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Getting Started with the PTC System Monitor

June 2012

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Getting Started with the PTC System Monitor

This course is a subset of content from:

- TRN-3171 Monitoring Windchill Performance using the PTC System Monitor

Course Objectives

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- Learn the fundamentals of the PTC System Monitor
- Plan PTC System Monitor architecture and deployment
- Review the installation procedure
- Learn the basics of the PTC System Monitor client
- Use Export Session to capture data for diagnosis by PTC or others
- Use Fastpacks
- (Optional) advanced diagnostic options

Purpose: Reduce Turnaround Time and Escalations

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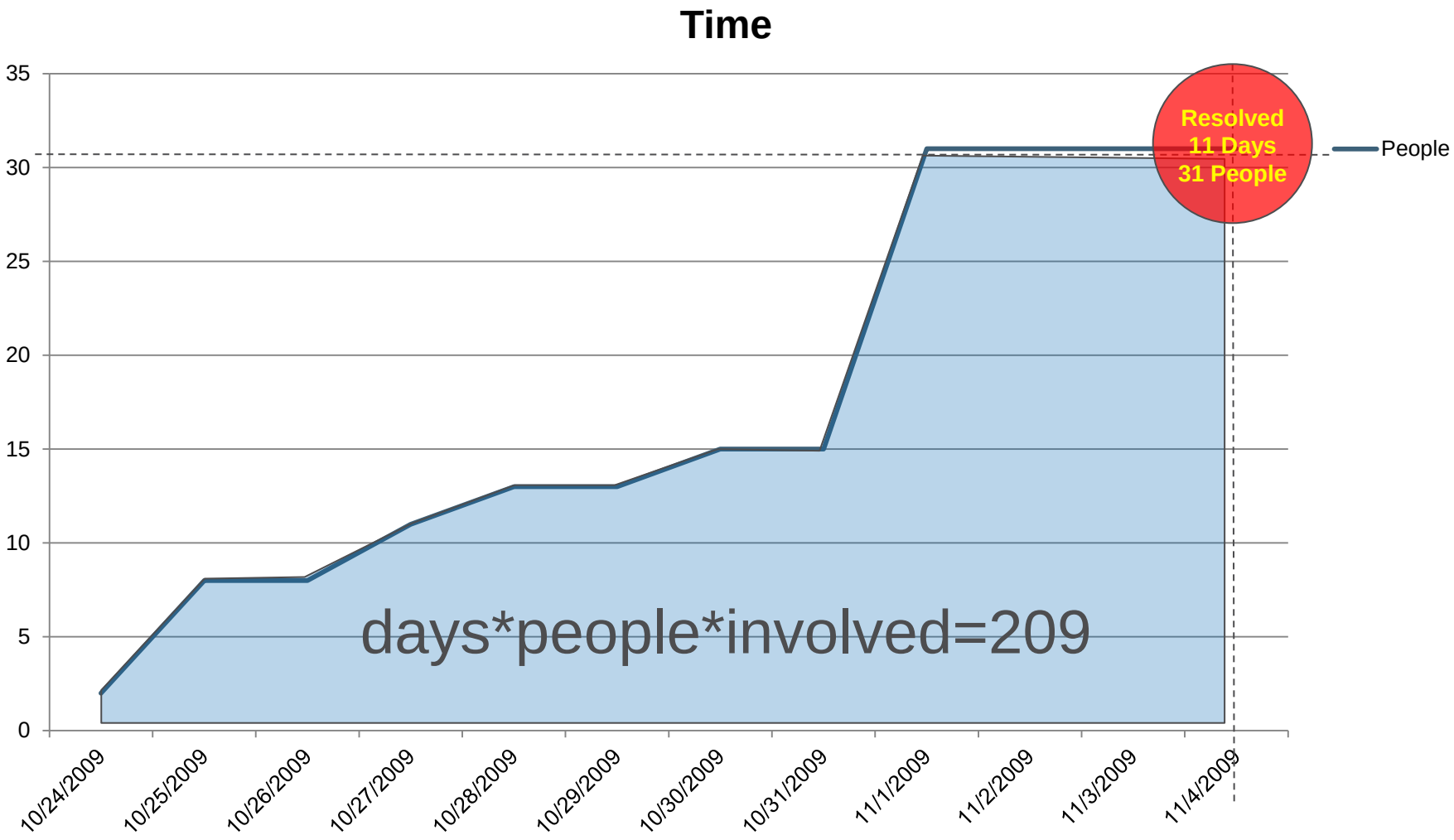
How long would this incident take to troubleshoot with the new System Monitor?



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Reduce Mean Time To Resolution (MTTR)

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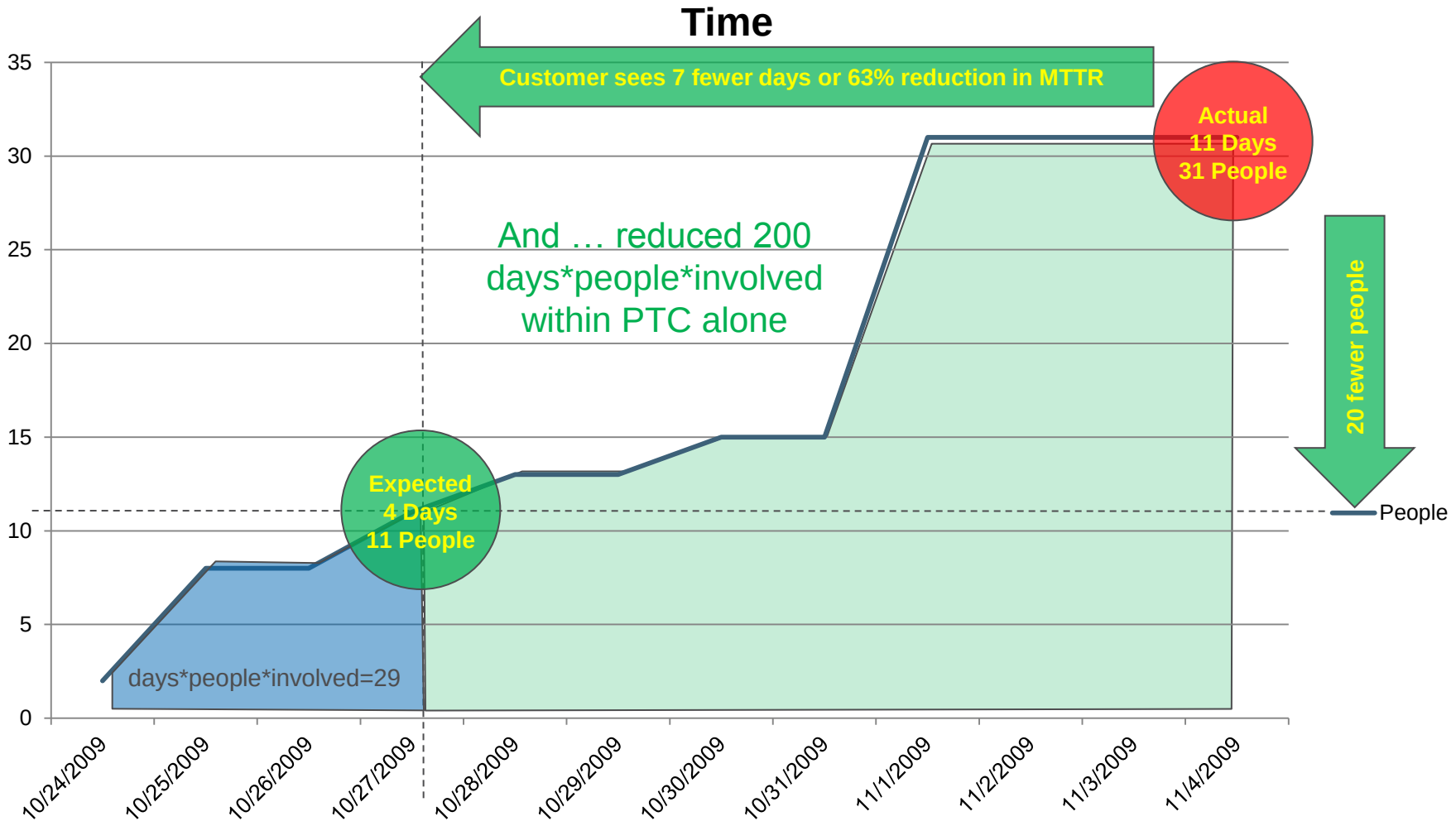
Answer: Estimate 7 fewer days and almost 10 times fewer people*days*involved.



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How the PSM functions

- PSM is a **separate server-client system** powered by dynaTrace that monitors Windchill and/or Sharepoint
  - stays on if Windchill/Sharepoint is down
  - Licensed for PTC software monitoring only, but can be expanded to monitor other systems with further license purchases from dynaTrace
- It **continuously gathers** Java/.NET method data and **samples** O/S metrics directly on the production system– “flight data recorder”
- A **separate database** stores a subset of collected data depending on configurable parameters (for example: **incident definitions**)
- **Dashboards** are accessible via http URL for remote monitoring
- Easily or automatically **store** and **export** incident data for use by PTC for diagnostic analysis
- It is **customizable** for customer requirements and custom source code

PSM: uses PurePath Technology from dynaTrace

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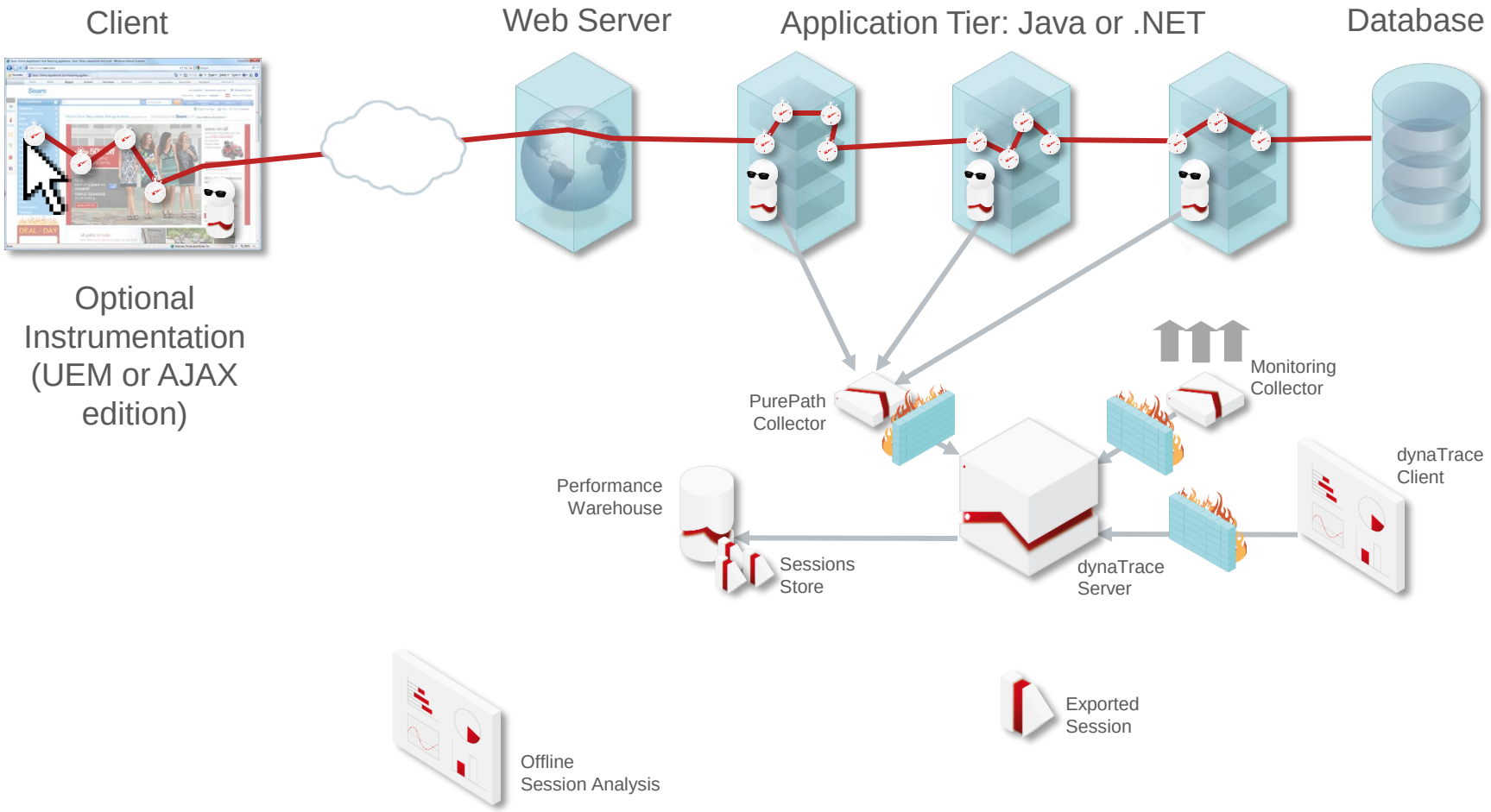

Use PurePaths data as source for monitoring

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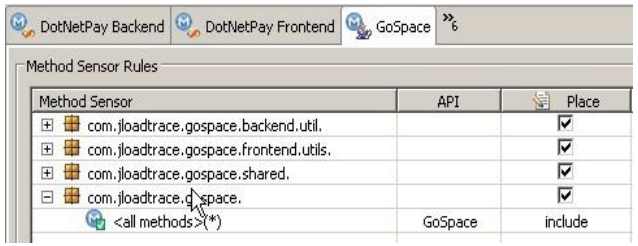
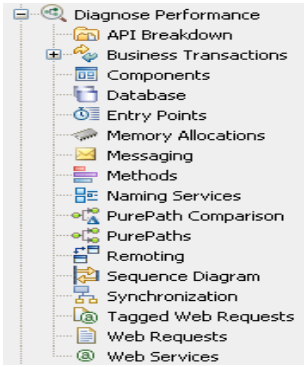
Capture Data

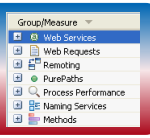


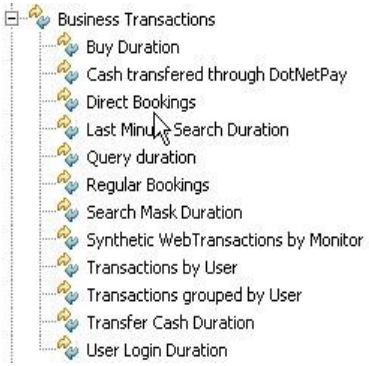


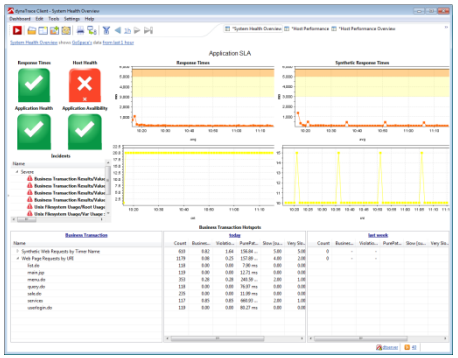
Analyze Data

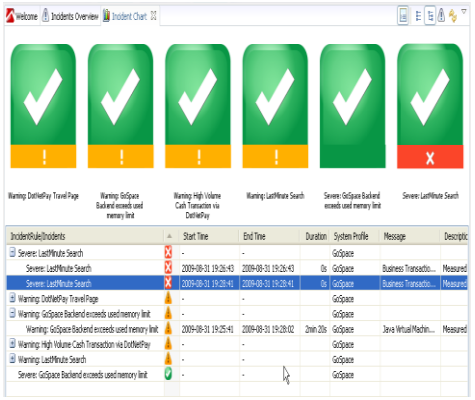
Monitor Captured Data

Define Data to be Monitored (Subscribe Measures and Define Incidents)



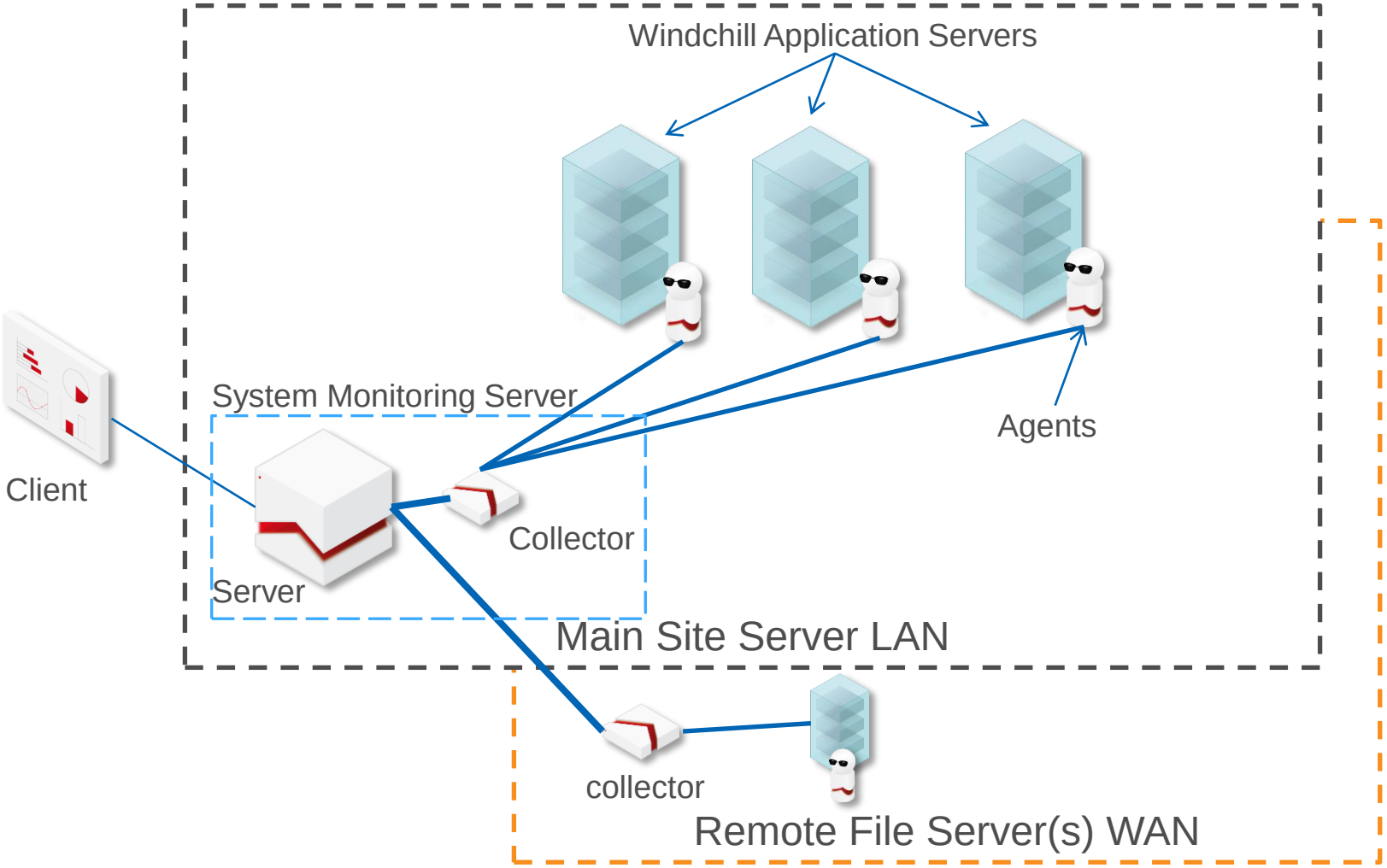






Architecture and Deployment Planning

PSM can be deployed over LAN and WAN environments



Required Components

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What is installed?

- Components (memory)
  - Server (Xmx minimum 768Mb recommended 8 Gb)
  - Performance Warehouse (Oracle or SQL Server, 20 Gb)
  - Collector (Xmx recommended 1Gb per 50 agents)
  - Agents (for Windchill JVMs)
  - Client (local install or java web start)
  - (optional) Analysis Server
- Client - Windows/Linux 32 bit only. There is no Unix client
- Server/Collector/Analysis Server – Windows/Linux/Solaris/AIX, 64 bit only
- Agents – all platforms (including HP), both 32 bit and 64 bit

Deployment Planning Rules of Thumb

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Placement, Memory, Performance Warehouse Disk Space

- Installation of non-agent PSM components on **separate hardware** from Windchill is recommended on production systems. This allows PSM to operate when Windchill hardware is down.
- Disk space requirement over 2 year window for Performance Warehouse (or Repository) database is estimated as 20 Gb using default configuration of subscribed measures.
- It is recommended use one or more standalone collector processes rather than using the built-in (embedded) collector in the Server process.

Sizing CPU, Memory and Storage space

- CPU: recommend 4 cores or more dedicated to Server
- Memory:
  - Server JVM Heap size: 8 to 16 Gb
- Storage Space:
  - Varies widely. Start with 100 Gb, depending on frequency of stored session creation.
  - Session storage can take significant disk space over time.
  - **Note:** Sessions are not stored in the Performance Warehouse database.
  - Sizing for the Performance Warehouse datafiles is addressed separately because the Performance Warehouse is often located on a separate host.
- In default deployments, the main site Collector JVM (heap size 1 to 2 Gb) is usually running as a separate process on the same host as the PSM Server, so add this to memory requirement when needed.
- If optional Analysis Server is located on Server host, additional CPU and memory resources must be added

Installation Step 1: Download and Start the Installer

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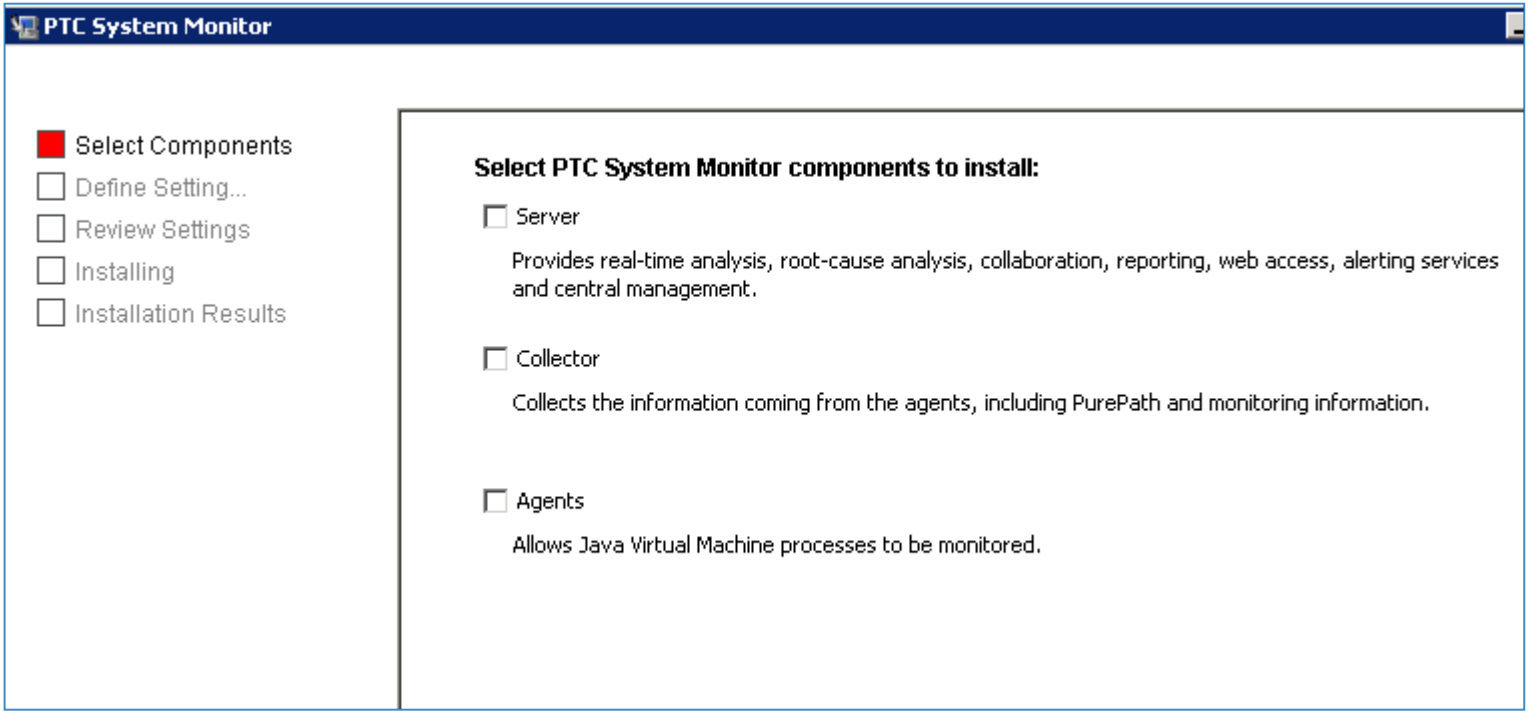
- Download PSMInstaller.jar and the fastpack (*.dtp) file to hosts that will run components of the PSM or Windchill.
- Start a Cmd Shell (using “run as administrator” option on windows 7)
- Execute “java –jar PSMInstaller.jar” to start the Installer GUI



Installation Step 2: Select the Component(s)

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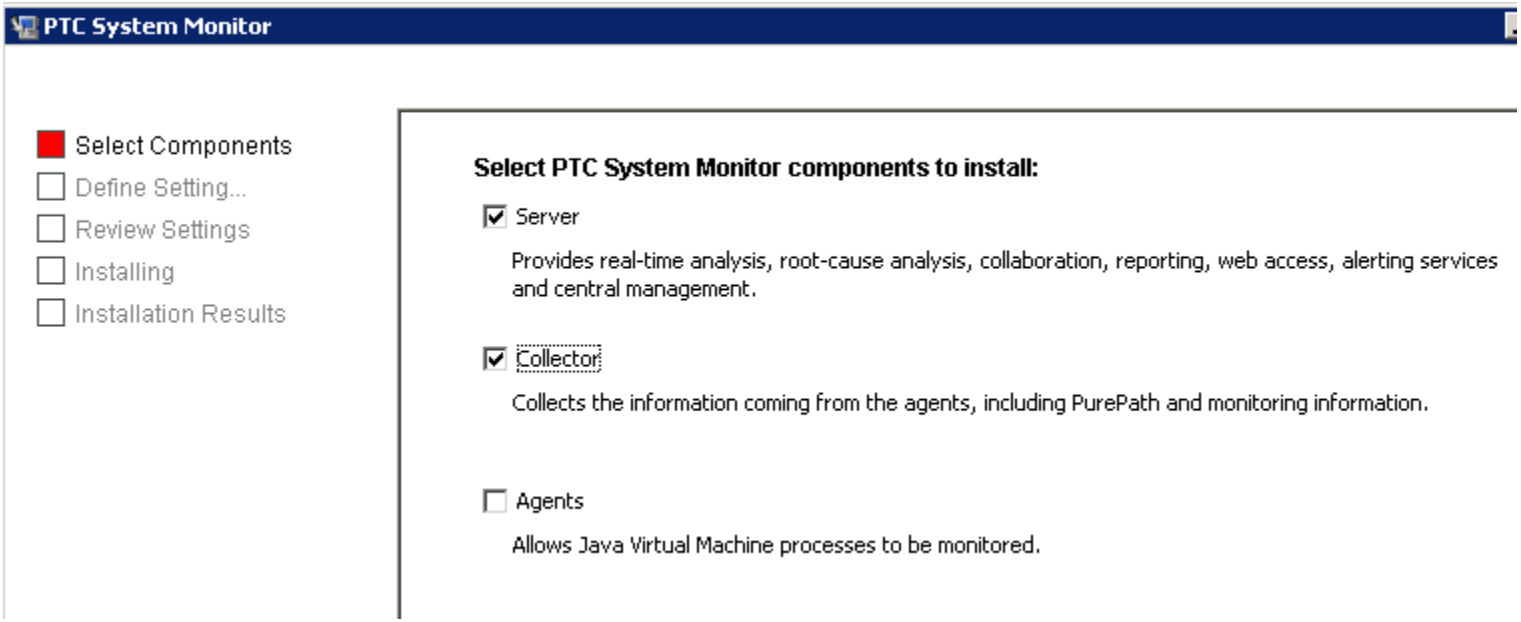
- Select the Component(s) to install on the host. Repeat steps 1 and 2 on each host containing either the Server, Collector, Agent (Windchill) or Analysis Server.



Installation Step 3: Set values for component(s)

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- Options for the Server:
  - Installation directory
  - Bind Address
  - Port for Web Start Client
  - Port for Collector
  - “admin” password
- Options for Collector:
  - Installation directory
  - Bind Address
  - Port for Agent
  - Server host and port
- Options for Agents
  - Windchill component directories
  - Collector host and port
- Hint: Keep default values for ports and the “open” Bind Address (0.0.0.0) unless required to change them by your IT department.

Installation: Open TCP Ports

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The following list shows the default communication ports for dynaTrace. Firewalls between components must be configured to allow communication to pass through.

- Client-to-Server Port 2020 (ssl 2021) TCP
- Collector-to-Server Port 6698 (ssl 6699) TCP (**Note:** this must be open prior to collector installation for validation purposes)
- Agent-to-Collector Port 9999 TCP
- Server Default Webpage Port 8020 (ssl 8021) TCP

Installation: Server Configuration Parameters

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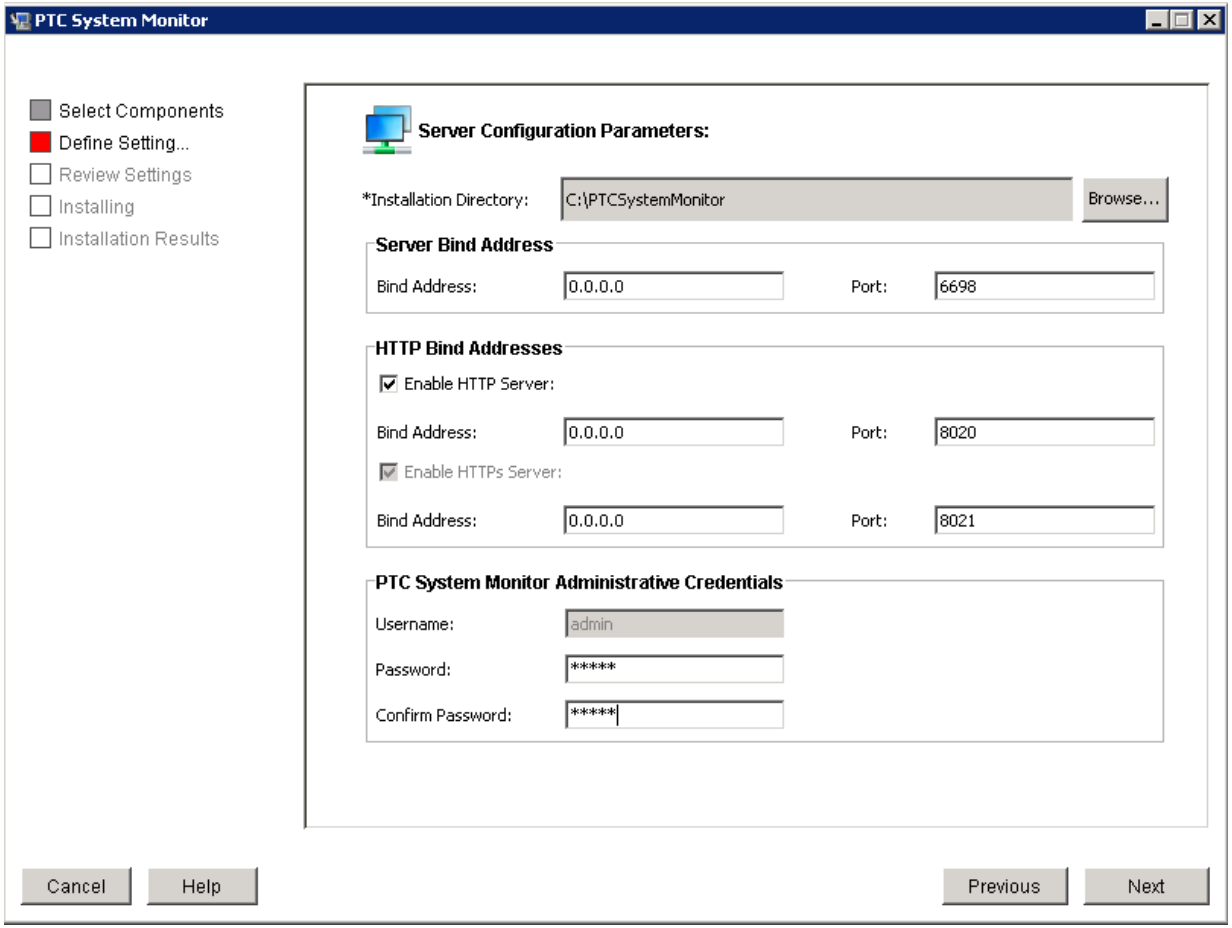
- Installation Directory will be shared with Collector if both are being installed.
- Set password for the “admin” user account.



Installation: Collector Configuration Parameters

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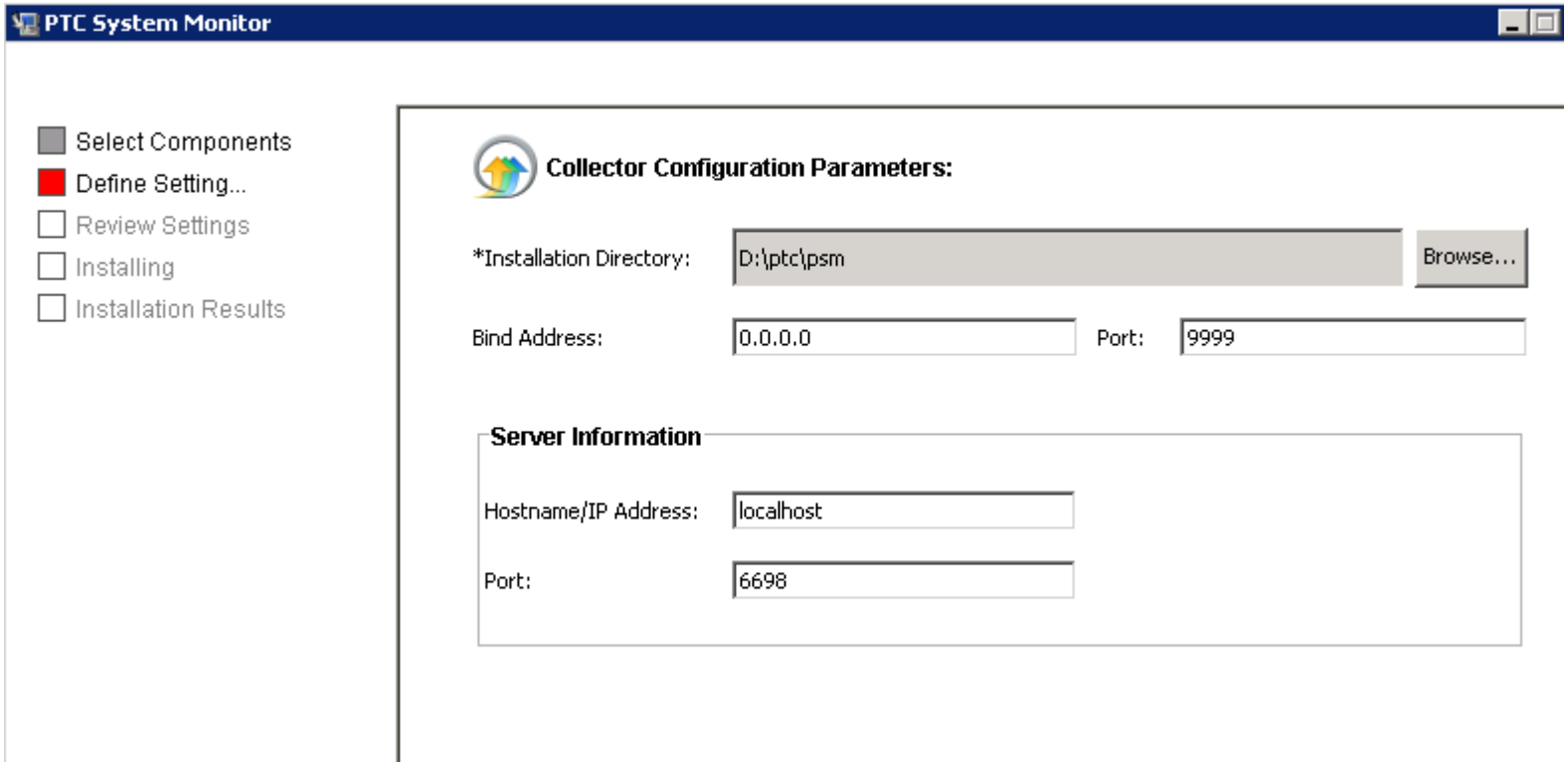
- Installation Directory will be shared with Server if both are being installed.
- Set hostname/IP address or “localhost” for the Server
- Set Port to match the Server if that was changed.



Installation: Agents Configuration Parameters

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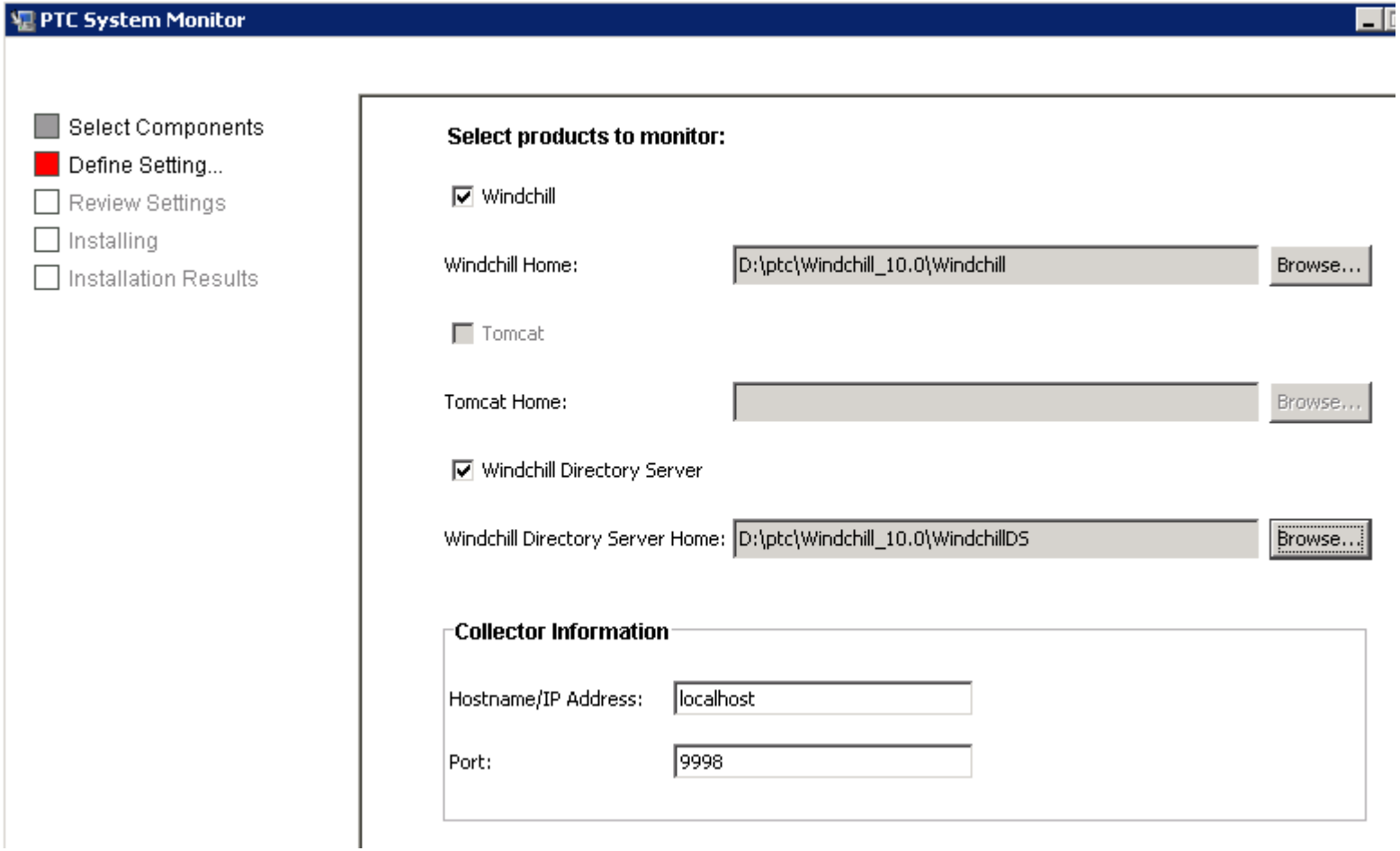
- Set Host and Port to match the Collector for this location
- Separate Tomcat Home is only required for Windchill 9.1



Installation Step 4: Start the Server and Collector

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Use the commands below to start (or stop) components

- Windows
  - Services: dynaTrace Server, dynaTrace Analysis Server, dynaTrace Collector
  - Client: web start command: http://<host>:8020/webstart/Client/client.jnlp
- Linux/Unix
  - Note: Installing or running as root is not recommended.
  - Server: In <DTHOME>, execute ./dtserver
  - Analysis Server: In <DTHOME>, execute ./dtanalysisserver
  - Collector: In <DTHOME>, execute ./dtcollector
  - Stop server: ./dtcmd –shutdown
  - Stop collector: ./dtcmd –shutdown -collector <name of collector>
  - Client (Linux): web start command: http://<host>:8020/webstart/Client/client.jnlp

Installation Step 5: Web Start the Client

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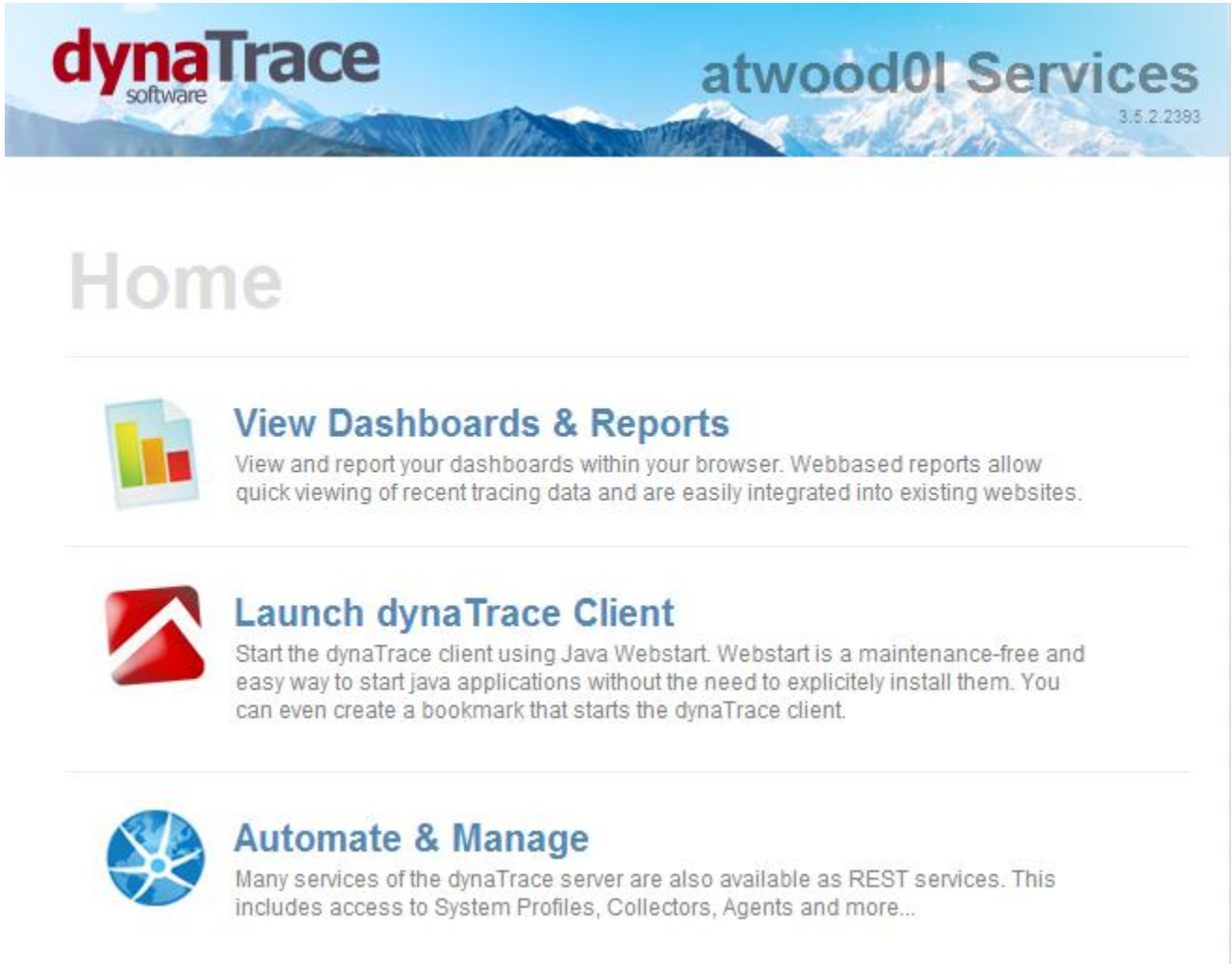
http://<host>:8020/ or https://<host>:8021/ gives access to server tools and Client



Installation Step 6: Initial Configuration

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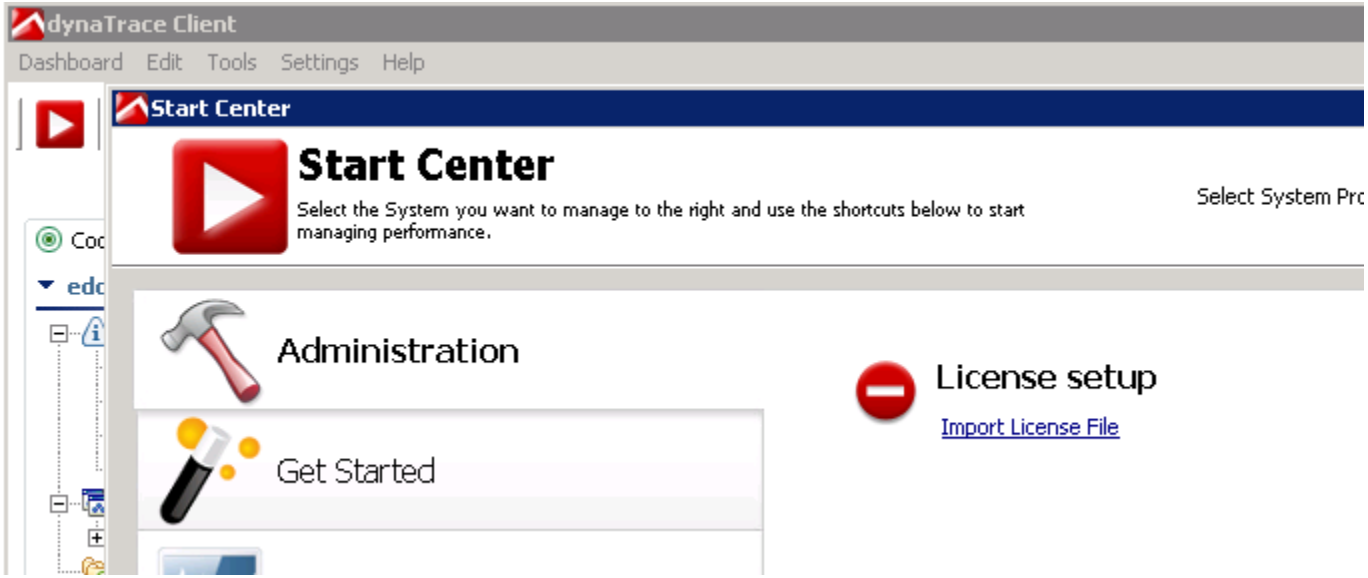
The **Start Center** screen is given on initial startup of the client.

- Initially the License key is not set, but do not select **Import License File**. The license is contained in the FastPack plugin instead.



- Close the Start Center and select **Settings/dynaTrace Server** .

Initial Configuration: Install FastPack (and License)

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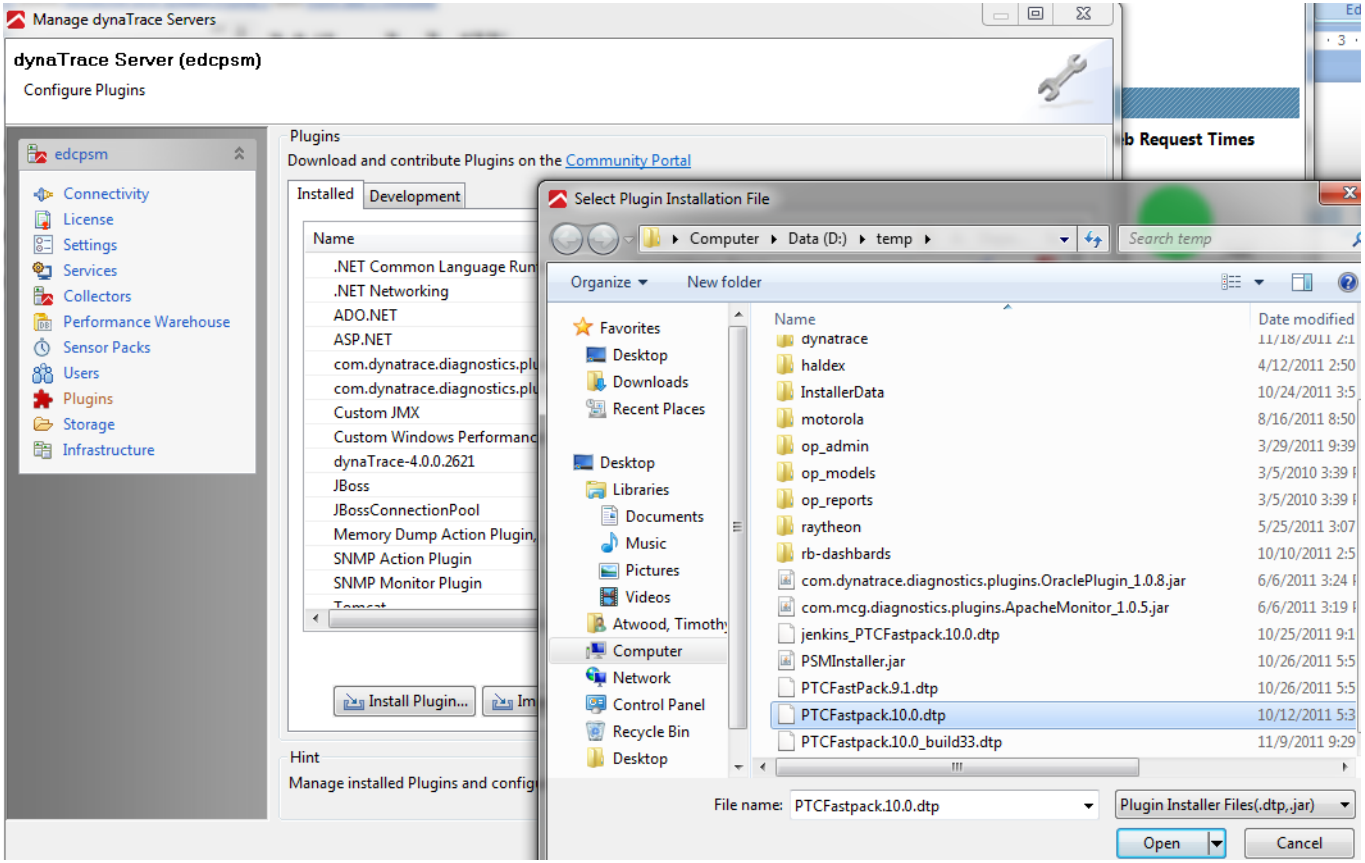
- The **License** key is included in the “FastPack” file (**Windchill_9_1.dtp** or **PTCFastpack.10.0.dtp**).
- Go to **Settings/dynaTrace Server/Plugins/Install Plugin** and import the <fastpack>.dtp file.



Initial Configuration: Install FastPack (and License)

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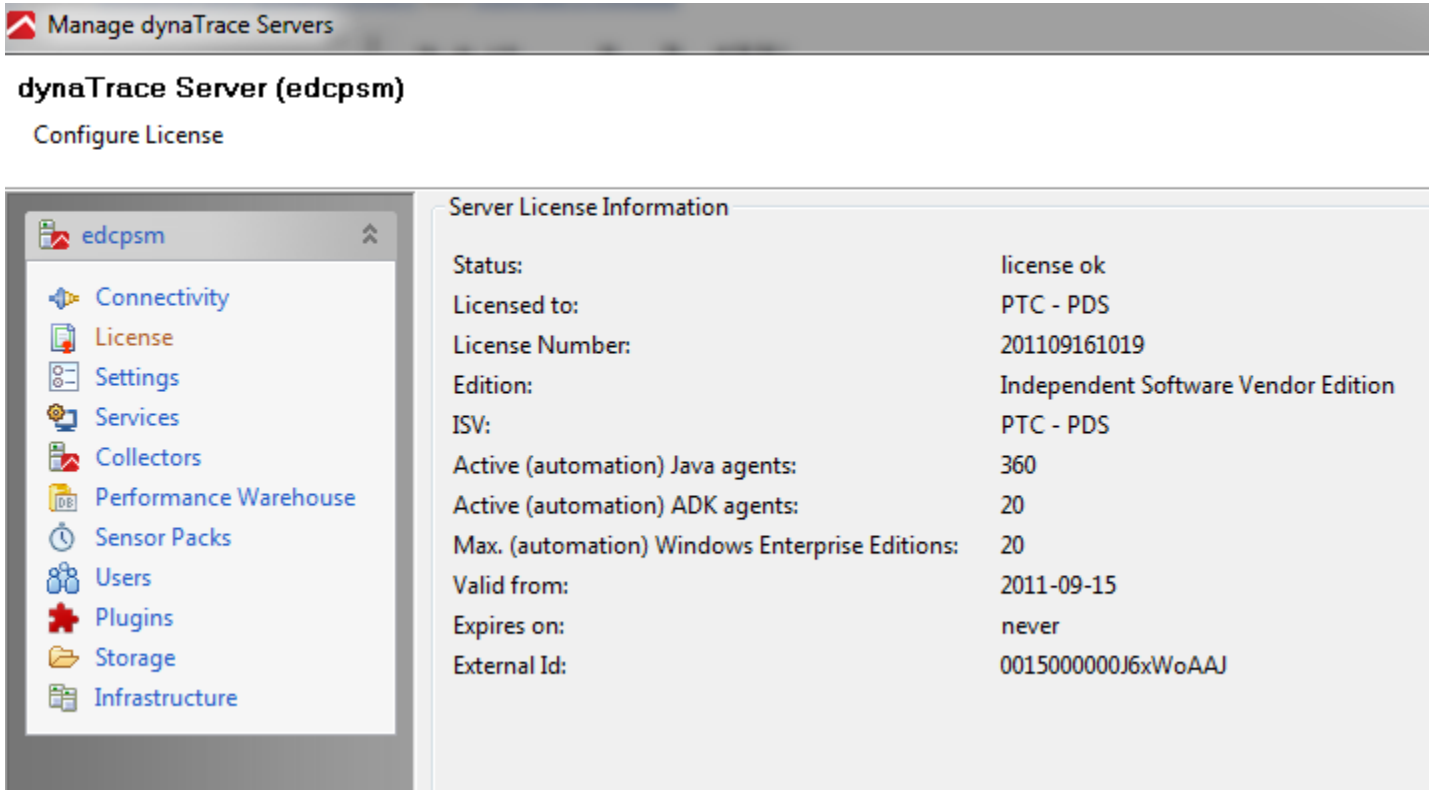
Verify under **License** that Status is “ok”:



Initial Configuration: Performance Warehouse

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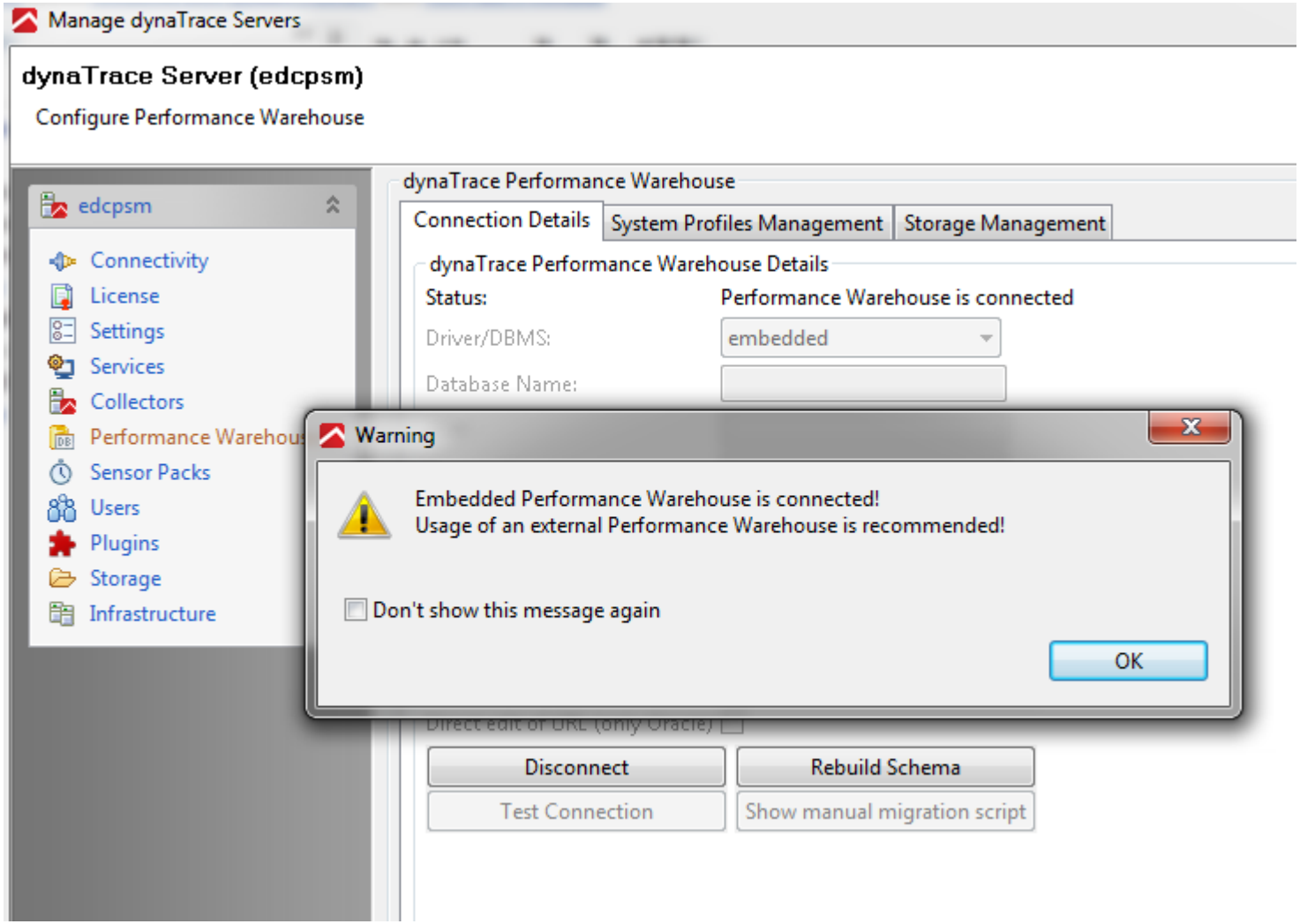
An embedded performance warehouse database is configured by default, but a production database such as SQL Server or Oracle is recommended.



Initial Configuration: Other Settings

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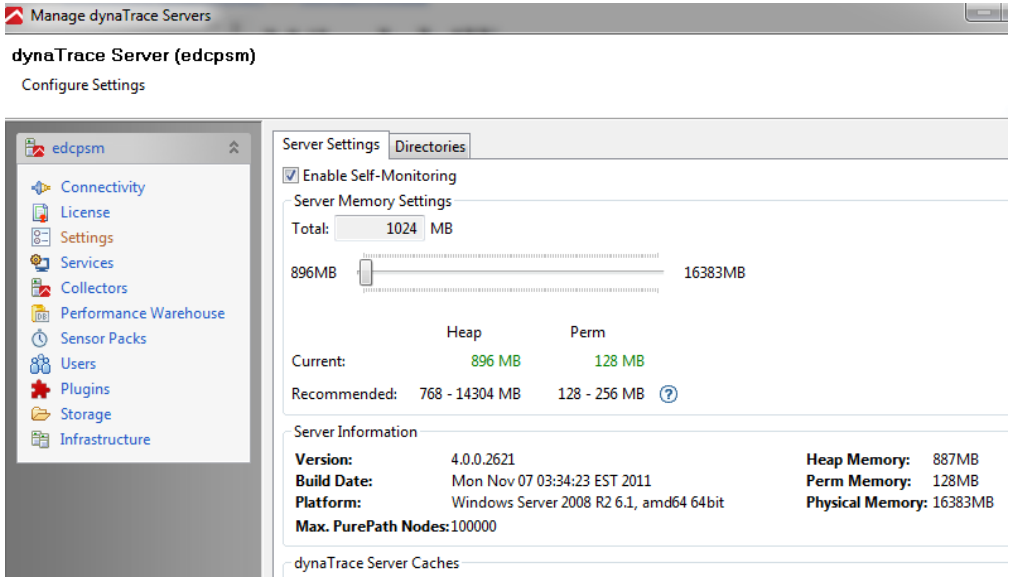
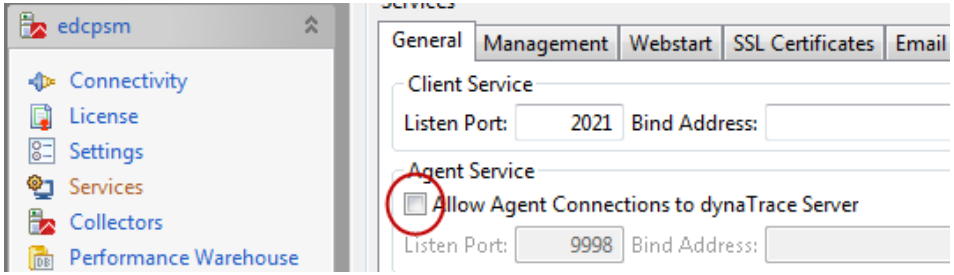
Accessed through **Settings/dynaTrace Server settings**

- Set memory size for dynaTrace server. Production recommendation is 6 to 18 Gb, but demo can be 1 Gb.
- Set administrator alerts email address.
- Enable Self-Monitoring in order to track the impact of different dynaTrace sensor configurations on overall performance.
- Set smtp server hostname.
- Deselect the Agent Service under **Services** in order to just run a standalone collector.





Initial Configuration: Continuous Transaction Storage

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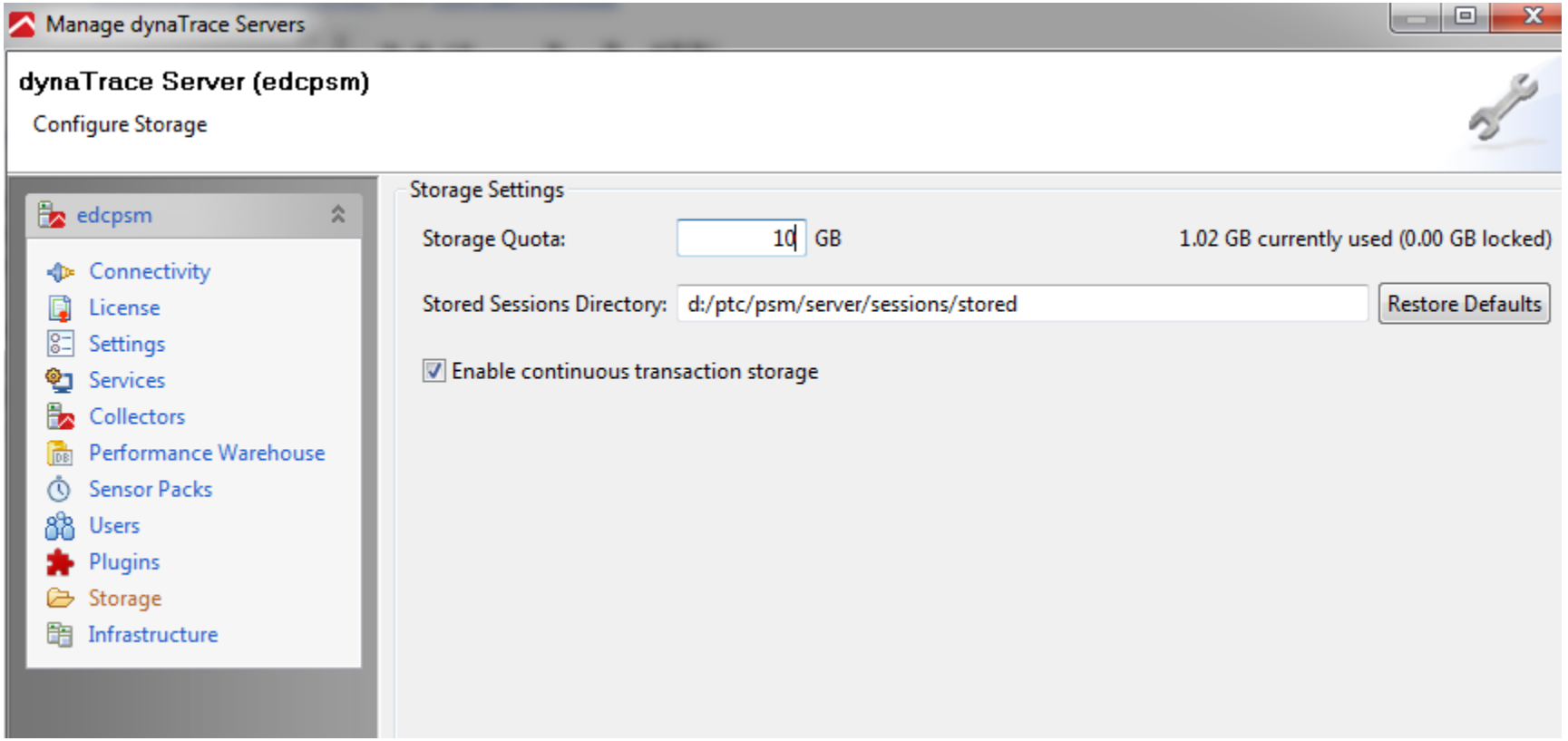
Accessed through **Settings/dynaTrace Server settings**

- Enable continuous transaction storage and set the directory and disk quota for the rotating Stored Sessions (this will allow X days of automatic storage, dependent on the quota and the size of your deployment)



Validation: Agents Overview Dashboard

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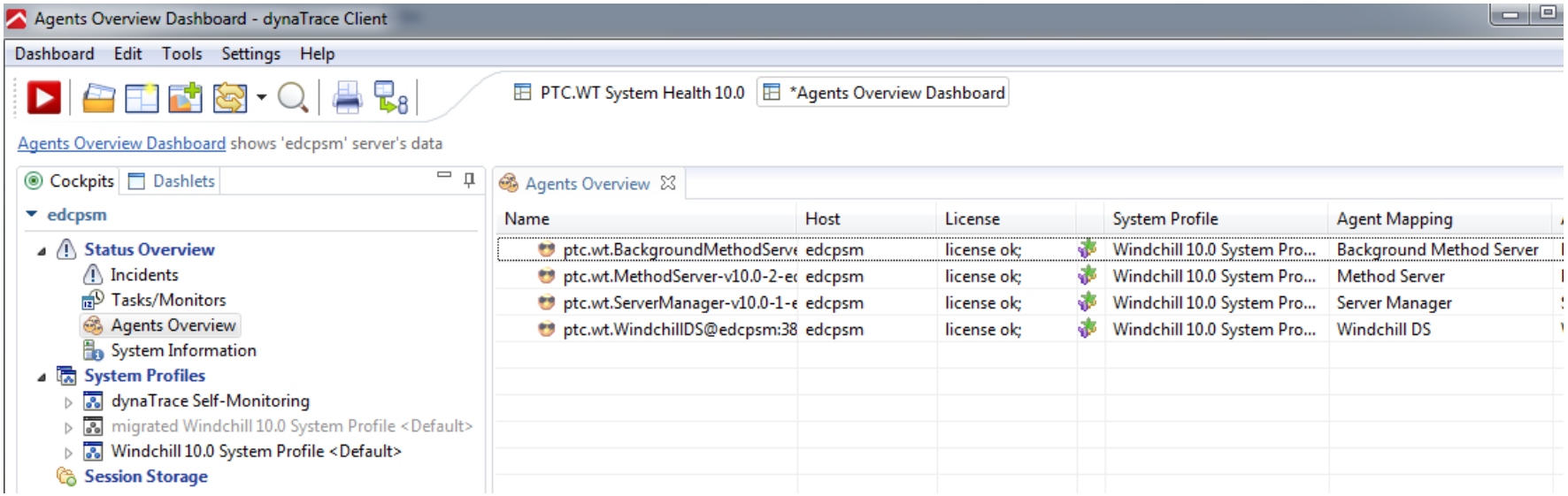
- Restart Windchill after applying the Agents.
- Check in **Cockpit/Status Overview/Agents Overview** to see that the list contains agents from all Windchill JVMs with “license ok”



Validation: Start Center Page

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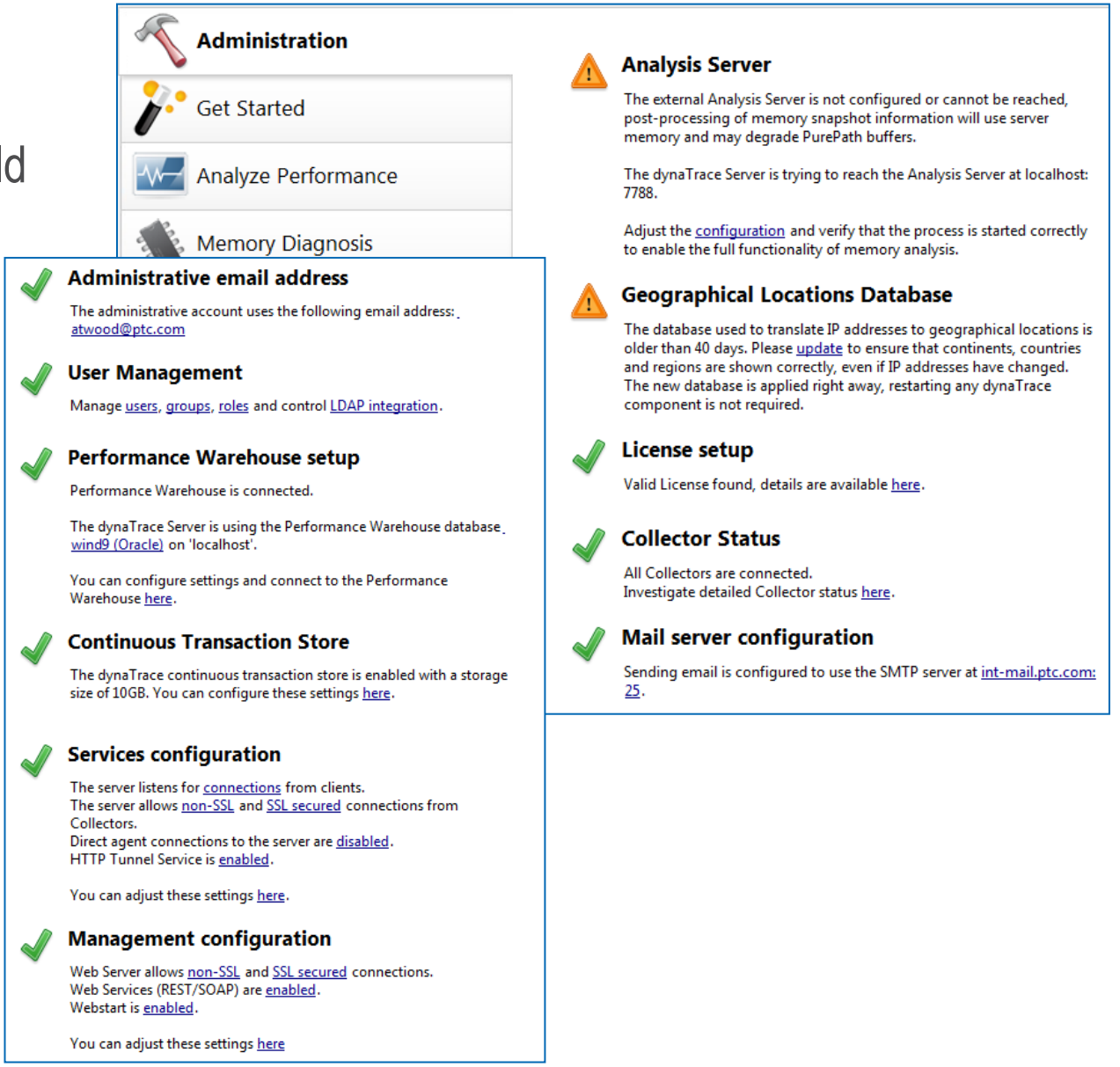
When correctly configured, the **Start Center/ Administration** page should look like this (optional Analysis Server is not installed and the Geographical Locations Database is not relevant without UEM)



Validation: Windchill with Agent Deployment

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- Check for creation of <windchill>/opt/psm directory
- Check for additional href in <windchill>/declarations.xconf:
  <ConfigurationRef xlink:href="opt/psm/psm-override.xconf"/>
- Check for “psm” settings in wt.properties:
  - psm.home=$(wt.home)$(dir.sep)opt$(dir.sep)psm$(dir.sep)agent
  - psm.lib.bit.dir=64
  - psm.lib.dir=lib64
  - psm.log.level=info
  - psm.name=ptc.wt
  - psm.profile.instance.name=$(psm.name).{1}-$(psm.windchill.version) -$(wt.httpgw.hostname)-$(wt.webserver.port)-$(wt.webapp.name)-{0}
  - psm.server.hostname=myhost.ptcnet.ptc.com
  - psm.server.port=9999
  - psm.startup.library=dtagent.dll
  - psm.windchill.version=v10.0

Exercise 1: Installation Validation (15 min)

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Client Navigation

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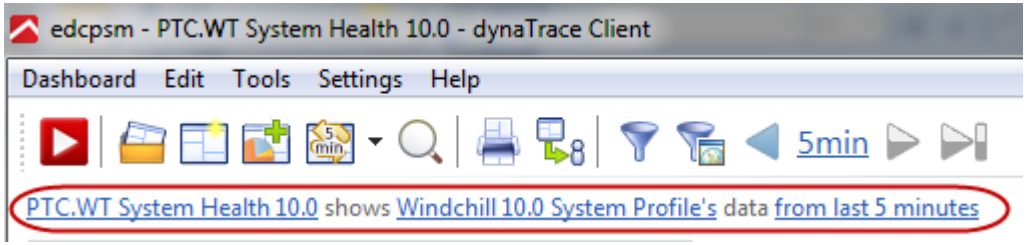
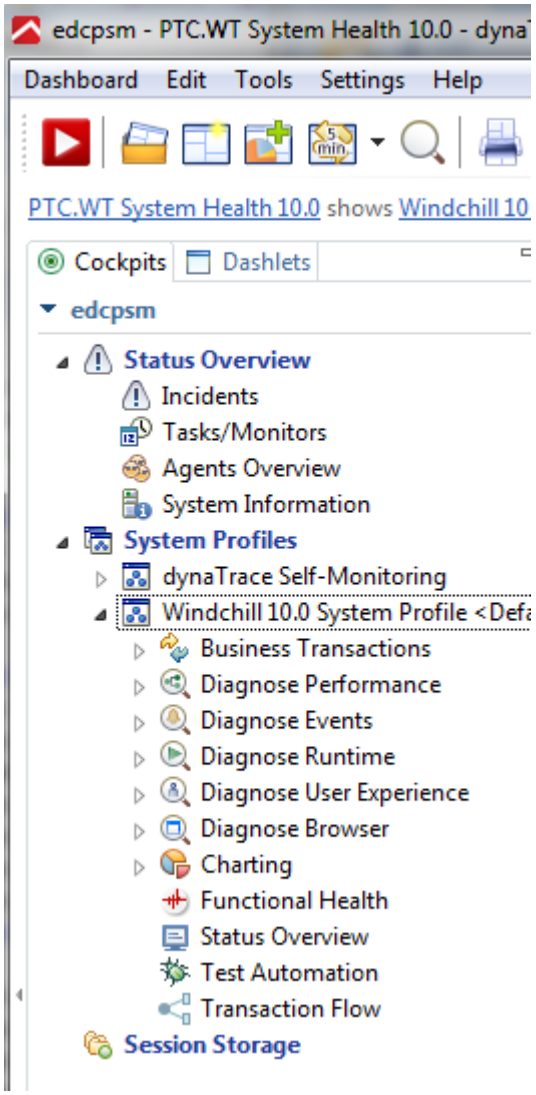
- **Cockpit** - used to select Profile, Session, live "Diagnose" dashlets
- **Status Line** - "breadcrumb" trail shows source and time frame for the currently selected object.



- **Menus** - give access to dashboards and server/client settings. Many of these are accessible as right-click context picks from the Cockpit or Dashlets.



Client Navigation: Dashboards and Dashlets

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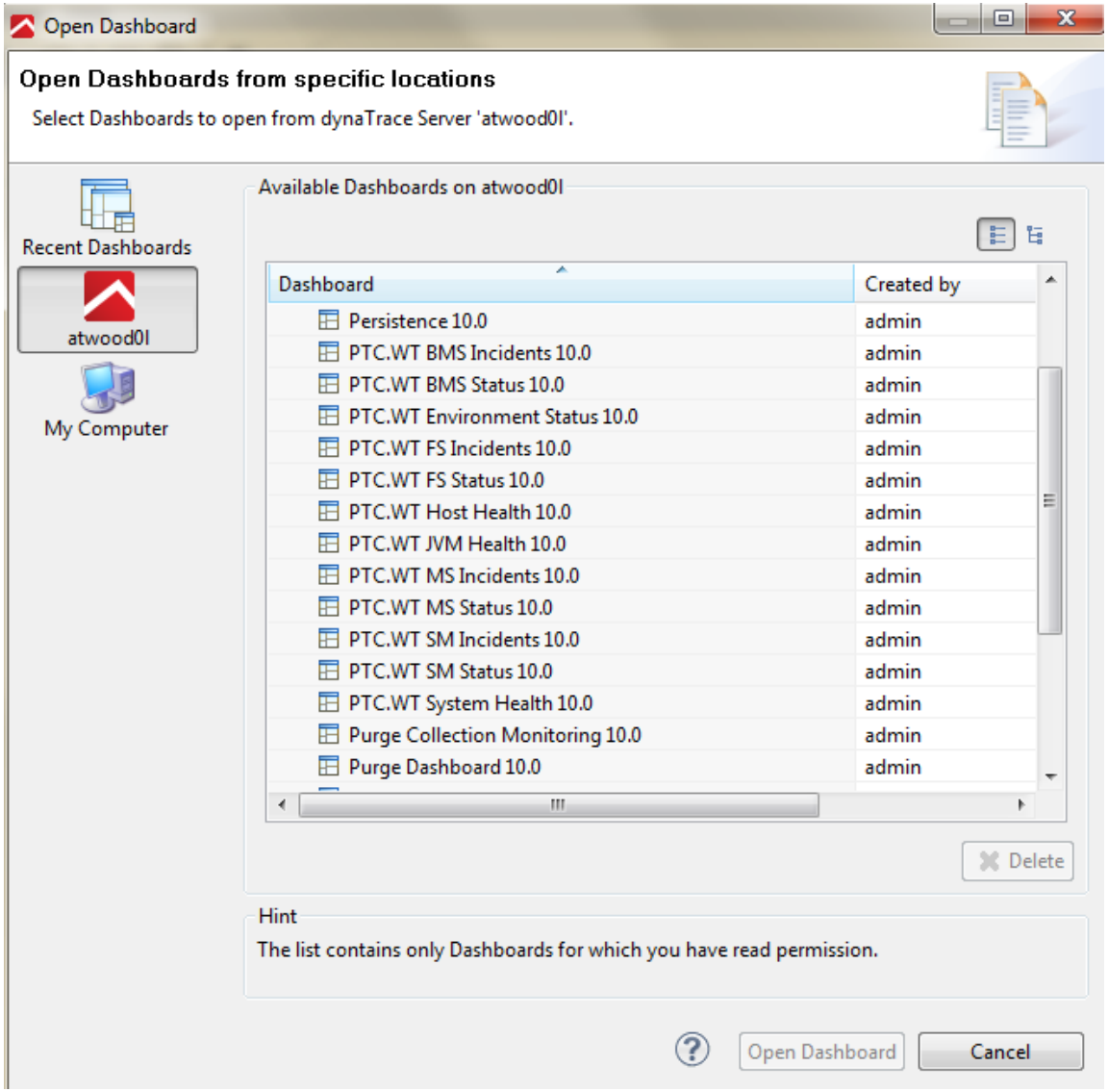
- Dashlet: Graphical or Tabular object to display captured data
- Dashboards: A collection of dashlets configured and saved for reuse
- Drilldowns and Details available (varies depending on dashlet/dashboard)
- Dashboards accessible via services URL when saved to Server
  1) Use http://<dtServer>:8020/rest/management/reports/create/<dashboardName> or
  2) Select from full list at http://<dtServer>:8020/rest/html/management/dashboards
- Dashlets are customizable in many ways
- Can be configured with multiple sources to monitor many systems

Client Navigation: Dashboards

Dashboards menu

- The lists depend on user permissions.
- 3 sources:
  - Recent
  - <server>
  - computer (xml files)
- Most used:
  - PTC.WT System Health
  - PTC.WT MS Status
  - PTC.WT Environment Status
  - PTC.WT JVM Health
  - Common Operations
  - Workspace Operations



System Health Dashboard

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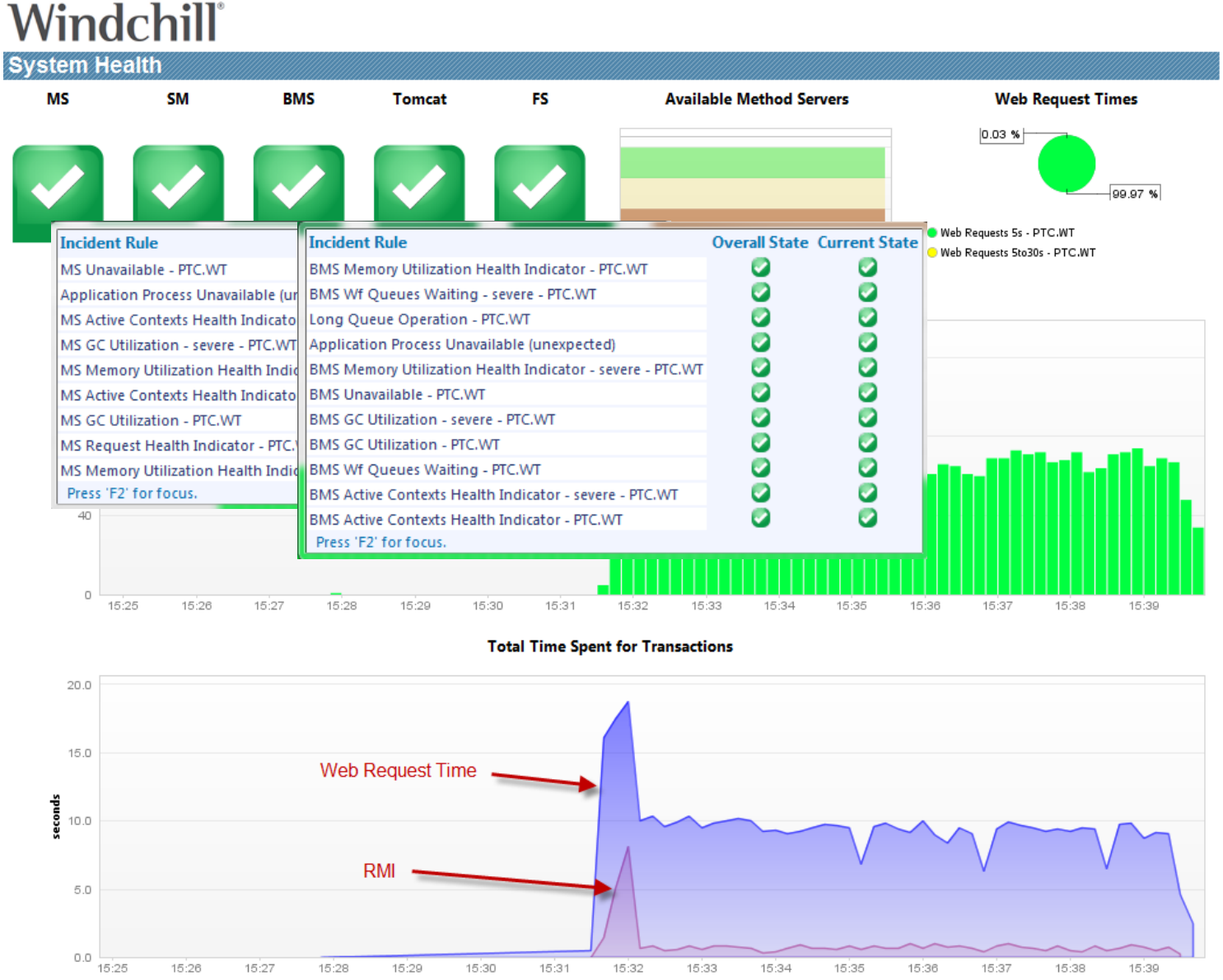

System Health Dashboard - Indicator

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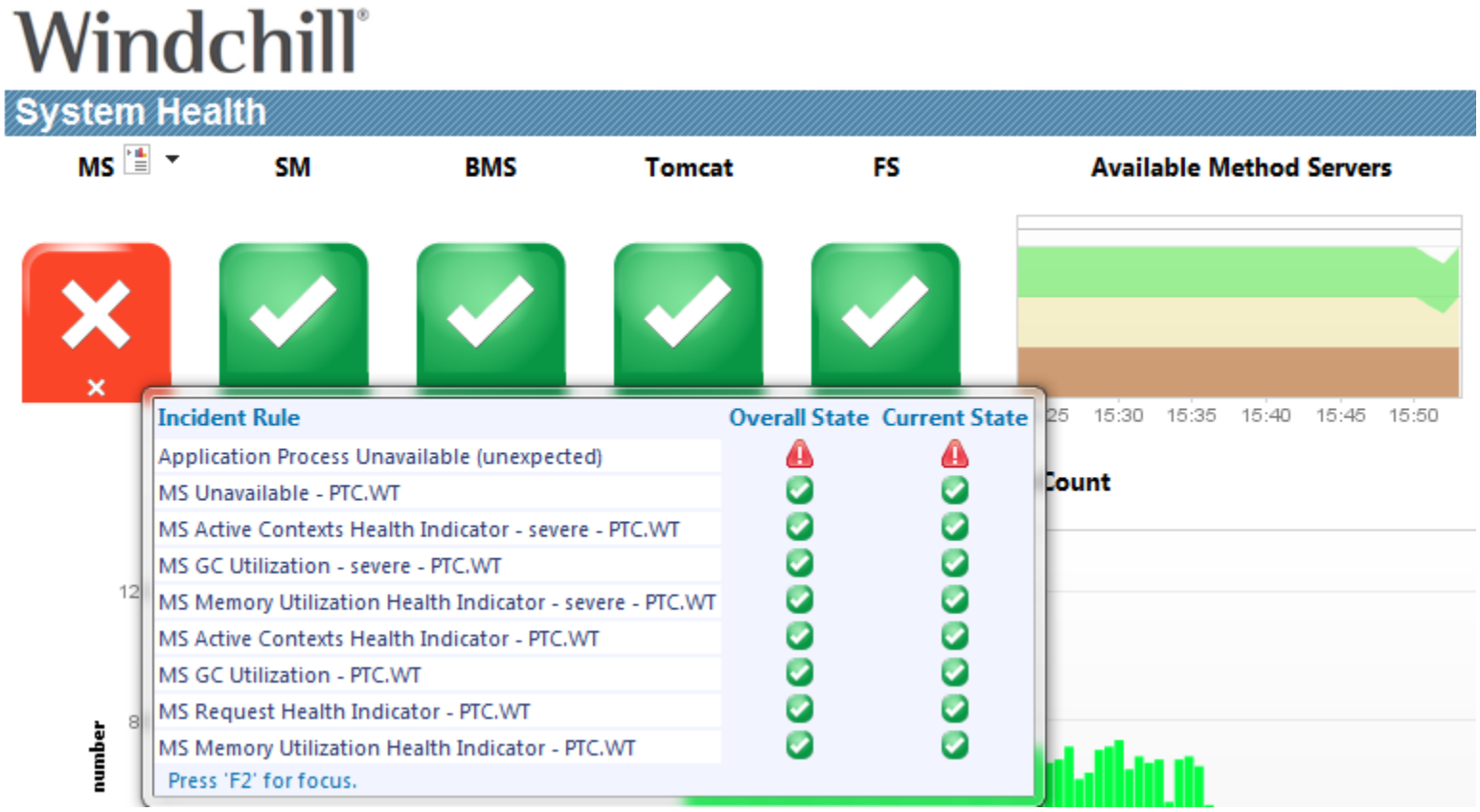
Indicators are driven from a set of incidents unique to each JVM group.



System Health Dashboard - Indicators

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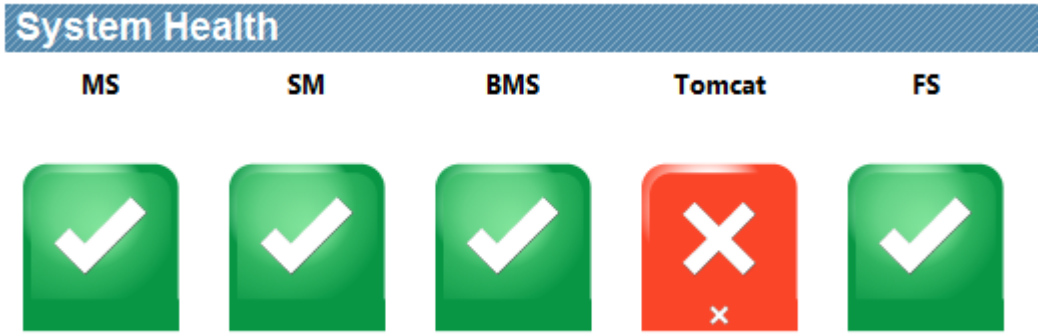
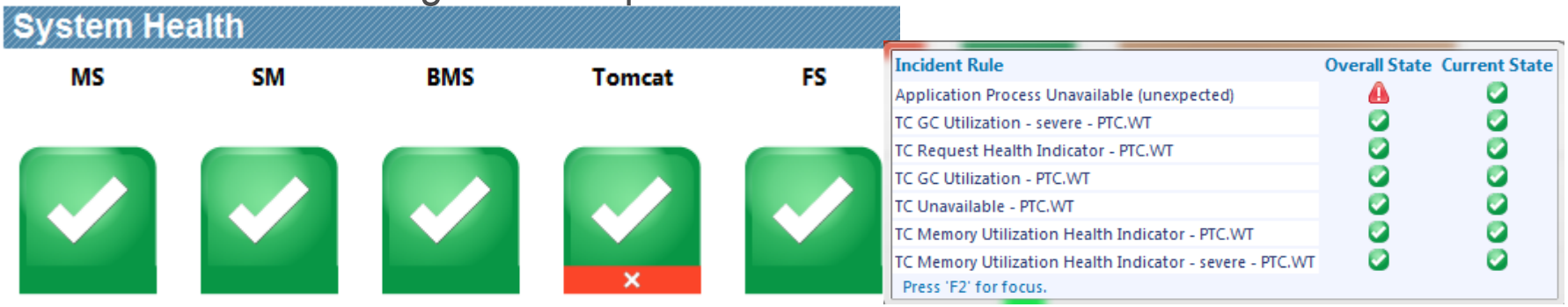
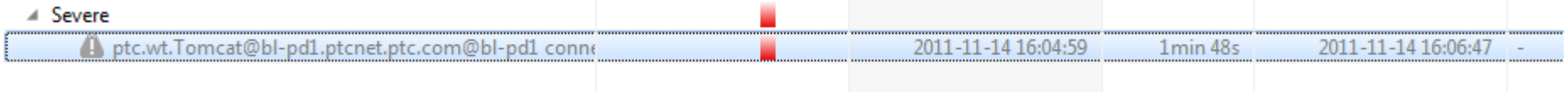
1) Initial occurrence show full red (or yellow, depending)



2) Incident has ended because a new tomcat was started, but red bar indicates it is still in the incidents list for the given time period. Either wait it out or **delete** it.



Note: Confirmation of the incident doesn't affect the indicator.



How to Clear MS/SM/BMS Availability Indicators

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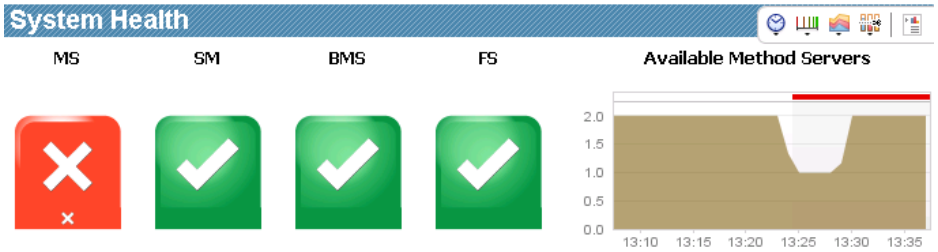
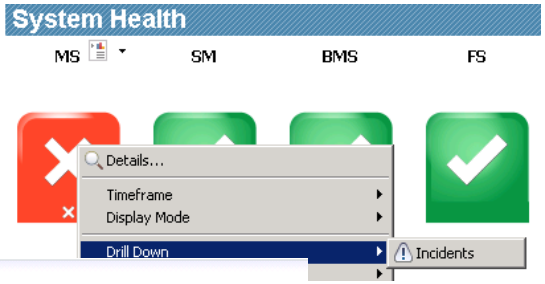
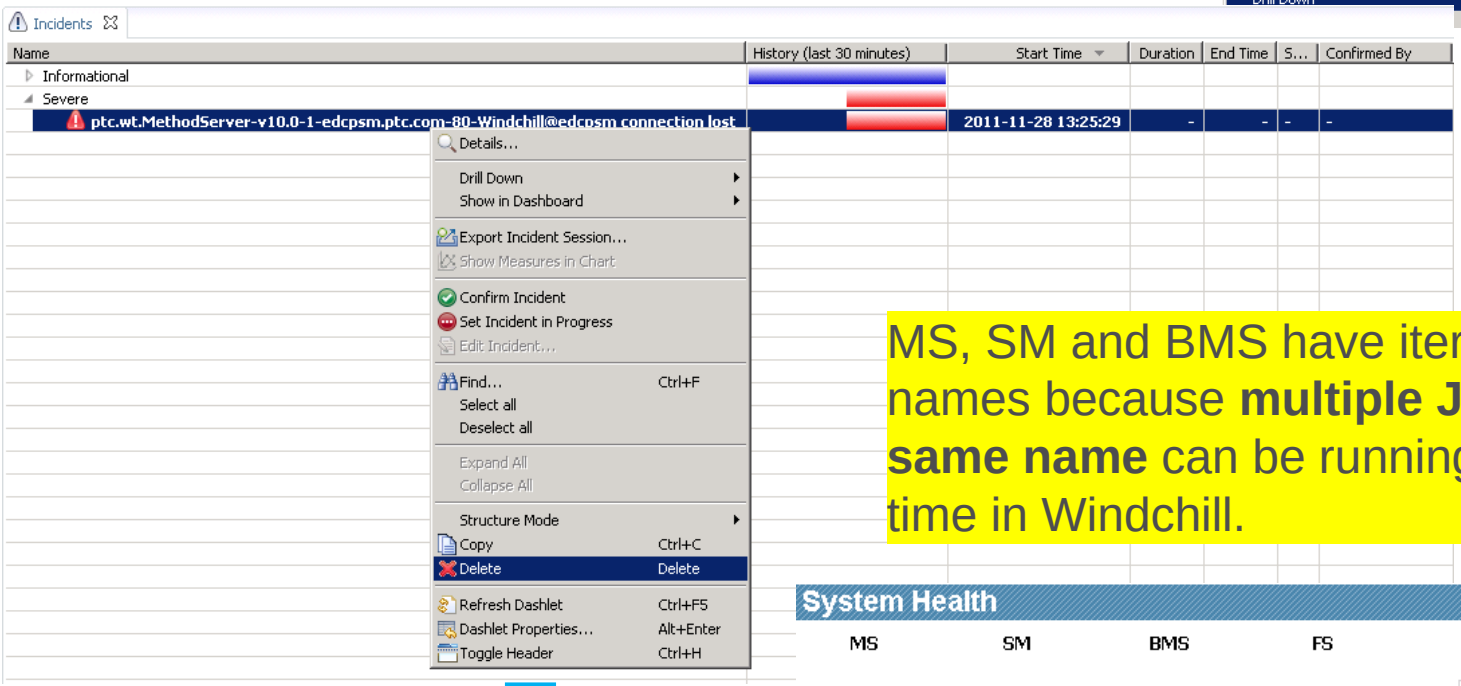
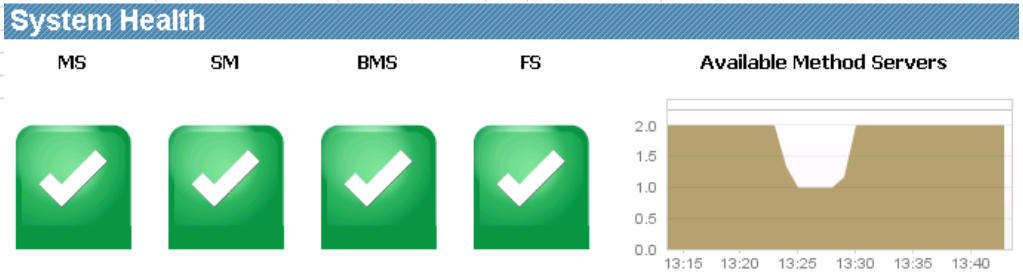
Due to agent name iteration, MS/SM/BMS Availability incidents must be deleted.







MS, SM and BMS have iterated agent names because **multiple JVMs of the same name** can be running at the same time in Windchill.



Working with Incidents

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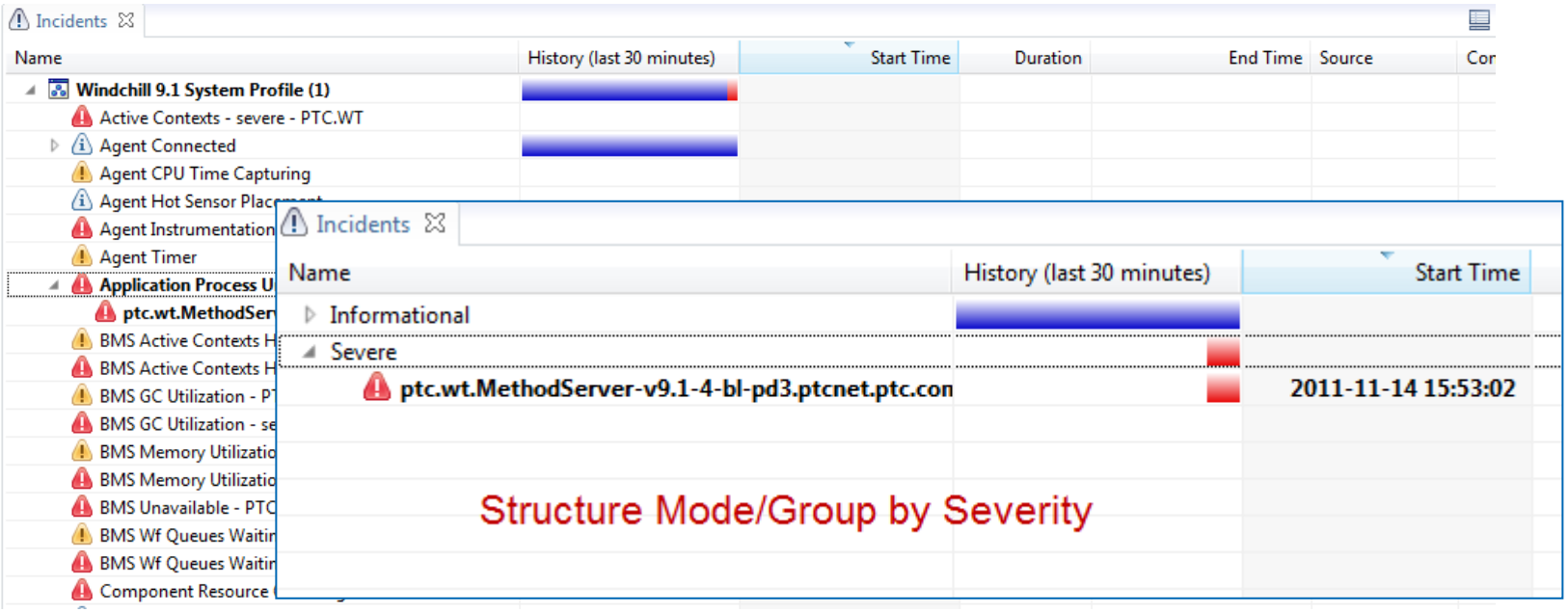
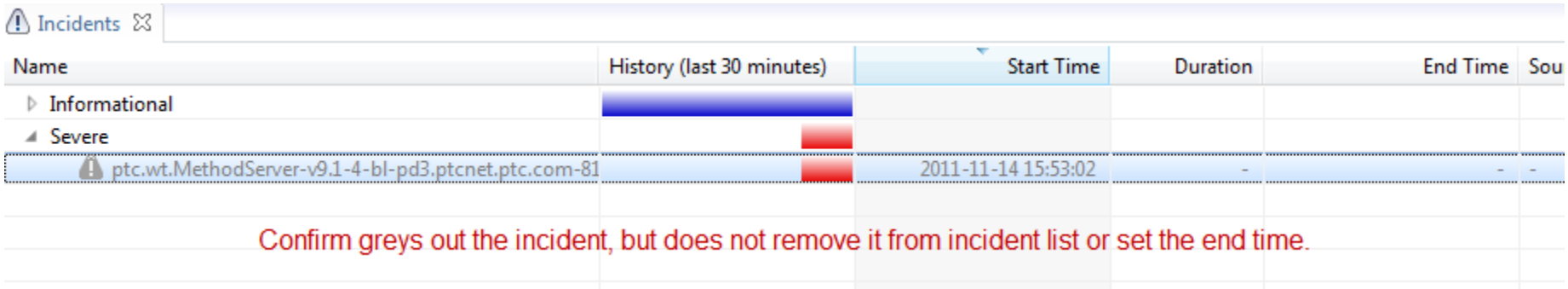
Default Incidents display includes configured incidents as well as current ones.





Confirming an Incident

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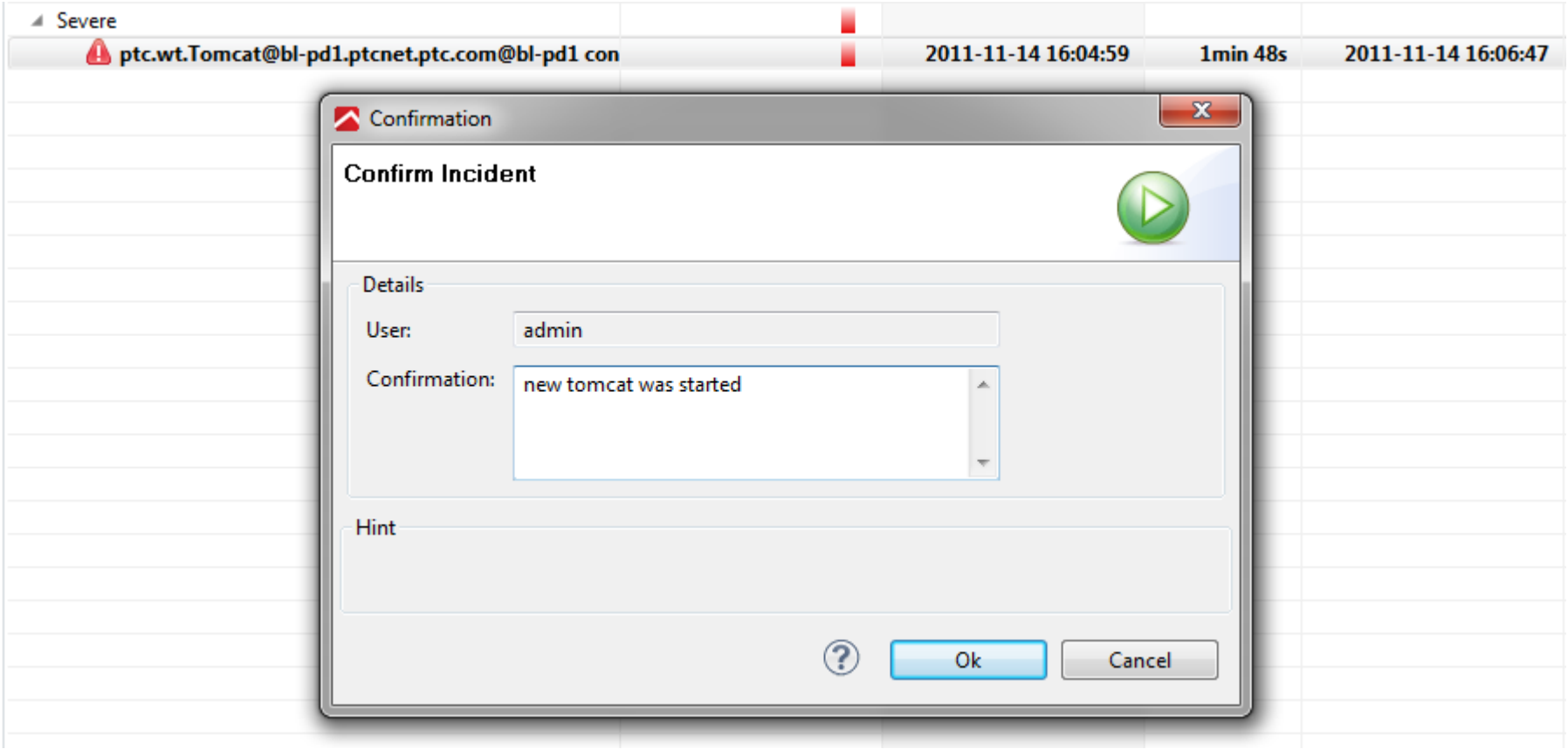
Mostly relevant to Smart Alerting, which we don't currently have configured.



Drill down from Health Indicator or Switch to Chart

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Double-click on the header of the dashlet to expand it (if header is not displayed, first use Right-click/Toggle Header).

Next select Display Mode/Chart + Table to see the Tabular values as well.

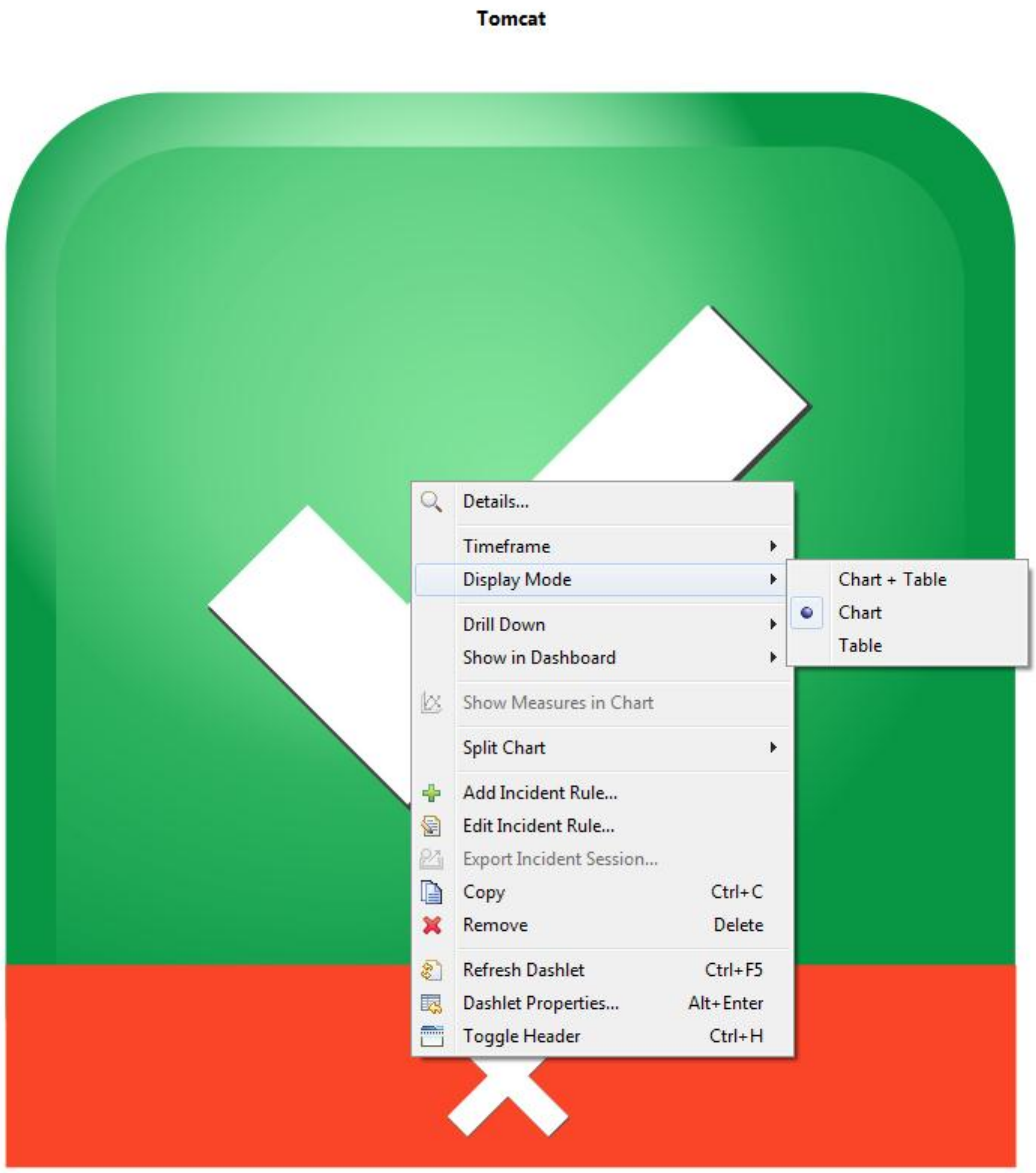

Chart + Table Display

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Incident Rule/Incidents		Start Time	End Time	Duration	System Profile	Message
TC GC Utilization - severe - PTC.WT		-	-	-	Windchill 9.1 S...	
TC Request Health Indicator - PTC.WT		-	-	-	Windchill 9.1 S...	
TC GC Utilization - PTC.WT		-	-	-	Windchill 9.1 S...	
TC Unavailable - PTC.WT		-	-	-	Windchill 9.1 S...	
Application Process Unavailable (unexpected)		-	-	-	Windchill 9.1 S...	
Application Process Unavailable (unexpected)		2011-11-14 16:04:59	2011-11-14 16:06:47	1min 4...	Windchill 9.1 S...	ptc.wt.Tomcat@bl-pd1.ptcnet.ptc.com@bl-pd1 con...
TC Memory Utilization Health Indicator - PTC.WT		-	-	-	Windchill 9.1 S...	
TC Memory Utilization Health Indicator - severe - PTC.WT		-	-	-	Windchill 9.1 S...	

Charting Measures

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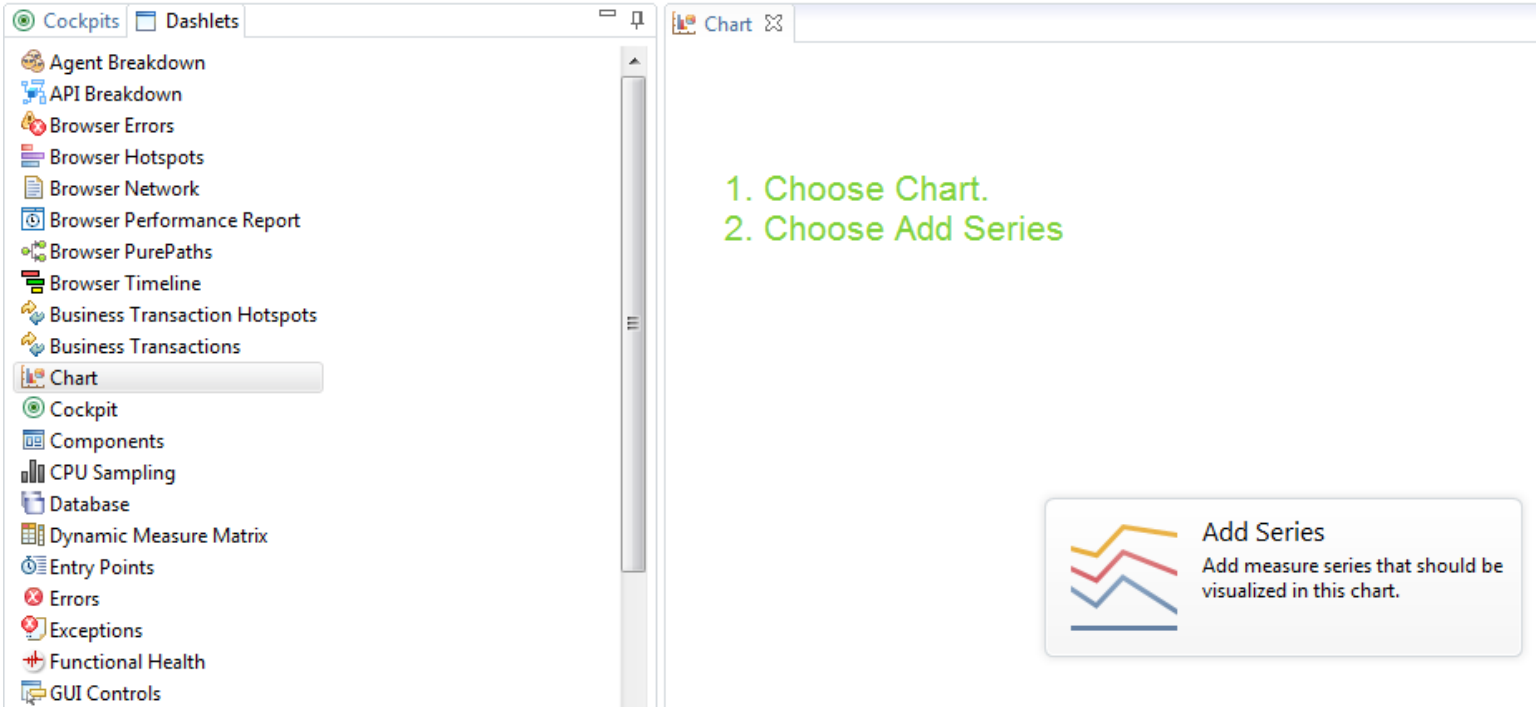
Select the **Chart** dashlet to add it to a new or existing dashboard. The **Add Series** button allows you to add Measures to the chart.



Charting Measures (continued)

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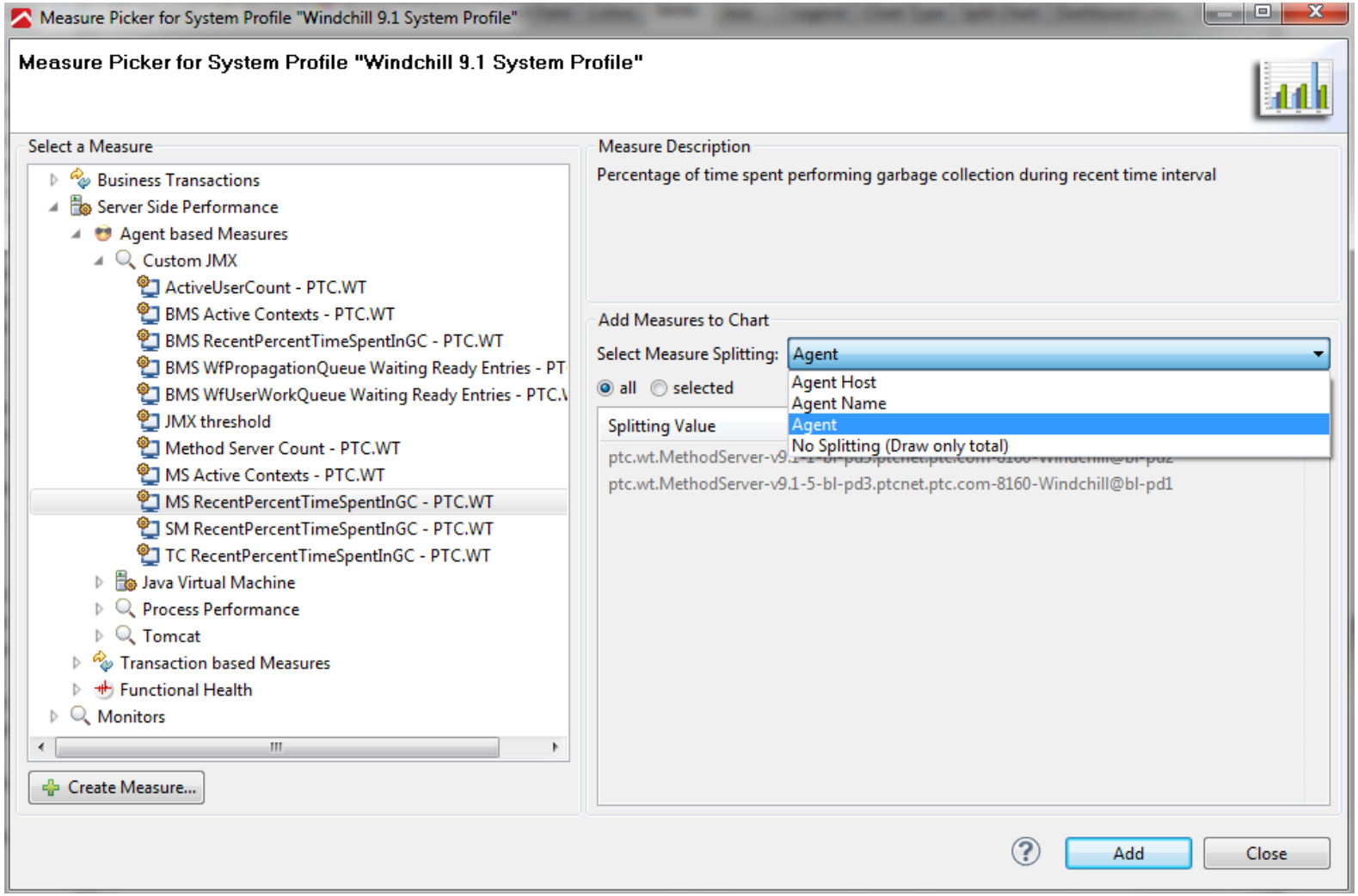
Select from any existing measures.



Charting Measures (continued)

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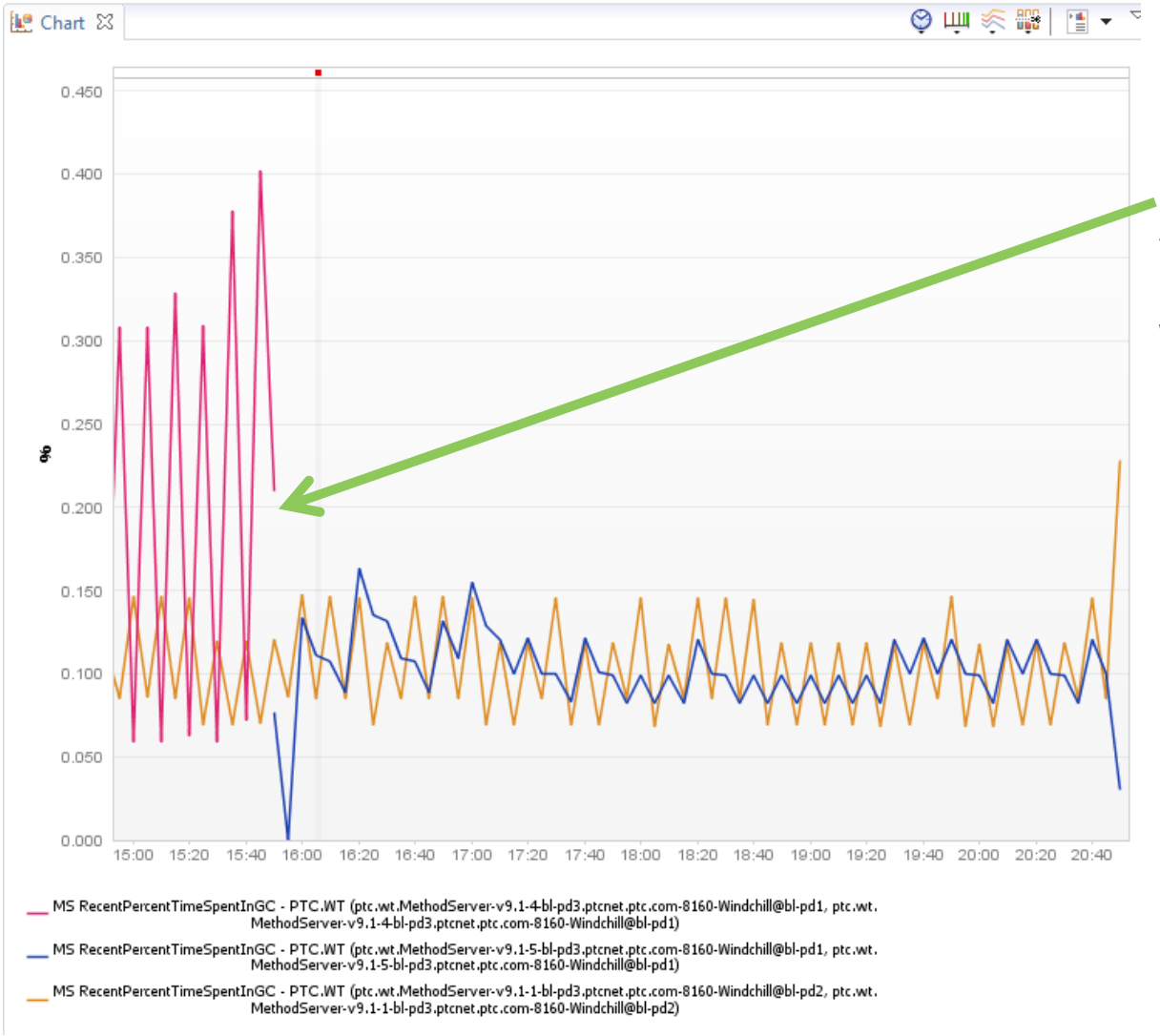
The chart will show all data from within the selected time window.



Note: This chart shows 3 traces for 2 method servers. One MS process stopped and restarted within the time window.

Resize Dashlets

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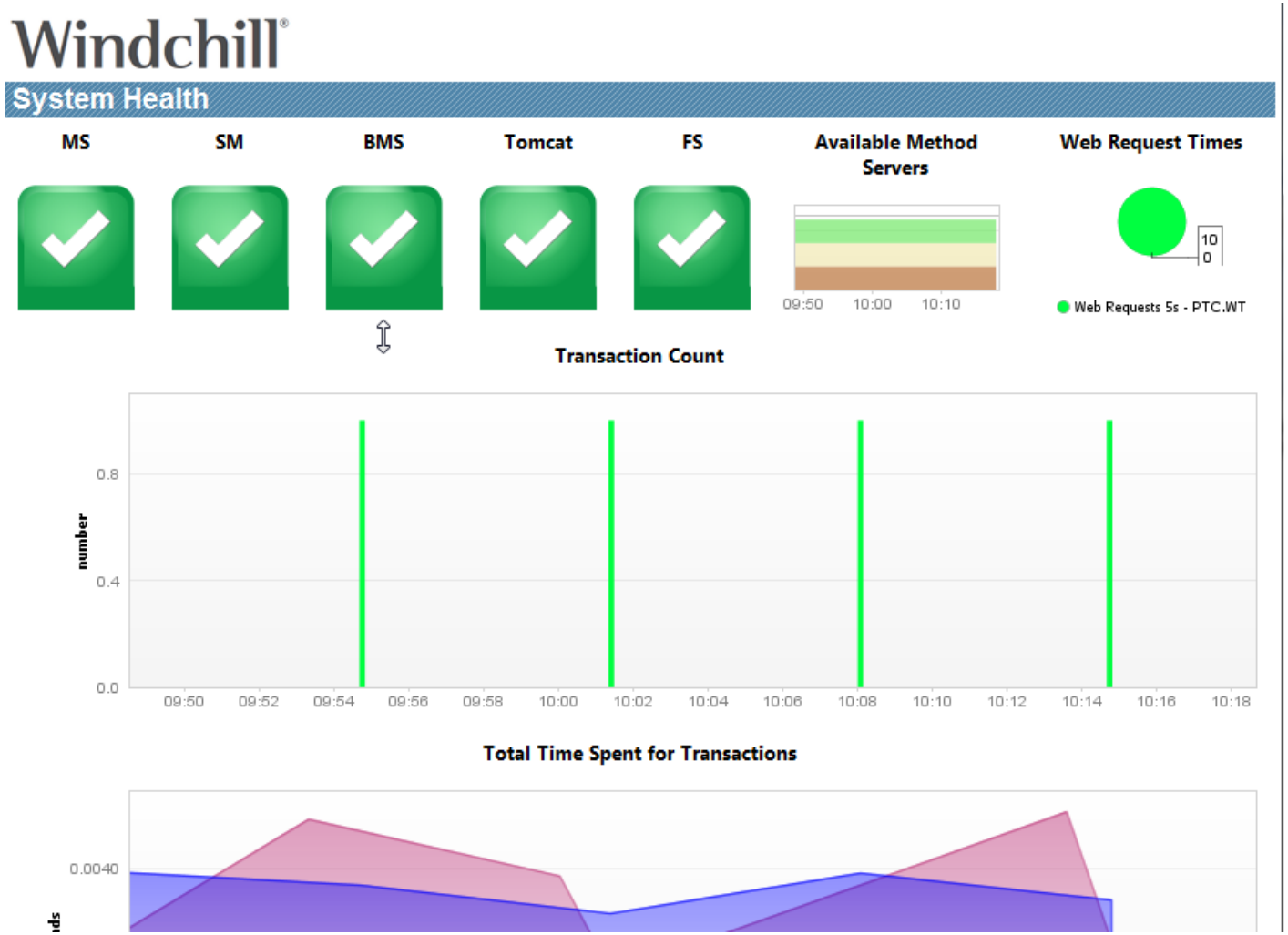
Hold cursor on edge until double arrow appears, then click and drag



MS Status Dashboard

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Method Server Status

Method Server KPIs

Aggregated View on Key Performance Indicators for all Method Servers

Agent/Monitor	Web Request Ti...	MS Memory Utilization - PTC....	MS A
bl-pd1		✓	
ptc.wt.Met		✓	
ptc.wt.Met		✓	
bl-pd2		✓	
ptc.wt.Met		✓	

Web Request Duration Breakdown

Name	Count	Failed %
Web Requests 5s - PTC.WT	1560	1.47 %
Web Requests 5to30s - PTC.WT	1	0 %

User Activity Breakdown

Group	Count	Time [ms] Sum	Cpu Time [ms] Sum	Fa
demo	1430	301949.45	38567.73	
null	100	743.69	289.80	
user2	24	15557.04	1499.06	
user1	7	2397.98	281.01	

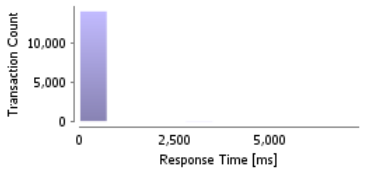
Response Time Hotspots

Windchill 9.1 System Profile

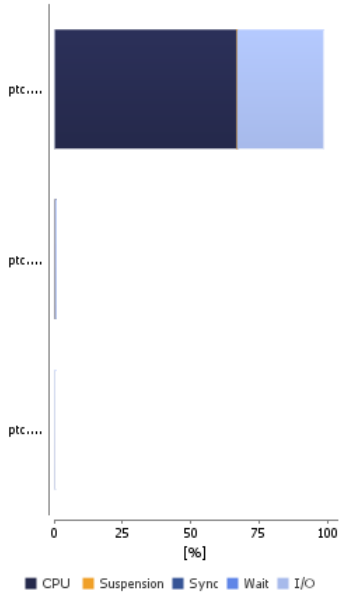
Analyze the transaction response time and its distribution across tiers and APIs to isolate performance problen

Server Transaction Statistics — Show Method Hotspots

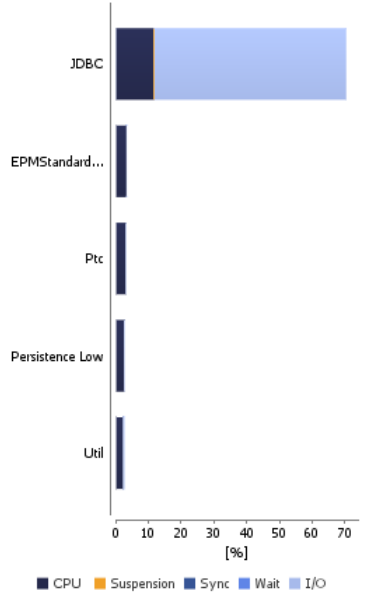
Transaction Count:	14122
Average Response Time:	34.65 ms
Failed Transactions:	23 (0.1(



Hotspots by Tier — show by Agent



Hotspots by API — Show API Breakdown



JVM Health Dashboard

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Client Navigation: Tools and Settings

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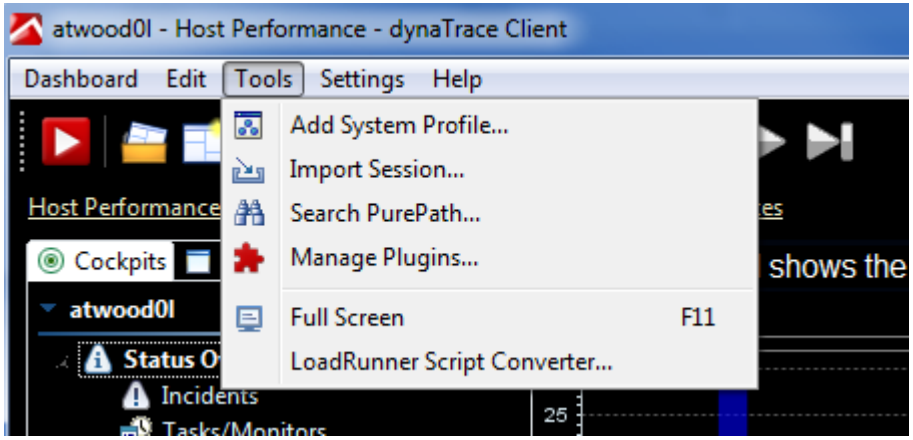
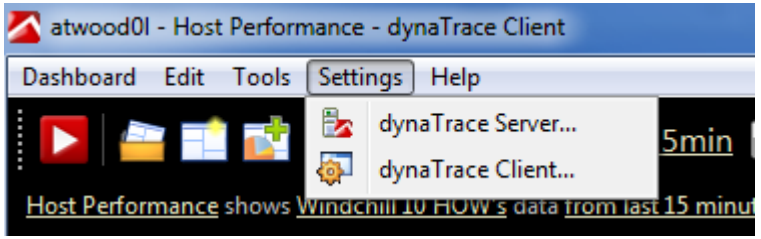
Tools and Settings menu

- Profiles, Sessions, Plugins
- Access dynaTrace Server settings





Exercise 2: Client Navigation (15 min)

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Drill Downs

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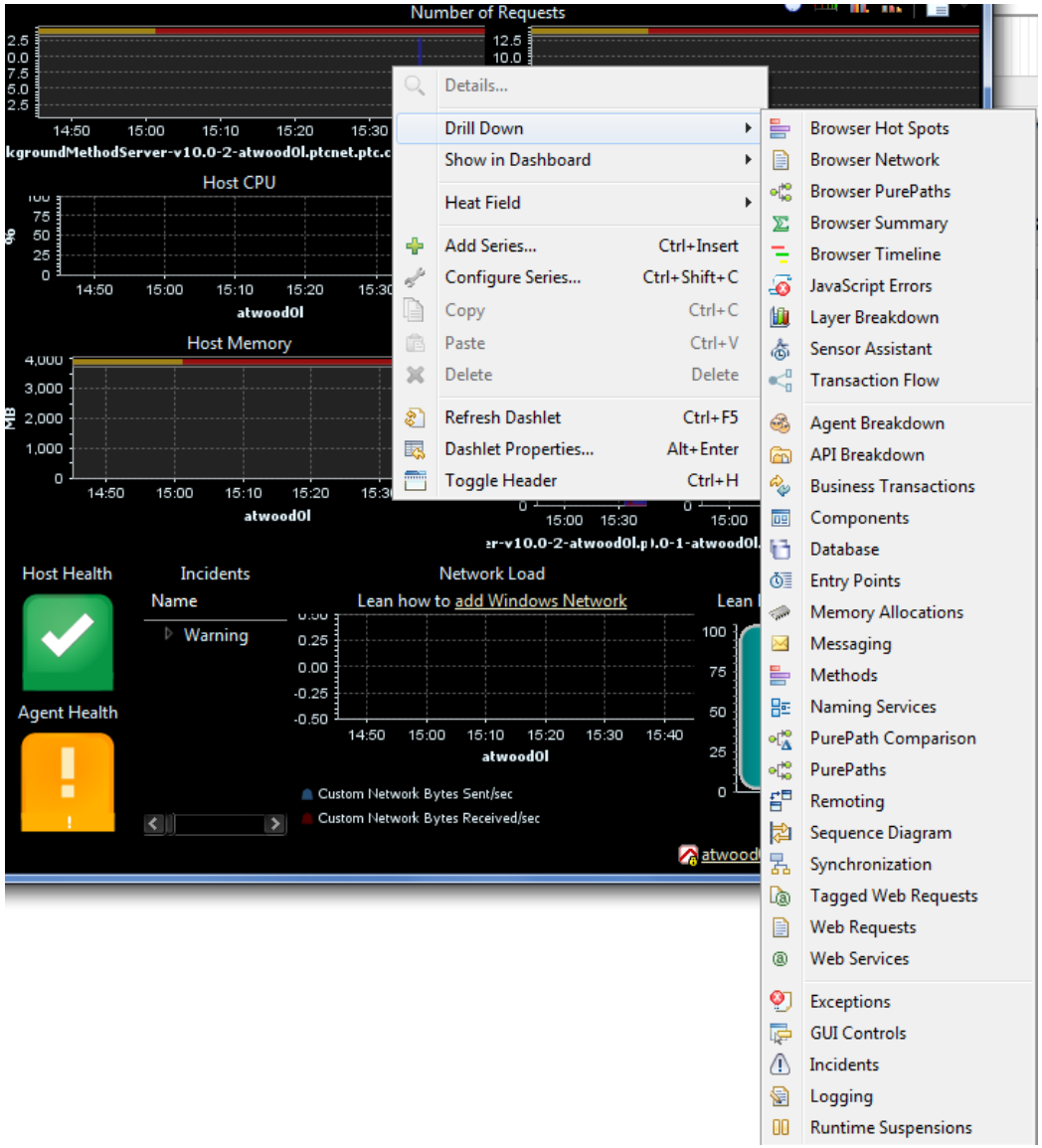
- There are drill down menus available by right-clicking on most places in the client.
- Some often accessed include the following: Details, Purepaths, Layer Breakdown, API Breakdown, Sequence Diagram, Database, Exceptions, Incidents



Sessions

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- A “session” in PSM is a set of diagnostic data captured from a system profile.
- Sessions **are not stored** in the Performance Warehouse, but are **locally stored** on the Server or web-start client.
- Information types contained in a sessions can include:
  - **PurePath Session**: represents the combined information about PurePaths and Time Series (sampled data) within a given time period
  - **Memory Dump**: contains analysis data about the number, size and class of allocated objects and their references
  - **Thread Dump**: is a collection of data for thread analysis including CPU time information
  - **Sampling (CPU)**: provides statistical data of all threads currently being serviced by the CPU
- There are 3 types of session:
  - **Live**: a Purepath session performed on live data in the server cache
  - **Stored**: any of the 4 information types above, stored on the client or Server
  - **Offline**: A session that was stored on the client, and can be accessed without the server.

Types of Session Storage

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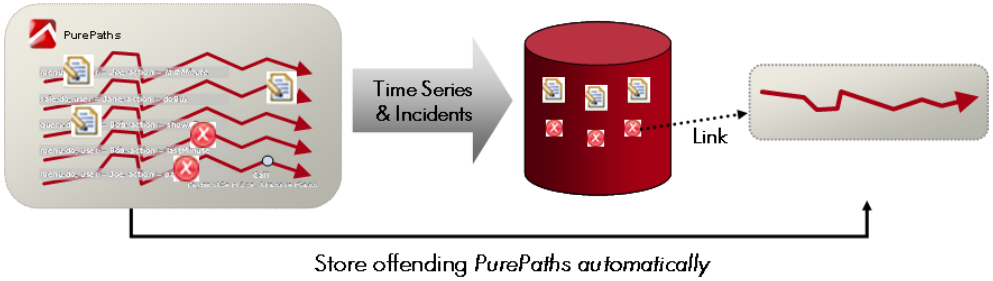
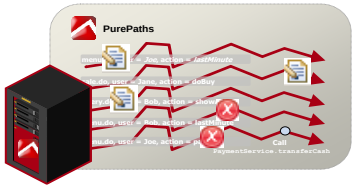


Manual and/or automatic session storage



Live Session (Continuous Transaction Storage): Latest N PurePaths & 1 hour measures for X days

Stored Session: PurePaths + Measures persistently stored on Server

Offline Session: PurePaths + Measures persistently stored on Client; no Server needed

Exported Session: A zipped stored/offline session

How to Create a Stored Session

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Each stored session contains a copy of the System Profile active at the time.

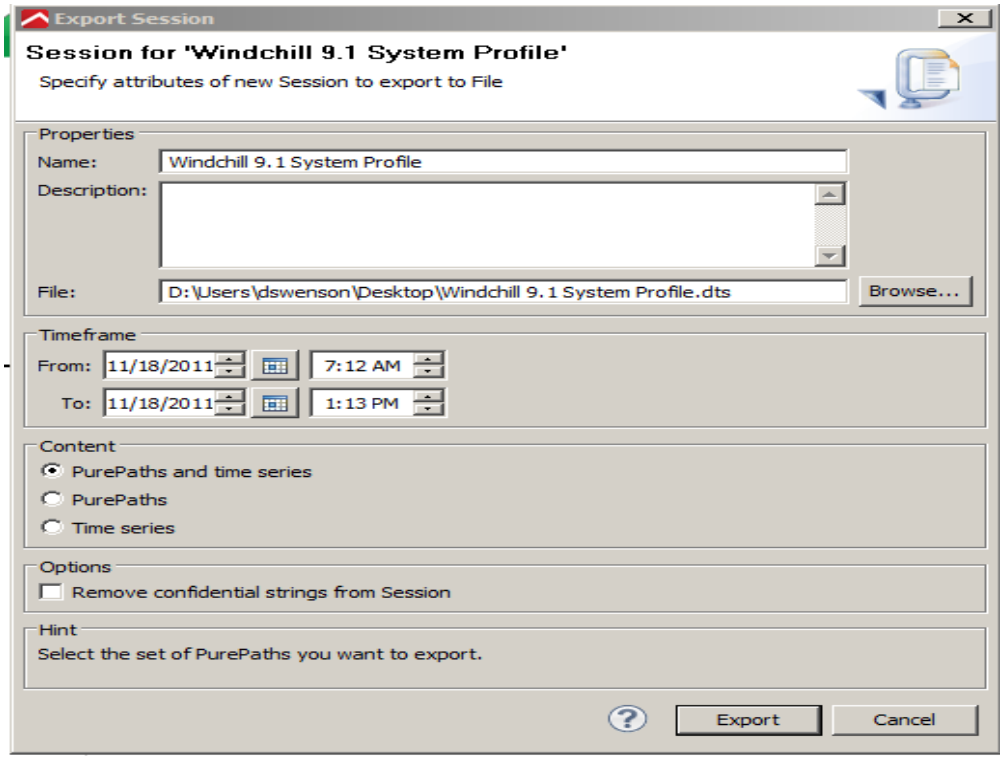
- Dump – create a snapshot
  - Live (or continuously recorded) PurePath Session can be transferred to a specific Stored Session file by selecting **Store Session** (or Export Session) out of the live session's context menu (submenu Session Storage)
  - A Memory Dump or a Thread Dump can be manually created via **Total Memory**, **Selective Memory** or **Threads** dashlets, or created automatically using an Incident action.
- Download
  - A Stored Session can be downloaded from dynaTrace Server to a dynaTrace Client by the command **Make Available Offline** which can be found within the context menu of a Stored Session.
- Task
  - A schedule task can be set to create a stored session.

Note: File type created is *.dts

Method 1: Sending the entire session over a period of time

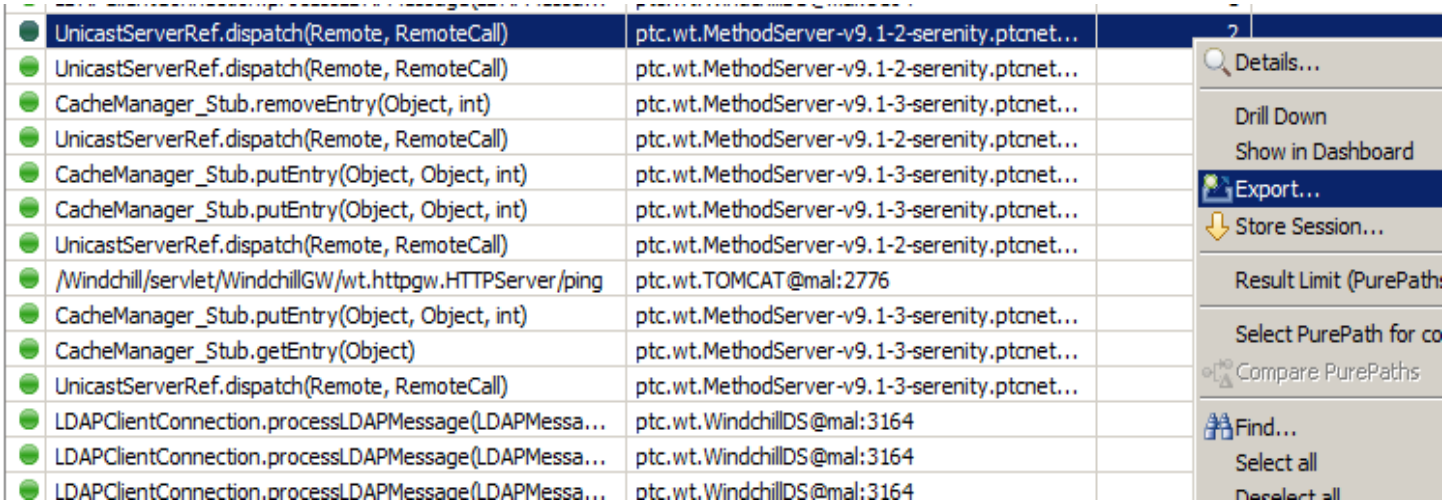
- **Pros: All session data is collected for all PurePath's for the given time as well.**

- **Cons: Export can be very large depending on how long of a time frame is specified. Best to use a 4 hour window around a time of interest.**



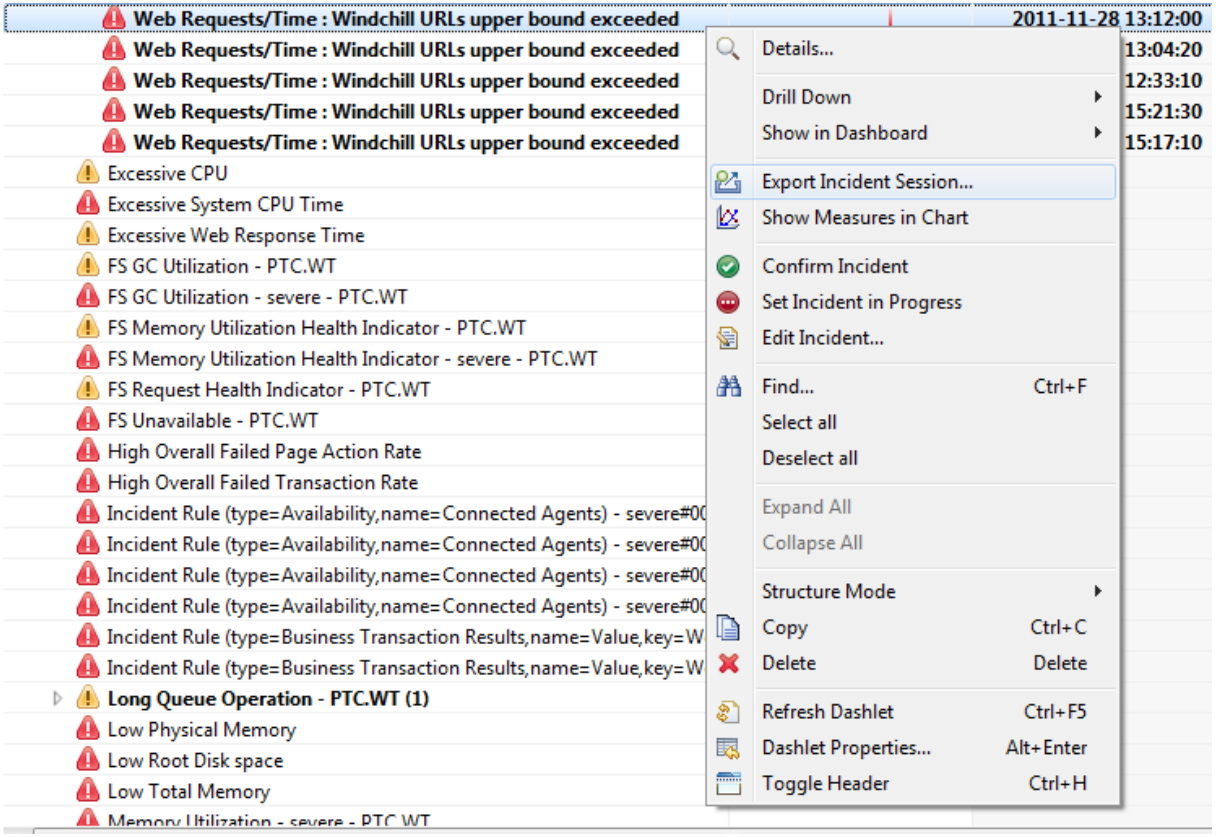
Method 2: Exporting a specific PurePath

- **Pros: allows the export of a single PurePath for Analysis. Usually very small export file**
- **Cons: No other data collected about any other transaction.**



Method 3: Exporting on a specific incident

- **Pros: Allows a finite session around the time an incident occurred**
- **Cons: Since it only collects data around an incident, it may not show the root cause of the incident occurring for certain types.**



Exercise 3: Create and Export a Stored Session (5 min)

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Monitors

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Collect cyclic measures from hosts (performance and resources) or URLs

- Infrastructure Monitoring requires configuration of O/S specific Monitors and Measures.
- Can monitor Unix or Windows system performance
- URL monitoring (availability) and Web Transaction monitoring (automatic performance check) can be configured
- VMware
  - Compute Resource
  - Host System Performance
  - Resource Pool
  - Virtual Machine Performance

Incidents and Alerting

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- Configured per System Profile
- Based on **thresholds** for subscribed Measures or Business Transactions
- Single or multiple **conditions**
- Can execute **actions** for incident
- Can have **Linked Dashboard** (default is **Incident Dashboard**)

Advanced Actions for Incidents

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The following Advanced actions can be configured for an incident

- Can configure Smart Alerting (confirmation required), Severity and Execution time (delayed or not) for each action listed.
- Activate Configuration Action: select from predefined sensor configurations
- Email Notification: notifications are sent via SMTP to configured users.
- Sampling Action: triggers CPU Sampling session.
- Memory Dump Action: triggers memory dump(s) for configured agent(s).
- Thread Dump Action: triggers thread dump(s) for the configured agent(s).

FastPacks

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- A “FastPack” is a dynaTrace transferrable archive of the following server information:
  - Dashboards
  - License
  - System Profiles
  - Sensor Packs
- Use the Plugins menu to apply (**import**) a FastPack
  - Note that the FastPack is NOT listed separately in plugins list
  - For this reason, FastPacks can not be used to do version management for configurations
- Patches from dynaTrace are a plugin (subset of FastPack)

Copying Information between FastPacks

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- We recommend copying the default profile created by the FastPack to a new name, then apply your customizations to the new profile while disabling the default profile (to allow duplicate agent definitions).
  - This will allow you to install new fastpacks without overwriting your existing, customized profile.
- Use the commands below to move information between profiles.
  - Sensor Packs
    - Use Export/Import commands
  - System Profiles
    - Use Export (right-click on a profile) and Import (right-click on **System Profiles** in **Cockpit**)
  - Dashboards
    - Use **Dashboard/Save As** command and select the My Computer icon to save locally as xml file.
    - Use **Dashboard/Open** command and select the My Computer icon to open from local xml file.
  - Measures & Business Transactions
    - Use **Copy** in the **Edit System Profile/Measures (or Business Transactions)** UI to copy and paste between profiles.

Example: Combined 10.0 and 9.1 on same PSM

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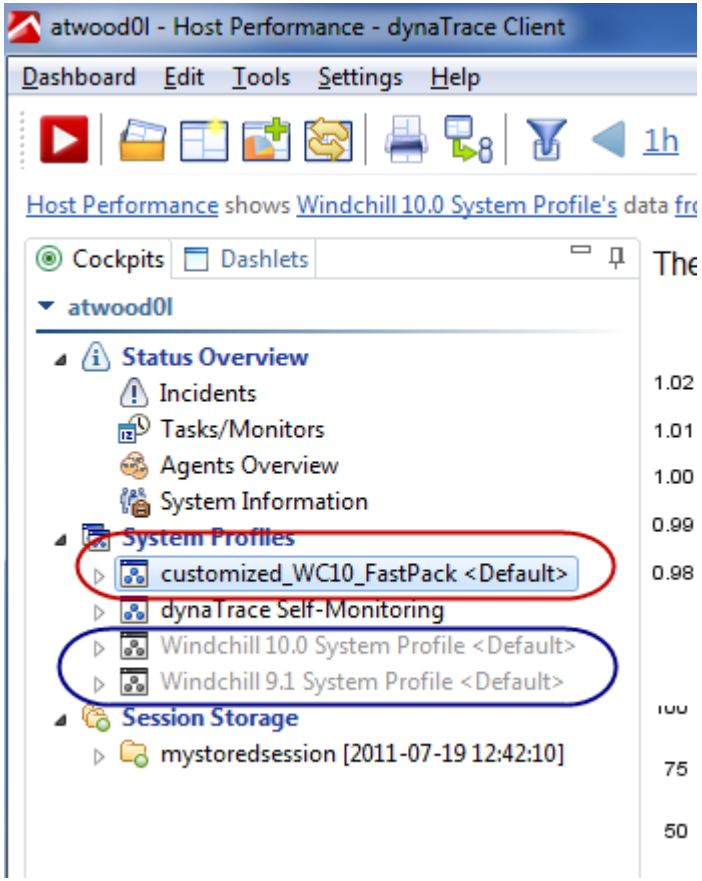

- Active Profile with new name will not be overwritten by a FastPack
- Inactive Profiles can be overwritten by a FastPack.

How to Obtain System Information

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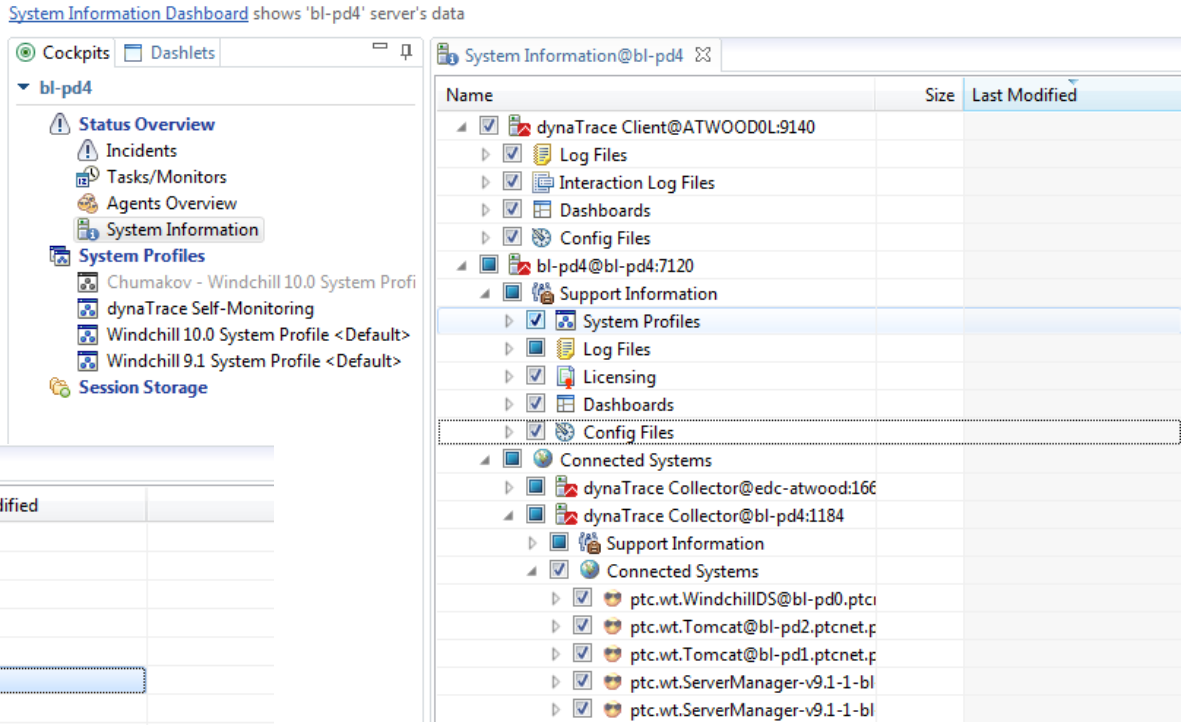
Use checkboxes to pick and choose the information, then right-click and **Package Files**



Advanced Diagnostic Features

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PSM has several advanced diagnostic capabilities. PTC Technical Support will guide customers regarding when these are recommended for use in response to any given issue.

- CPU Profiling
- Thread Dumps
- Memory Trending Dumps
- Memory Leak Dumps
- Purepath Comparison
- Session Comparison

Although customers are not required to become proficient in using these features, we will quickly review them in order to further show the value of the new monitoring tool.

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  - LearningConnector
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  - Precision LMS 3.0
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- **At the Conference**
  - eLearning Lab (St. John's 24)
  - Usability Lab (St. John's 33-34)
  - PTC University Booth (Solutions Expo)

WARNING

PTC University is a very powerful, highly volatile resource. Contact of any kind with PTC University may result in an explosion of knowledge. Super-human effects have been observed in individuals interacting with PTC University for even brief lengths of time.

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This course is a subset of content from:

- TRN-3171 Monitoring Windchill Performance using the PTC System Monitor

Thank You