Monitor application window. It has a sidebar on the left with a tree view of log sources, all of which are currently expanded and show a red error icon. The main area displays a table with the following columns: Status, Platform Name, Host Name, Error Count, Warning Count, Last Error, and Last Warning. The table contains 18 rows of data, mostly showing 'OK' status and zero error/warning counts.

Status	Platform Name	Host Name	Error Count	Warning Count	Last Error	Last Warning
OK	USFTSL0022	USFTSL0022	0	0	10/4/2021 5:50:26 AM	10/18/2021 3:56:06 PM
OK	USFTSL0023	usftsl0023	0	0	10/5/2021 4:23:20 PM	10/18/2021 3:56:04 PM
OK	USFTSL0025	USFTSL0025	0	0	10/13/2021 9:18:51 PM	10/18/2021 3:56:03 PM
OK	USFTSL0030	USFTSL0030	0	0	10/18/2021 2:04:53 PM	10/18/2021 3:55:59 PM
OK	USFTSL0031	USFTSL0031	0	0	10/15/2021 12:16:33 AM	10/18/2021 3:52:48 PM
OK	USFTSL0033	USFTSL0033	0	0	10/15/2021 10:24:53 PM	10/18/2021 3:52:29 PM
OK	USFTSL0032	USFTSL0032	0	0	10/15/2021 1:47:18 PM	10/18/2021 3:54:21 PM
OK	USFTSL0024	USFTSL0024	0	0	10/3/2021 12:49:40 PM	10/18/2021 3:55:06 PM
OK	USFTSL0045	USFTSL0045	0	0	10/18/2021 8:13:46 AM	10/18/2021 3:55:24 PM
OK	*usftsl0028	usftsl0028	0	0	10/3/2021 1:18:52 PM	10/9/2021 1:33:33 PM
OK	USFTSL0036	USFTSL0036	0	0	8/31/2021 11:47:52 AM	10/16/2021 5:10:18 PM
OK	USFTSL0046	USFTSL0046	0	0	10/17/2021 8:39:12 AM	10/18/2021 3:14:19 PM
OK	USFTSL0034	USFTSL0034	0	0	10/18/2021 12:11:12 PM	10/18/2021 2:56:02 PM
OK	USFTSL0039	USFTSL0039	0	0	7/23/2021 8:09:55 PM	10/18/2021 3:01:02 PM
OK	USFTSL0048	USFTSL0048	0	0	7/15/2021 4:22:21 PM	10/16/2021 5:10:18 PM

- Select a row and hit Ctrl A to select all rows
- Right click and select reset
- Now watch for current Errors or warning
- Double click a Row and that logger will open.

- The Error count looks bad because it shows all the way to the beginning of the log

Are the engines overloaded ?



What is a quick way we can view all engines to see if the ExecutionTimeAvg is within the Scan period

- Create a manual watch window in Object Viewer, but very time consuming if you have many engines
- Check the Log for issues, but sometimes nothing will show here. Plus, you have a log for each platform.

We can make a script to help us monitor our ExecutionTimeAvg, and Watch windows

- Create a script to gather the engine names , and create a script to monitor the engines
- Check the Log for issues , but sometimes nothing will show here. Plus, you have a log for each platform.

What information do we want to gather ?

Engine Attributes

- ScanPeriod
- ExecutionTimeAvg
- TimedleAvg
- ScanOverrunsConsecCnt

Watch window: Script to create a xml file

- Redundant Engines
- RDI Objects

Healthy:

```
CreateWatch.CheckScanOverruns: ***AAEng_DRY23_01.Scheduler.ScanOverrunsConsecCnt = 0 ScanPeriod = 1000 62.8 ExecutionTimeAvg msec
CreateWatch.CheckScanOverruns: ***AAEng_DRY14_01.Scheduler.ScanOverrunsConsecCnt = 0 ScanPeriod = 1000 42 ExecutionTimeAvg msec
CreateWatch.CheckScanOverruns: ***AAEng_DRY12_01.Scheduler.ScanOverrunsConsecCnt = 0 ScanPeriod = 1000 38.6 ExecutionTimeAvg msec
CreateWatch.CheckScanOverruns: ***AAEng_ENZ10_01.Scheduler.ScanOverrunsConsecCnt = 0 ScanPeriod = 1000 47.6 ExecutionTimeAvg msec
```

Issues:






```
Check4ScanOverRuns.Check4ScanOverruns: ***AE_ZER.Scheduler.ScanOverrunsConsecCnt = 33702 ScanPeriod = 250 2505.333
Check4ScanOverRuns.Check4ScanOverruns: ***AE_ZER.Scheduler.ScanOverrunsConsecCnt = 33702 ScanPeriod = 250 2505.333
Check4ScanOverRuns.Check4ScanOverruns: ***AE_ROP.Scheduler.ScanOverrunsConsecCnt = 15162 ScanPeriod = 250 8375
Check4ScanOverRuns.Check4ScanOverruns: ***AE_ROP.Scheduler.ScanOverrunsConsecCnt = 15162 ScanPeriod = 250 8375
```

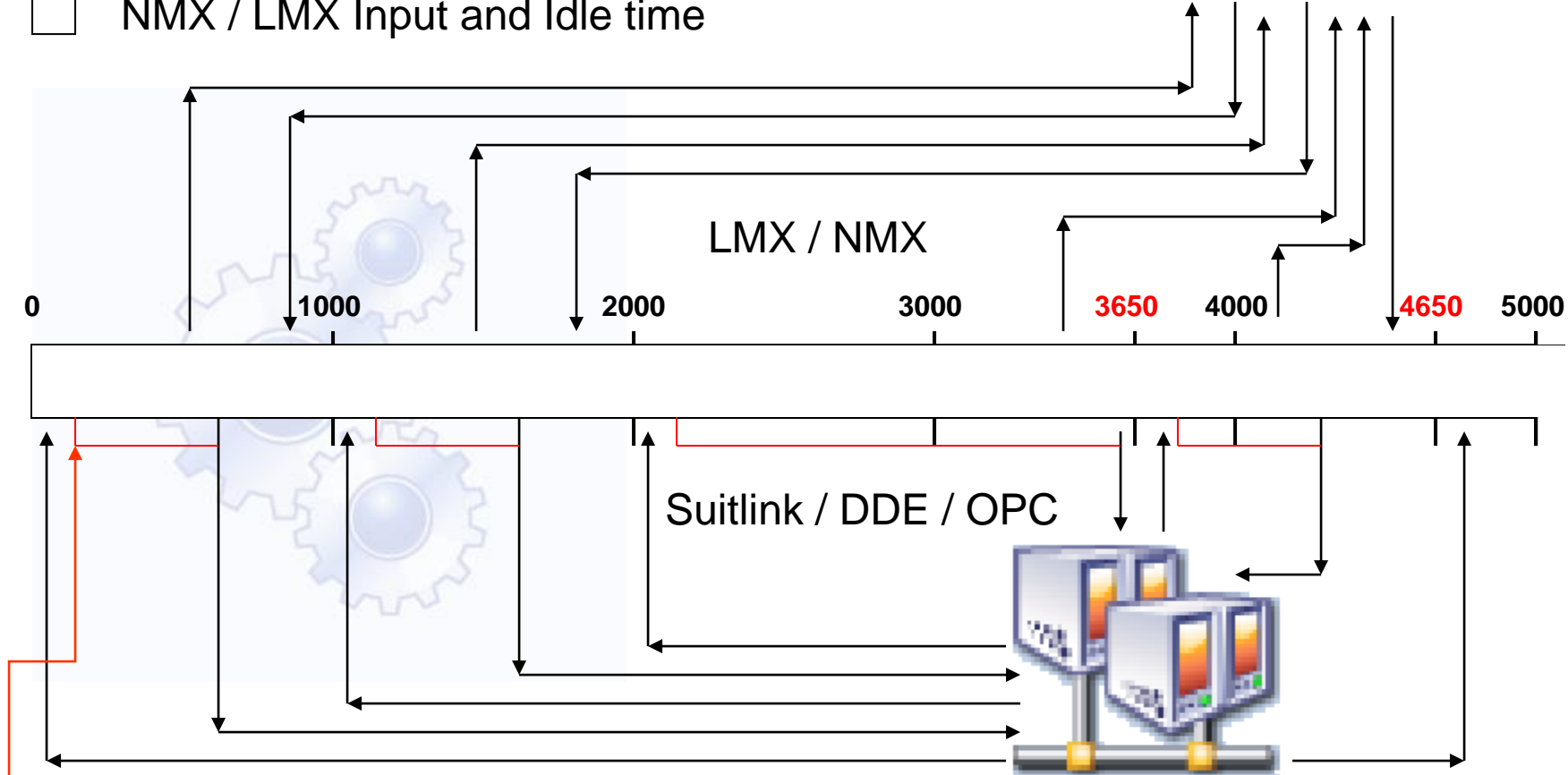
Sample Watch Windows

AttributeReference	Value
AAEng_Common_01.Redundancy.Identity	Primary
AAEng_Common_01.Redundancy.PartnerStatus	Standby - Ready
AAEng_Common_01.Scheduler.ScanPeriod	1000
AAEng_Common_01.Scheduler.TimedleAvg	951.5684
AAEng_Common_01.Redundancy.ForceFailoverC...	false
	No Data
	No Data
AAEng_DRX10_01.Redundancy.Identity	Primary
AAEng_DRX10_01.Redundancy.PartnerStatus	Standby - Ready
AAEng_DRX10_01.Scheduler.ScanPeriod	1000
AAEng_DRX10_01.Scheduler.TimedleAvg	836.7853

	No Data
AAEng_DRY12_01.Redundancy.Identity	Primary
AAEng_DRY12_01.Redundancy.PartnerStatus	Standby - Ready
AAEng_DRY12_01.Scheduler.ScanPeriod	1000
AAEng_DRY12_01.Scheduler.TimedleAvg	940.2437
AAEng_DRY12_01.Redundancy.ForceFailoverCmd	false
	No Data
	No Data
AAEng_DRY13_01.Redundancy.Identity	Primary
AAEng_DRY13_01.Redundancy.PartnerStatus	Standby - Ready
AAEng_DRY13_01.Scheduler.ScanPeriod	1000
AAEng_DRY13_01.Scheduler.TimedleAvg	925.6244

History: Hist Engines USFTSL0022 USFTSL0023 USFTSL0024

-  Scheduler Execution
-  NMX / LMX Output
-  DDE / Suitlink msg pump
-  Checkpoint
-  NMX / LMX Input and Idle time



This redline indicates where in the scan the output data comes from, the black line indicates the point in the scan that the output is made.

CreateWatch *

Attributes | Scripts | Object Information

☒ Inherited

☒ User defined

cfg

X

Attributes

cfg_GalaxyName

cfg_maxScanOverruns

cfg_ServerName

cfg_WatchFilePath_Engine

Cfg_WatchFilepath_RDI

- Script is in the slide notes

```
1 Me.trg_CreateScript = false;
2
3 dim connection as System.Data.SqlClient.SqlConnection;
4 dim command as System.Data.SqlClient.SqlCommand;
5 dim reader as System.Data.SqlClient.SqlDataReader;
6 dim sw as System.IO.StreamWriter;
7 dim Template_Id as integer;
8
9 sw = System.IO.File.CreateText("C:\temp\ScanOverrunScript.txt");
10
11 connection = new System.Data.SqlClient.SqlConnection("Integrated Security=SSPI;Persist Security Info=False;Initial Catalog=" + me.cfg_GalaxyName + ";Data Source=" + me.cfg_ServerName);
12 connection.Open();
13 command = new System.Data.SqlClient.SqlCommand("select template_definition_id from gobject where tag_name = '$AppEngine'", connection);
14 reader = command.ExecuteReader();
15 while reader.Read()
16     Template_Id = reader("template_definition_id");
17 endwhile;
18 reader.Close();
19
20 command = new System.Data.SqlClient.SqlCommand("select tag_name from Gobject where template_definition_id = " & text(Template_Id , "#") & " and tag_name not like '%$%' and deployed_package_id > 0", connection);
21 reader = command.ExecuteReader();
22 while reader.Read()
23     sw.WriteLine("if " & reader("Tag_name") & ".Scheduler.ScanOverrunsConsecCnt >= " & "Me.cfg_maxScanOveruns" & " then");
24     sw.WriteLine("Logmessage(" & """""""" & reader("Tag_name") & ".Scheduler.ScanOverrunsConsecCnt = """ & " & " & reader("Tag_name") & 
        """.Scheduler.ScanOverrunsConsecCnt" & " & " & """" ScanPeriod = """ & "+" & reader("Tag_name") & ".Scheduler.ScanPeriod" & " & " & """" """" & " & " & 
        reader("Tag_name") & ".Scheduler.ExecutionTimeAvg" & " & """" ExecutionTimeAvg msec""" & ")";" );
25     sw.WriteLine("endif;");
26 endwhile;
27 reader.Close();
28 sw.Close();
```

CheckScanOverruns Script

The script will generate the body for the CheckScanOverruns script

- 1) Set the CreateWatch.trg_CreateScript to True in Object viewer
- 2) Copy the Text from the file that was created from this location:
C:\temp\ScanOverrunScript.txt into the body of the script in step 3
- 3) Create a new Script in the CreateWatch Object called CheckScanOverruns

AttributeReference	Value
CreateWatch.trg_CreateScript	false
CreateWatch.trg_Check4ScanOverruns	true
CreateWatch.trg_CreateWatch_REngines	false
CreateWatch.trg_RDI_Watch	false
CreateWatch.cfg_maxScanOverruns	2

ScanOverrunScript.txt - Notepad

```
File Edit Format View Help

if Utility_Engine.Scheduler.ScanOverrunsConsecCnt >= Me.cfg_maxScanOv
Logmessage("***Utility_Engine.Scheduler.ScanOverrunsConsecCnt = " + U
endif;
if FTS_DIO_ASPFNP_AOS01.Scheduler.ScanOverrunsConsecCnt >= Me.cfg_max
Logmessage("***FTS_DIO_ASPFNP_AOS01.Scheduler.ScanOverrunsConsecCnt =
endif;
if FTS_DIO_WET_AOS01.Scheduler.ScanOverrunsConsecCnt >= Me.cfg_maxScan
Logmessage("***FTS_DIO_WET_AOS01.Scheduler.ScanOverrunsConsecCnt = "
endif;
if FTS_DIO_DRY_AOS01.Scheduler.ScanOverrunsConsecCnt >= Me.cfg_maxScan
Logmessage("***FTS_DIO_DRY_AOS01.Scheduler.ScanOverrunsConsecCnt = "
...
```

Aliases:

Declarations:

Scripts:

Basics

Expression: me.trg_Check4ScanOverruns

Trigger type: WhileTrue

Trigger period: 00:00:05.0000000

Deadband: 0.0

☐ Historize script state

```
1 if Utility_Engine.Scheduler.
2 Logmessage("***Utility_Engin
3 endif;
4 if FTS_DIO_ASPFNP_AOS01.Sche
5 Logmessage("***FTS_DIO_ASPFN
6 endif;
7 if FTS_DIO_WET_AOS01.Schedul
8 Logmessage("***FTS_DIO_WET_A
9 endif;
```

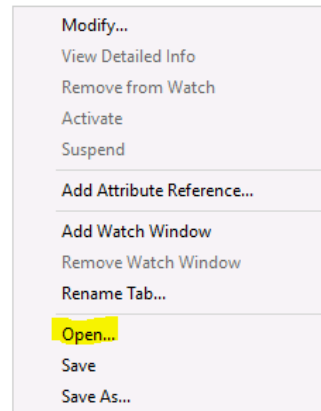
- Script is in the slide notes

Redundant Engine Watch Window

The script will generate the xml for a watch window

- 1) Set the CreateWatch.trg_CreateWatch_REngines to True in Object Viewer
- 2) Right click the Watch window in Object Viewer and select open, now select the file in the c:\temp dir

AttributeReference	Value
CreateWatch.trg_CreateScript	false
CreateWatch.trg_Check4ScanOverruns	true
CreateWatch.trg_CreateWatch_REngines	false
CreateWatch.trg_RDI_Watch	false
CreateWatch.cfg_maxScanOverruns	2



AttributeReference	Value
Platform = USFTSL0022	No Data
AAEng_CHE10_01.Engine.Historian.ConnectState	true
AAEng_CHE10_01.Engine.Historian.InStoreforward	false
	No Data
AAEng_CHE20_01.Engine.Historian.ConnectState	true
AAEng_CHE20_01.Engine.Historian.InStoreforward	false
	No Data
AAEng_CIP00_01.Engine.Historian.ConnectState	true
AAEng_CIP00_01.Engine.Historian.InStoreforward	false
	No Data
AAEng_Common_01.Engine.Historian.ConnectSt...	true
AAEng_Common_01.Engine.Historian.InStorefor...	false
	No Data
AAEng_DRX10_01.Engine.Historian.ConnectState	true
AAEng_DRX10_01.Engine.Historian.InStoreforward	false
	No Data
AAEng_DRX20_01.Engine.Historian.ConnectState	true
AAEng_DRX20_01.Engine.Historian.InStoreforward	false
	No Data
AAEng_DRX30_01.Engine.Historian.ConnectState	true
AAEng_DRX30_01.Engine.Historian.InStoreforward	false
	No Data
AAEng_DRY11_01.Engine.Historian.ConnectState	true
AAEng_DRY11_01.Engine.Historian.InStoreforward	false
	No Data
AAEng_DRY12_01.Engine.Historian.ConnectState	true
AAEng_DRY12_01.Engine.Historian.InStoreforward	false
	No Data
AAEng_DRY13_01.Engine.Historian.ConnectState	true
AAEng_DRY13_01.Engine.Historian.InStoreforward	false
	No Data
AAEng_DRY14_01.Engine.Historian.ConnectState	true
AAEng_DRY14_01.Engine.Historian.InStoreforward	false
	No Data
AAEng_DRY21_01.Engine.Historian.ConnectState	true
AAEng_DRY21_01.Engine.Historian.InStoreforward	false
	No Data
AAEng_DRY22_01.Engine.Historian.ConnectState	true
AAEng_DRY22_01.Engine.Historian.InStoreforward	false
	No Data

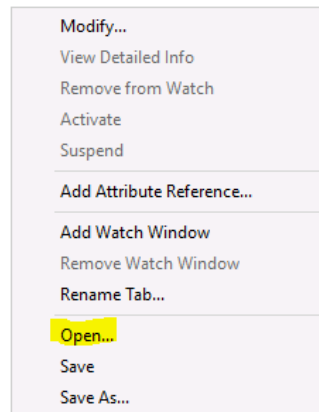
- Script is in the slide notes

RDI Watch Window

The script will generate the xml for a watch window

- 1) Set the CreateWatch.trg_RDI_Watch to True in Object Viewer
- 2) Right click the Watch window in Object viewer and select open, now select the file in the c:\temp dir

AttributeReference	Value
CreateWatch.trg_CreateScript	false
CreateWatch.trg_Check4ScanOverruns	true
CreateWatch.trg_CreateWatch_REngines	false
CreateWatch.trg_RDI_Watch	false
CreateWatch.cfg_maxScanOverruns	2



AttributeReference	Value
Engine = AAEng_DRX10_01	No Data
DIO_DRX10_01.DiSourceActive	DIO_DRX10_01_P
DIO_DRX10_01.DiSourcePrimary	DIO_DRX10_01_P
DIO_DRX10_01.DiSourceBackup	DIO_DRX10_01_S
DIO_DRX10_01.Attribute(pingitems)[1]	drx10 Button.Simulation.OnReq
DIO_DRX10_01.ConnectionStatus	Connected
DIO_DRX10_01.ForceFailoverCmd	false
Engine = AAEng_DRX20_01	No Data
DIO_DRX20_01.DiSourceActive	No Data
DIO_DRX20_01.DiSourcePrimary	No Data
DIO_DRX20_01.DiSourceBackup	DIO_DRX20_01_P
DIO_DRX20_01.Attribute(pingitems)[1]	DIO_DRX20_01_P
DIO_DRX20_01.ConnectionStatus	DIO_DRX20_01_S
DIO_DRX20_01.ForceFailoverCmd	drx20 Button.Simulation.OnReq
Engine = AAEng_DRY11_01	Connected
DIO_DRY11_01.DiSourceActive	false
DIO_DRY11_01.DiSourcePrimary	No Data
DIO_DRY11_01.DiSourceBackup	No Data
DIO_DRY11_01.Attribute(pingitems)[1]	No Data
DIO_DRY11_01.ConnectionStatus	DIO_DRY11_01_P
DIO_DRY11_01.ForceFailoverCmd	DIO_DRY11_01_P
Engine = AAEng_DRY12_01	DIO_DRY11_01_S
DIO_DRY12_01.DiSourceActive	dry11 Button.Simulation.OnReq
DIO_DRY12_01.DiSourcePrimary	Connected
DIO_DRY12_01.DiSourceBackup	false
DIO_DRY12_01.Attribute(pingitems)[1]	No Data
DIO_DRY12_01.ConnectionStatus	No Data
DIO_DRY12_01.ForceFailoverCmd	No Data
Engine = AAEng_DRY13_01	DIO_DRY12_01_P
DIO_DRY13_01.DiSourceActive	DIO_DRY12_01_P
DIO_DRY13_01.DiSourcePrimary	DIO_DRY12_01_P
DIO_DRY13_01.DiSourceBackup	DIO_DRY12_01_S
DIO_DRY13_01.Attribute(pingitems)[1]	dry12 Button.Simulation.OnReq
DIO_DRY13_01.ConnectionStatus	Connected
DIO_DRY13_01.ForceFailoverCmd	false
Engine = AAEng_DRY13_01	No Data
DIO_DRY13_01.DiSourceActive	No Data
DIO_DRY13_01.DiSourcePrimary	DIO_DRY13_01_P
DIO_DRY13_01.DiSourceBackup	DIO_DRY13_01_P

Other Considerations...

Alarms and Events

What needs to be changed when switching from WWAlmDB to the History blocks

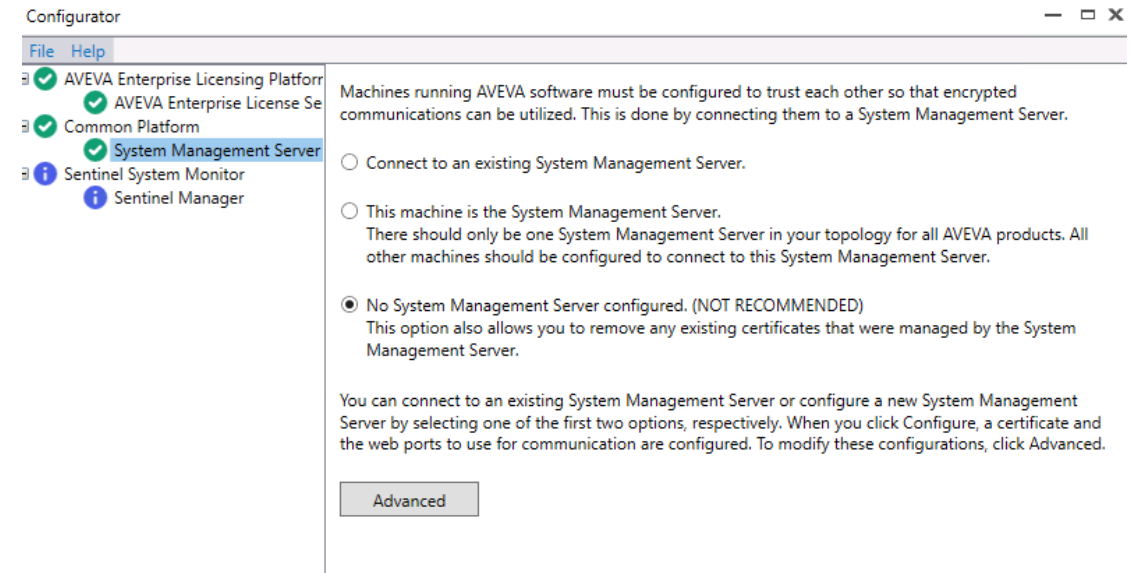
- Old ActiveX controls need to be replaced with the EAC
- Old alarm data required to be migrated to History blocks
- SQL Server Local accounts can no longer be used
- Query for Alarms and Events now requires the EventStamp to be used to return any rows

Events:

Types	Description	Historize
1	System	<input type="checkbox"/>
2	Application	<input type="checkbox"/>
3	User	<input checked="" type="checkbox"/>

- Query the database to make sure you don't have more being logged than expected. One customer has some PID tags being logged for events, and 800,000 events were logged in 30 minutes.

System Management Server



- If No SMS is selected, remember to add the key in the registry setting :
HKEY_LOCAL_MACHINE\SOFTWARE\WOW6432Node\ArchestrA\Framework\Nmx
- "DisableSecureChannel"=dword:00000001



Assistance with Upgrade

Experience helps

- Option to work with the following group if assistance is needed :
 - System Integrators
 - Distributors
 - AVEVA


Questions




Questions
?

This presentation may include predictions, estimates, intentions, beliefs and other statements that are or may be construed as being forward-looking. While these forward-looking statements represent our current judgment on what the future holds, they are subject to risks and uncertainties that could result in actual outcomes differing materially from those projected in these statements. No statement contained herein constitutes a commitment by AVEVA to perform any particular action or to deliver any particular product or product features. Readers are cautioned not to place undue reliance on these forward-looking statements, which reflect our opinions only as of the date of this presentation.

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