IBM

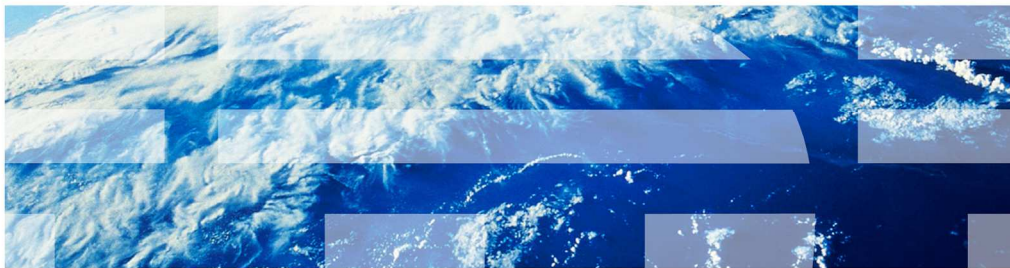# IBM PureApplication System

License tracking and management

This presentation describes the license tracking and management capabilities that are available in IBM PureApplication™ System.

Table of contents

- Overview of license tracking
- License awareness in IBM PureApplication System
- Enforcement Options
- Miscellaneous
- Summary and references

This presentation shows an overview of license tracking and awareness that is integrated with IBM PureApplication System.

You learn about license awareness in PureApplication System. You see how the enforcement options can help you with your license usage goals. A miscellaneous section discusses a few other topics that relate to licensing. The presentation ends with a summary of the topic.

In another presentation, you can optionally review the IBM License Metric Tool presentation in IBM Education Assistant to see how to use that tool with PureApplication System.

Section

Overview of license tracking

This section of the presentation shows an overview of license tracking in PureApplication System.

Goals of license awareness

- In cloud environments, license usage can be volatile
    - Hard to understand how licenses are being consumed over time
    - Easy to inadvertently overuse purchased licenses

- License awareness offers these benefits:
    - Generate reports to monitor usage
    - View all product licenses and entitlements
    - Enforce deployment behavior based on license usage
    - Spread subsets of licenses you own across users
    - Control software cost

The license awareness capabilities in PureApplication System are designed to help you monitor license usage, which ultimately helps you to control software cost. Using these license tracking features, you can track licenses that are being consumed, and view all of your product licenses and entitlements. Optionally you can enforce deployment behavior based on the number of licenses that you have available. For example, you can prevent a virtual machine deployment if the required licenses are not available. Taken together, this functionality helps you with your short- and long-term plans for software spending, allowing you to better control your software cost.

It is important to understand that these license awareness capabilities are not designed to help you minimize your license usage. That is, the PureApplication System is not actively making deployment decisions that help you to reduce your overall license consumption. Before deploying any virtual systems, you purchased the additional licenses required for the products that are not included in the "all you can eat" PureApplication System license. Once you own these additional licenses, you want to use as much of your entitlement as needed to support your operating environment. The license tracking implementation is designed to help you use all the licenses that you have without going over the license pool that you have purchased. Additionally you can also receive warnings when you are approaching the limit of your license allocation and view reports of your license usage over time.

Licensing terminology – 1 of 2

- **Processor value unit (PVU) licensing:** pricing structure for software
  - Determined by type and number of processors available to installed products
  - Licenses tracked in PVUs
    - Not as a simple count of the number of instances of a product
  - For PureApplication System, number of PVUs consumed depends on:
    - Rack model: total available cores, depending on system offering
      - 608, 384, 192, or 96
    - Number of virtual processors assigned to the virtual machines
    - Number of virtual machines deployed

- **Server licensing**: restricts number of processors and memory a virtual machine can use
  - Simpler licensing model than PVU model
  - One server licenses represents single deployment
  - PVU-based or server-based licensing determined by your IBM purchase agreement
  - For Non-catalog product licenses (new in V1.1), server licensing is determined by you and the vendor agreement

- **NEW** **Software catalog:** IBM-maintained list of signatures for IBM software products – product, version, release, component
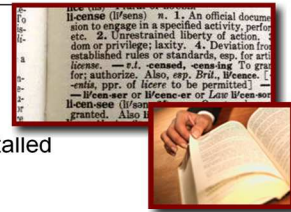
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PVU licensing is a license type based on a "PVU", or a "processor value unit. A PVU is a measure of license consumption based on the number and type of processors in the physical machine where you are running your software products. IBM tracks licenses using PVUs and not as a simple count of the number of instances of a product. For PureApplication System, the total possible PVU consumption depends on the system offering and model, and thus the number of CPUs available, which ranges from 608 down to 96. The number of PVUs consumed by products on PureApplication System depends on the number of virtual processors assigned to the virtual machines for the products, and the current PVU consumption. In PureApplication System, PVUs are counted against a product ID, or PID.

Server license type is a simpler licensing model than the PVU model which allows you restrict the number of processors and memory a virtual machine can use. For example, one server license represents a single system deployment. Whether you use PVU-based or server-based licensing is determined by your license purchase agreement with IBM. You can also specify server licensing for entries you add to the Non-catalog product licenses.

The **software catalog** is an IBM-maintained list of signatures for all IBM software products, including the product name, ID, version, release, and component. IBM provides several virtual images that the PureApplication System can deploy, and sometimes these images contain multiple products for which you can track licenses. These products are identified in the virtual image by a product ID field that is a part of the image metadata. This table is maintained using a link on the Product Licenses page.

- **PVU table:** IBM-maintained list of conversion ratios for pricing with different types of processors
  - IBM makes any necessary PVU table updates
- **PerCore:** Licensing is determined by the number of cores (processors) running the non-catalog product (New in V1.1)
  - Customer defines the number of physical cores the software license allows
  - When product is deployed, the number of available cores is decreased based on the number of virtual CPUs allocated
  - Used for Non-catalog products
- **ComputeNode:** Licensing is determined by the number of compute nodes running the non-catalog product (New in V1.1)
  - Licenses tracked per compute node, or ITE (physical server)
    - Only one license needed per compute node, regardless of number of VM's running the software
  - Used for Non-catalog products

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The **PVU table** is an IBM-maintained list of conversion ratios for pricing with different types of processors. You do not need to update the PVU table for IBM PureApplication Server because IBM makes any necessary PVU table updates. The PVU capacity of the rack is determined by the model of PureApplication Server you purchase, which determines the number of processors available in the PVU count.

PureApplication System V1.1 introduced two new terms in licensing: PerCore and ComputeNode. These two terms apply to non-catalog products.

PerCore license type means that licensing is determined by the total number of processors running the non-catalog product. Each time a deployment is made using the product, the total number of available cores is decreased based on the number of virtual CPUs allocated.

ComputeNode license type means that licensing is determined by the total number of compute nodes running the non-catalog product. Only one license is needed per compute node, regardless of the number of VM's running the product.

User roles and Product Licenses page

Permission that allows View on *product licenses* page	Permission that allows View and Update on *product licenses* page
Cloud group administration (Read-only)	Cloud group administration (Read-only or Full) + ILMT permission
Hardware administration (Read-only)	Hardware administration (Read-only) + ILMT permission
	Hardware administration (Full permission)

- **System Console > System > Product Licenses**
  - Provides product licenses settings and information and IBM License Metric Tool settings

- **IBM License Metric Tool (ILMT) permission**
  - Enables user to review or update Product Licenses page
  - Requires additional permission (Cloud group or Hardware administration) to access Product Licenses page

- Hardware administrator with Full permission (even with no ILMT permission) can view and update Product Licenses page
  - Capabilities includes updating IBM License Metric Tool settings on that page

Within PureApplication Server, the Product Licenses page shows you a total system summary of license reporting, license awareness and a list of products. Depending on your authority level you can access this page to view the information or additionally update fields on this page. You access it from the Systems Console, expanding the **System** pull down and clicking **Product Licenses.** This page also provides access to the IBM License Metric Tool settings. There are several permission settings that provide you access to the Product Licenses page, shown in the table on this slide. Note that if you give the "IBM License Metric Tool" permission to a user account, that user account must also have additional permission – either Cloud group administrator "read access" or Hardware administration "read access". This allows the user account to access the Product Licenses page. You can thus prevent unintended "update" access to other resources in the system as required, but provide full access to the Product Licenses page.

The Product Licenses page

■ System Console > System > Product Licenses

Product Licenses

License reporting

⊞ Track license usage

⊞ Download license usage

License awareness

☐ Notify virtual image owners when license usage reaches the thresholds set below

⊞ IBM Software Catalog product licenses

⊞ Non-catalog product licenses

Previously-existing IBM Software Catalog now has collapsible view

New "Non-catalog product licenses"

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The Product Licenses page is condensed by using collapsible sections. In V1.1 of PureApplication System, the IBM Software Catalog product licenses list is collapsible. The Non-catalog product licenses list is new in V1.1 and is also contained in a collapsible view.

Track license usage - IBM License Metric Tool

System Console > System > Product Licenses

- External license tracking
- ILMT section – discussed in "**IBM License Metric Tool**" presentation in IBM Education Assistant
- Note: IBM License Metric Tool does not track licenses for non-catalog product licenses

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On the Product Licenses page, the "Track license usage" section deals with the IBM License Metric Tool, a separate no-charge product used for license tracking across a broad range of IBM software products. You typically install the server-based product in your data center – typically external to PureApplication System - to collect license information about all your various products. Agents installed within each of the running PureApplication System deployments report data to the external server about the active products in the virtual machines. It is discussed in a separate IBM License Metric Tool presentation in the IBM Education Assistant. Note that IBM License Metric Tool does not track licenses for non-catalog product licenses. However the native license tracking facility in PureApplication System tracks the usage data for non-catalog product licenses.

Download license usage

- For each product in virtual image, system maintains maximum license consumption data
  - Tracked daily, weekly, monthly, lifetime
  - Provide IBM Software audit records to IBM
  - Virtual image product IDs must exist in IBM software catalog or Non-catalog product licenses
- Download data in CSV format, filter by product or date

- Non-catalog product licenses are also tracked, if you:
  - Add product to the Non-catalog product licenses list
  - Add product component to the catalog virtual image

- Suitable for tracking subcapacity license usage

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For IBM products that are not included in the "unlimited usage on the rack" agreement, IBM expects you to maintain audit records that show you have been attempting to stay within your license entitlement. One way to do this is to periodically download and store these usage logs and keep them for auditing purposes. For software product IDs associated with an image on your PureApplication System and found in the IBM Software Catalog or in the Non-catalog product licenses, the PureApplication System keeps a record of maximum license consumption data. This data is available on a daily, weekly, monthly, and lifetime basis. The lifetime maximum value reflects the highest PVU, Server, PerCore, or ComputeNode license usage ever recorded since the license was first registered in the PureApplication System. You can use this license usage data to assist in license planning and provide an audit record of your license consumption. Licenses are tracked as being either in use or reserved. Only licenses that are actually in use are recorded in the audit logs; reserved licenses do not count against your entitlement. The license usage data is available in CSV format, so you can filter the download by product or date. Access these options from the Product Licenses page in the Download license usage section. License tracking is performed for all products registered in IBM Software Catalog and in the Non-catalog product licenses, even if they are products for which you have unlimited use. This report is suitable for tracking subcapacity license usage.

Configuring email notifications for a warning threshold

- System can optionally email cloud administrator when license consumption reaches threshold

- Enable notifications on the **System Console > System > Product Licenses** page by:
  – Selecting the check box next to **Notify virtual image owners when license usage reaches the thresholds set below**
    • Provide the license pool and warning threshold for the product for which you want to receive warnings
    • Independent of license enforcement configuration

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If you want to receive warnings when you are getting close to your product license limit, you can configure the PureApplication System to send you email notifications. The warning threshold is set as a percentage of the total number of PVUs or licenses that you own for a particular product. In order to receive threshold email notifications, you must do two things. First, select the box labeled **Notify virtual image owners when license usage reaches the thresholds set below**. This box is not enabled by default and must be set manually to enable these email warnings. Second, for the products for which you want to receive threshold notifications, you need to set the **Licenses owned field** in the console. Optionally, you can adjust the notification threshold percentage field, set by default to the 90% threshold. When your license usage reaches the specified threshold for the products you are tracking, an email notification is sent to all of the users who have the *Create new catalog content* role. These notification emails are sent regardless of the enforcement option that you have selected. You will learn more about the enforcement option later in this presentation.

In the initial release of PureApplication System V1.1, these two issues exist. First, no warning email notifications are sent for license thresholds violations. Second, no threshold violation warning messages are written to the History section of deployments for license threshold violations. IBM plans to resolve these issues in the maintenance stream for PureApplication System V1.1.

You can still see the proper warning symbols and statistics on the Product Licenses page in either the IBM Product Catalog license section or in the non-catalog product licenses section. The "Enforce" option listed in the "Enforcement" column still functions as expected, stopping deployments with an appropriate message when the number of additional licenses needed for deployment exceed the number of licenses owned. Once these issues are resolved, this slide will be removed from the presentation.

Update IBM Software Catalog

- Keep your PureApplication System up-to-date by periodically importing the latest software catalog
- From the **System Console > Cloud > Product Licenses**:
  1) Click **Browse** and download the latest copy of the configuration file from IBM using the links provided
  2) Point to the downloaded and selected file and click **Update**

IBM Software Catalog product licenses

Below are the products that can be deployed from this system. The list is generated by checking the contents of your virtual images against the product list in the IBM Software Catalog. When enabled, license awareness will alert you when PVU or SERVER license usage approaches a given threshold.

Update IBM Software Catalog

You should download and import the IBM Software Catalog on a regular basis so that the system has access to the latest licensing data. These are machine-readable files that contain the entire list of IBM products for known processor types, respectively. These files are updated periodically at www.ibm.com.

Download IBM Software Catalog

Import IBM Software Catalog (XML or ZIP file)

Browse...

Update

IBMSoftwareCatalog.xml was last updated on Jul 4, 2013, 3:07:30 PM (105776.48 KB)

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License tracking for IBM products in the PureApplication System relies on the software catalog that contains the total list of IBM products for which you might want to track licenses. Periodically, IBM updates the software catalog to include new software products and types of processor cores, so it is a good practice to periodically import an updated catalog to keep your PureApplication System up-to-date. PureApplication Server firmware updates the PVU table when changes to the PVU table are needed.

IBM maintains the software catalog files and makes them available for download. From the Product Licenses page, the Download IBM Software Catalog link opens an FTP server connection. From that server, you can download the latest copy of the software catalog. Always download the catalog that has the has the string "canonical form" in the file name. Once you have downloaded the software catalog to your local system, use the console to locate the file and upload it to your PureApplication System.

IBM Software Catalog product licenses

- Native IBM Software product licenses tracking in PureApplication System
  - Configures pools of licenses for IBM software products in your virtual images
  - Determines license type
  - Monitors license usage
  - Generates audit reports of license usage in the cloud

Product Licenses

License reporting

⊞ Track license usage

⊞ Download license usage

License awareness

☑ Notify virtual image owners when license usage reaches the thresholds set below

⊟ **IBM Software Catalog product licenses**

Below are the products that can be deployed from this system. The list is generated by checking the contents of your virtual images against the product list in the IBM Software Catalog. When enabled, license awareness will alert you when PVU or SERVER license usage approaches a given threshold.

⊞ Update IBM Software Catalog

Note: Rack capacity (PVU) depends on the rack model

Rack capacity (PVU): 31360

Product	Product ID	License type	Enforcement	Licenses owned	Notify if usage reaches	Licenses in use	Licenses reserved	In the cloud now
WebSphere Service Registry and Repository	5724-N72	PVU	Enforce	1000	90.0 %	350	350	2 instances
IBM WebSphere App Svr Hypervisor Edition for Red Hat Enterprise Linux Svr	5725-A26	PVU	Warn	2000	90.0 %	3640	4060	6 instances

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PureApplication System contains native capabilities for license tracking for many IBM products. You can configure your license entitlement by product, determine the type of license tracking, set "Notify" thresholds, and track license usage. You can determine where to place virtual machines based on license availability. For auditing, you can download records of your license consumption. While the IBM Software Catalog product licenses list is shown on the Product Licenses page, the resulting list is derived from the IBM product IDs and parts in the virtual images installed within your virtual image catalog.

Incidentally, the Rack capacity in PVU value is shown in this section of the screen, the value of which depends on the PureApplication System model.

Adding products to the product license list (IBM Software Catalog)

- Products are added to the product list by:
  - Importing a new image into the catalog
    - Products included in the image are automatically added to the list
  - Manually adding a product ID to an existing image
    - **Workload Console > Catalog > Virtual Images**
      - Select a virtual image
      - Edit the **Product IDs** field
    - Product IDs can be added or deleted as long as no deployments are in the cloud
    - Non-catalog product licenses are now supported (V1.1)

The list of products on the two product licenses pages is based on the product IDs that are associated with the virtual images in your PureApplication System catalog. Here you see an IBM Software Catalog product ID that was added to this image. For IBM Software Catalog product licenses, IBM tracks these products according to a product ID (PID) string. WebSphere® Application Server Hypervisor Edition on Red Hat, for example, is associated with product ID 5725-A26. Virtual images have a Product IDs field that lists all of the products that are associated with that image. To add new products to the product list on the IBM Software Catalog product license page, you must import an image that already contains that product. Alternatively, you can modify the product IDs field for an image in your catalog so that it contains the PID for the product that you want to track. For example, you run "Extend" on one of the IBM-supplied virtual images. Then you install DB2® inside your image and capture that back to your PureApplication System. If you want to track DB2 licenses when you deploy patterns based on your new image, all you need to do is add the appropriate DB2 product ID to your image. The Product IDs field is only editable until you deploy a pattern based on this image. After a copy of this image exists in your cloud, the product IDs field is locked. Non-catalog product licenses are discussed later in this presentation, but notice that you can now add non-catalog product licenses to any virtual image as long as you have added that product to the non-catalog product licenses list.

Adding products to virtual image (IBM Software Catalog) – PVU or Server

When you click to add the product to a catalog image, you have a choice of license types in PureApplication System. If you type the license number and let the license type default to PVU, you have added the product using PVU based licensing. This type of license is dependent on factors such as physical processor and number of virtual processors.

If you select Server based licensing, you must then provide the maximum CPU count and the maximum virtual memory that you allow for deployments using this part in the catalog image. The type of license you choose is based on your product license agreement with IBM at the time you purchase the license.

Server based license management (IBM Software Catalog)

- PVU based licensing is based on the type of physical processor and number of virtual processors allocated to the deployed virtual machine
- Server based licensing is based per deployed virtual machine
    - Server based licensing restricts the number of virtual processors and memory a virtual machine can use
- System Console > System > Product Licenses
    - Cloud capacity table
    - Shows both license types in entries

Product	Product ID	License type	Enforcement	Licenses owned	Notify if usage reaches	Licenses in use	Licenses reserved	In the cloud now
WebSphere Service Registry and Repository	5724-N72	PVU	Ignore ▾	0	90.0 %	1680 ❌	1750 ❌	35 virtual systems
Product with Server licensing	57XX-XXX	Server	Warn ▾	4	90.0 %	4 ❌	4 ❌	2 virtual systems
IBM WebSphere App Svr Hypervisor Edition for Red Hat Enterprise Linux Svr	5725-A26	PVU	Warn ▾	1000	90.0 %	700 ⚠	910 ⚠	21 virtual systems

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Server based licensing is based on a virtual machine as a whole. For example, the same single virtual machine deployment can consume 75 PVU or one Server license. Server based licensing restricts the number of processors and memory a virtual machine can use. As you can see Server based licensing is a much simpler licensing model that avoids the complexity of the PVU model. A virtual image can be configured to use either PVU or Server based licensing, but remember that your licensing agreement with IBM for specific products determines how you must configure the license type for the virtual image.

In the Cloud capacity table snapshot, you see an entry for a deployment of a virtual image using the **Server** license type and the **PVU** license type. For the **Server** license type, notice that the number of licenses in use is "4." Below that entry is an entry for a deployment using the previously-existing "PVU" license type. The number of licenses in use is expressed for that entry as a PVU value – in this case, "700."

While the product list is shown on the Product Licenses page, the resulting list is derived from the products and parts within your virtual image catalog. Also, note that the Rack capacity, shown in the middle of the page, is dynamically calculated by PureApplication System and depends on the model you have purchased.

PureApplication System V1.1 contains license tracking capabilities for products not listed in the IBM Software Catalog, called "Non-catalog product licenses". Just like the IBM products previously discussed, you can configure your license entitlement by product ID, determine the type of license tracking, and track license usage. For auditing, you can download records of your license consumption.

Adding a new product to Non-catalog product licenses

- Supply:
  - Product
  - Product ID
  - License type (**ComputeNode** or **PerCore**)

Free-format fields

New types

Describe the license you want to add

Product   Demo product
Product ID   123ABC
License type PerCore
              Server
              ComputeNode
              PerCore

⊞ **IBM Software Catalog product licenses**

⊟ **Non-catalog product licenses**

In this section you may add or view license information for additional products that are being deployed to your virtual images, but are not currently listed in the IBM Software Catalog. When enabled, license awareness will alert you when the license usage approaches a given threshold.

	Product	Product ID	License type	Enforcement	Licenses owned	Notify if usage reaches	Licenses in use	Licenses reserved	In the cloud now
➕ Add a license ✖ Delete									
(none)									

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When you click **Add a license** in the Non-catalog product licenses section, you see a popup requiring settings for Product, Product ID and License type. For the **Product** field, specify any free-format description you want. For the **Product ID** specify the exact name you want for the product identification, since you will use this field value when you add the product to virtual images. For **License type** select in the dropdown whether you want ComputeNode or PerCore license type.

Adding products to the product license list (Non-catalog license)

- You can only add product IDs to a virtual image if the product ID has previously been added non-catalog product licenses list
- When needed, you must manually add non-catalog product IDs to existing virtual images
  - **Workload Console > Catalog > Virtual Images**
    - Select a virtual image
    - Edit the **Product IDs** field
  - Product IDs must be unique and already defined
    - Case-sensitive
  - Product IDs can be added or deleted as long as no deployments using image are in the cloud

LW Copy of WAS 7.		Refresh	Export	Clone	Extend	Capture	Lock	De
Description:	Virtual image description							
Created on:	Jul 12, 2013, 1:19:06 PM							
Current status:	Read-only							
Updated on:	Jul 16, 2013, 6:38:09 AM							
License agreement:	Accepted [view...]							
Intelligent Management Pack:	Disabled Enabling advanced features may result in additional cost. Please refer to the license agreement.							
Hypervisor type:	None provided							
Operating system:	RedHat Enterprise Linux 64-Bit, version 6 (RedHat Enterprise Linux 6)							
Version:	1.0.0.1							
Image reference number:	faf201328.0							
Product IDs (e.g., 5724-X89):	5725-C04 (PVU license) 5725-A27 (PVU license) 5725-A26 (PVU license) A non-IBM product (ComputeNode license) Click to add							

Non-catalog product

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Here you see that a non-catalog product license has been added to a virtual image. The native license tracking within PureApplication System tracks these products according to a product ID string that you provide in the non-catalog product license list. Virtual images have a Product IDs field that lists all of the products that are associated with that image. If you have already added the product to the non-catalog product licenses list, you can modify the Product IDs field for an image in your catalog so that it contains the Product ID for the product that you want to track. For example, you run "Extend" on one of the virtual images. Then you install a non-IBM product inside your image and capture that back to your PureApplication System. If you want to track those licenses when you deploy patterns based on your new image, add the product to the non-catalog product licenses list and then add the Product ID to your image. The Product IDs field is only editable until you deploy a pattern based on this image. After a copy of this image exists in your cloud, the product IDs field is locked.

The next slides tell you how to add non-catalog license entries to a virtual image.

Adding products to virtual image (Non-catalog product license)

- When you **Click to add**
  - Choose license type of **Server, ComputeNode or Per Core**
  - **Server** license type requires

Image reference number: 32663.115

Product IDs (e.g., 5724-X89): 5725-C04 (PVU license)
5725-A27 (PVU license)
5725-A26 (PVU license)
Click to add

Non-catalog product

Compute Node or Per Core

Describe the product ID that you want to add.

* Product ID: A non-IBM product
* License type: Compute Node
  PVU
  Server
  Compute Node
  Per Core

Server

Describe the product ID that you want to add.

* Product ID: Non-catalog Product
* License type: Server

Fill in the limits for this license.

* CPU count: 2
* Memory (GB): 8

OK   Cancel

Supply **CPU count** and **Memory**

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hen you click **Click to add** in the Product IDs section of a virtual image, you see a popup box. For non-catalog products, you specify the **Product ID** by typing it into the field. In the dropdown menu, you then select either **Server, Compute Node** or **Per Core.** If you select PVU, the system will generate an error message indicating your product is not in the IBM Software Catalog. If you select **Server,** you will see additional fields that can limit the maximum number of CPUs allocated and the maximum memory in gigabytes. The type of license you choose is based on your product license agreement with the owner of the product, unless you own all rights to the product and have added the Product ID for tracking purposes only.

Here is an example of two entry in the non-catalog product license list. Notice that you can set the enforcement options, set the number of licenses owned, and set the notify threshold percentage, just like you can for IBM Software Catalog products licenses entries.

Section

Enforcement options

This section of the presentation describes how to configure and use the license awareness features in PureApplication System.
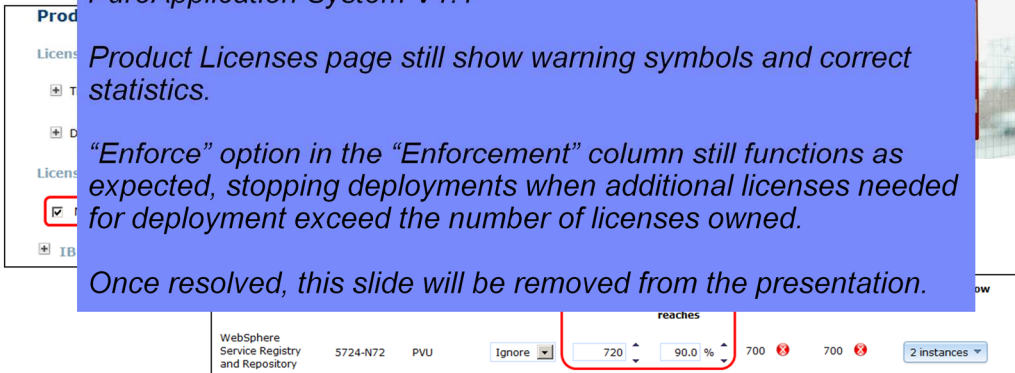
Configuring email notifications for a warning threshold

- Sys...
  thr...
- En...

Notice: In the initial release of PureApplication System V1.1, these two issues are reported:
1. No warning email notifications are sent for threshold violations.
2. No threshold violation warning messages are written in the History section of the deployment

IBM plans to resolve these issues in the maintenance stream for PureApplication System V1.1

Product Licenses page still show warning symbols and correct statistics.

"Enforce" option in the "Enforcement" column still functions as expected, stopping deployments when additional licenses needed for deployment exceed the number of licenses owned.

Once resolved, this slide will be removed from the presentation.

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In the initial release of PureApplication System V1.1, these two issues exist. First, no warning email notifications are sent for license thresholds violations. Second, no threshold violation warning messages are written to the History section of deployments for license threshold violations. IBM plans to resolve these issues in the maintenance stream for PureApplication System V1.1.

You can still see the proper warning symbols and statistics on the Product Licenses page in either the IBM Product Catalog license section or in the non-catalog product licenses section. The "Enforce" option listed in the "Enforcement" column still functions as expected, stopping deployments with an appropriate message when the number of additional licenses needed for deployment exceed the number of licenses owned. Once these issues are resolved, this slide will be removed from the presentation.

Working with license enforcement options

- From the **IBM Products** section of the **System Console > System > Product License** page, you can configure, per product:
  – Enforcement option (ignore/default, warn, enforce)
  – Number of licenses owned (PVUs or Server licenses)
  – Warning threshold (used for email notifications configured above)

- PureApplication System maintains a count of licenses in use and license reserved, based on currently deployed virtual systems
  – Reserved licenses include licenses in use and those reserved for virtual machines that are stopped

- Hover over virtual systems link to view a pop up list of virtual systems consuming licenses from this pool

Product	Product ID	License type	Enforcement	Licenses owned	Notify if usage reaches	Licenses in use	Licenses reserved	In the cloud now
IBM Transactional Database Pattern for Non Production Environment	5725-F36	PVU	Warn	150	90.0 %	140 ⚠	140 ⚠	1 virtual systems ▼ ▶ RPT_license_server

The product licenses pages contains a list of all of the software products that your PureApplication System is able to track licenses for. Each product has an associated product ID, license type, enforcement option, number of licenses owned, notification threshold, and a count of licenses in use and reserved. To the right of the entry is a link if there are virtual systems currently in the cloud that contain the product.

The enforcement option, licenses owned, and notification threshold are configurable options. For enforcement, you can choose ignore, warn, or enforce; the option selected influences the PureApplication System's behavior at deployment time. The enforcement options are explained in more detail on the next page. The Licenses owned value represents the number of licenses or PVUs of the product that you have purchased from IBM, or your product entitlement. The email notification threshold indicates when your catalog administrators – those users with "Create new catalog content" permission - receive notifications as you approach the threshold you've set for your license entitlement.

The remaining fields are not configurable; they are maintained by the PureApplication System. As you deploy patterns from PureApplication System, the virtual machines that are running in your cloud consume licenses against your entitlement for the products that you deploy. The PureApplication System keeps track of the number of PVUs or licenses that you have in use or reserved per product. Licenses in use are for virtual machines you have actively running in your cloud; reserved licenses represent the active virtual machines plus any additional PVUs or licenses that are consumed if you started your stopped virtual machines. Reserved licenses are not included in audit reports and do not count against your entitlement. Regardless of the license enforcement option you have selected, the PureApplication System keeps track of your licenses currently reserved and in use, as shown in the screen capture here. The "In the cloud now" column contains a link to all of the virtual systems that you currently have in your cloud that contain the product listed. Hover over or click the hyperlinked text and the console displays a pop-up menu that allows you to directly navigate to the virtual system details page for the systems that are consuming licenses for that product.

Comparing enforcement options

	Ignore	Warn	Enforce
Generate audit reports of license usage	✔	✔	✔
Email catalog administrators when license usage exceeds warning threshold (if enabled)	✔	✔	✔
Email deployer and catalog administrators when enforcement is triggered		✔	✔
Note in logs/history that license pool was exceeded		✔	✔
Make placement decisions to avoid exceeding license pool when approaching full utilization			✔
Force deployment failure when new deployment exceed available licenses			✔

The table on this page shows the differences in behavior for the license enforcement options. Ignore is the default option. When this option is selected, the PureApplication System still tracks license usage and generates audit reports, but no action is taken at deployment time to warn users or to restrict virtual machine creation. When the warn option is selected, deployments that exceed your license entitlement are allowed to proceed. Additional warning messages are issued in the virtual system history and log files, and administrators are notified that the license limit has been exceeded. Note that the email notifications sent to administrators and deployers when the license pool has been exceeded are not the same as the threshold notifications that are also configured from the Product Licenses page. The threshold emails are sent only to catalog administrators when the specified license usage threshold has been reached (for example, 90%), regardless of the enforcement option selected. The email notifications that are sent under the warn enforcement option are sent to both the deployer and the catalog administrators, and happen when the deployment causes the license pool threshold to be exceeded. When the enforce option is selected, deployments that exceed your license entitlement are not allowed.

Enforcement option example: Enforce

Step 1
a. Navigate to **Workload Console > Cloud > Product Licenses**
b. Set the **Enforcement** option for your product to **Enforce**
c. Configure the number of **Licenses owned**

Product	Product ID	License type	Enforcement	Licenses owned	Notify if usage reaches	Licenses in use	Licenses reserved	In the cloud now
IBM WebSphere Application Server Hypervisor Edition	5724-X89	PVU	Enforce ▾	300 ↕	90.0 % ↕	300 ❌	300 ❌	1 virtual systems

Step 2
a. Deploy a pattern that exceeds your license allotment
b. Deployment fails with a message saying **One or more licenses will exceed its total allocation**

LW WebSphere Small Cluster 2	🔄 Refresh ▶ Start ⏹ Stop 🗄 Store ⚙ Service ✖ Delete
Created on:	Aug 15, 2012 1:20:15 PM
From pattern:	LW license test
Using Environment profile:	envProfile18
Deployment priority:	High
Current status:	❗ One or more licenses will exceed its total allocation

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When the enforce option is turned on, any deployment that exceeds the total license allocation is going to fail. During the deployment process, licenses are treated like other virtual system resources including memory and disk space. One of the first things that happens as the PureApplication System attempts to deploy is a resource check to make sure that there are sufficient resources available to host the virtual machines for the image. As a part of this check, the PureApplication System also verifies license availability. If sufficient licenses are not available and the enforce option is configured, the deployment fails as shown in the screen capture here.

Enforcement option example: Warn

When the warn enforcement option is selected, deployments are allowed to continue, even if they cause you to exceed your license allocation. When licenses are exceeded, a warning is recorded in the virtual system history and logs, and email notifications are sent to the deployer and catalog administrators. On the Product Licenses page, the licenses being used and reserved include PVUs or server licenses for the virtual system that generated the warning. In this example, a red status indicator on the product licenses page indicates the licenses are in use and reserved by this virtual system and that they exceed the number of licenses owned.

Virtual machine state and license consumption

- Virtual machines can have licenses in use or licenses reserved (or both)
- Whether licenses are used or reserved depends on virtual machine state

Virtual machine state	Licenses in use?	Licenses reserved?
Inactive (deploying)	No	Yes
Starting or started	Yes	Yes
Stopped (VS) Stopped (DB) Terminated (VA)	No	VS – Yes DB – Yes VA - No
Stored (VS only)	No	No
Deleted (VS, VA) / Destroyed (DB)	No	No

VS = Virtual System

VA = Virtual application

DB = Database instance

The license tracking capabilities in the PureApplication System report licenses as being either in use or reserved, depending on the state of the underlying virtual machine. In general, licenses are only consumed for virtual machines that are active – for example, while starting or in a started state. While the virtual machine is being created or when it is stopped, licenses are not consumed, but they are still reserved. Reserved licenses do not count against your entitlement pool for audit purposes. However, knowing how many licenses are reserved helps you understand how many licenses are consumed if all of your virtual machines became active at the same time. When a virtual machine is stored or deleted, its licenses are no longer in use or reserved.

Section

Miscellaneous

This section of the presentation describes how to configure and use the license awareness features in PureApplication System.

Command-line interface for license awareness (1 of 2)

- License awareness object contains fields and methods to work with license tracking and reporting
- **Example:** Enabling email notifications for a warning threshold
  - `admin.licenseawareness.thresholdalert=True`

- **Example:** Importing a software catalog
  - `admin.licenseawareness.ibmsoftwarecatalog.import('tmp/IBMSoftwareCatalog.xml')`

- **Example:** Displaying the list of product IDs for an image
  - `deployer.virtualimages["WebSphere Application Server Hypervisor Edition 8.0.0.3"][0].productids`
    - Result:[{u'licensetype': u'Server', u'mutable': u'T', u'productid': u'5724-X89', u'licensememory': 4096L, u'licensecpu': 4L}, {u'licensetype': u'PVU', u'mutable': u'T', u'productid': u'5725-A26', u'licensememory': None, u'licensecpu': None}]

The capabilities that are available in the web user interface to configure license tracking and reporting are also exposed through the command line interface. The license awareness object supplies fields and methods for working with license usage data, email notifications, and importing the software catalog. Examples of the syntax for these operations are provided on this page.

Command-line interface for license awareness (2 of 2)

- **Example:** Adding a product ID to an image
  - `deployer.virtualimages["WebSphere Application Server Hypervisor Edition 8.0.0.3"][0].productids=['5765-F41']`

- **Example:** Displaying the product list
  - `admin.licenseawareness.products`

- **Example:** Update license data for a product
  - `admin.licenseawareness.products[0].enforcement='W'`
    - `'E'=enforce, 'W'=warning, 'I'=ignore`
  - `admin.licenseawareness.products[0].totalallocation=30000`
  - `admin.licenseawareness.products[0].warningthreshold=20.0`

The virtual images object in the command-line interface can display product IDs associated with an image and supports programmatically modifying the product IDs for an image. When setting the product IDs field from the command-line interface, the default product IDs cannot be removed. The license awareness object also provides the ability to work with the product list. You can list information about the products, or chargeable components, that are currently being tracked by your PureApplication System, and then set configurable options. These options include enforcement, total PVUs available, and warning threshold.

Virtual image part product IDs

- Product IDs are associated with the virtual image part rather than at the virtual image level
    - Allows for more fine grained control over licensing and associated fees

	Administrative agents	[part product IDs...]
	5724-X89	
	Click to add	
Contains parts:	Custom nodes	[part product IDs...]
	Deployment manager	[part product IDs...]
	IBM HTTP servers	[part product IDs...]
	5725-C00	
	Click to add	

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In PureApplication System, product IDs are associated with the virtual image part. This allows finer control over how licenses are consumed based on how the virtual machine is being used, rather than what virtual image was used to create the virtual machine.

To view or add product IDs to virtual image parts navigate to Catalog->Virtual Images->your_virtual image. Located in the "Contains parts" section is the list of virtual image parts associated with this virtual image. Click the "part product IDs…" link to the right of the part to view its current product IDs. To add an addition product ID click the field marked "Click to add" and enter the product ID. The product ID must already be defined in either the IBM Software Catalog product licenses or in the Non-catalog product licenses.

Hypervisor licenses (W1500 only)

- Located at very bottom of **Product Licenses** page
- IBM supplies the license keys you need
  - Provided in a special email to you from IBM
  - You must type in the keys in order to use the system

IBM PureApplication System Workload Console System Console

Welcome Cloud ▾ Hardware ▾ Reports ▾ System ▾

Product Licenses

License reporting

⊞ Track license usage

⊞ Download license usage

License awareness

☑ Notify virtual image owners when license usage reaches the thresholds set below

⊞ IBM Software Catalog product licenses

⊞ Non-catalog product licenses

Vmware licenses

vCenter key: (none)

ESXi key: (none)

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For PureApplication Systems that use VMware as the hypervisor, IBM supplies you the hypervisor license keys that you need after you purchase PureApplication Server. Specifically, IBM sends you a separate email with the VMware component activation license keys. You can see the entry field for these license keys at the very bottom of the Product Licenses page. You must be logged in as a workload resources administrator with full permission or a Hardware administrator with full permission.

Summary and references

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This section contains a summary and references.

Summary

- License awareness in PureApplication System allows you to:
  - Track license usage in your cloud and generate audit reports
  - Understand how many license you need to purchase to make the most use of your cloud
  - Enforce placement decisions based on available licenses
  - Spread subsets of "licenses owned" across environment profiles

PureApplication System provides built-in capabilities for license tracking and reporting. The PureApplication System allows you to track license usage, generate audit reports, and enforce placement decisions based on license availability. Having knowledge of how you are consuming product licenses can help you understand how many licenses you need to purchase to make the most use of your cloud. Using license tracking can also help you to keep from inadvertently going over your license entitlement. Using the environment profiles, you can spread subsets of licenses of your own across environment profiles.

The IBM License Metric Tool is made up of a centralized server that gathers software usage information from specialized agents. When license tracking with the License Metric Tool is enabled, PureApplication System includes the IBM License Metric Tool agent in new deployed virtual machines. These agents report license consumption information back to the License Metric Tool server. With the exception of subcapacity license usage, the IBM License Metric Tool server tracks license usage information in its central database and generates audit reports to meet IBM's license tracking requirements.

References

- IBM License Metric Tool
  http://www.ibm.com/software/tivoli/products/license-metric-tool/
- IBM software catalog
  – ftp://ftp.software.ibm.com/software/tivoli_support/misc/CandO/TivoliCatalog/ibm/SwKBT/
- PVU table
  http://www.ibm.com/software/lotus/passportadvantage/pvu_licensing_for_customers.html
- Virtualization capacity license counting rules

http://www.ibm.com/software/lotus/passportadvantage/Counting_Software_licenses_using_specific_virtualization_technologies.html

This page provides links to additional license-related resources.

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