

IBM Rational Development and Test Environment for
System z

Activation Guide



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Note

Before using this information, be sure to read the general information under “Documentation notices for IBM Rational Development and Test Environment for System z” on page 37.

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This edition applies to IBM Rational Development and Test Environment for System z Version 9.1.0 (program number 5725-G39) and to all subsequent releases and modifications until otherwise indicated in new editions.

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Who should read this document

This document is intended to be a guide for people who are planning to obtain, renew, and install license activations that are required to run Rational® Development and Test Environment for System z®.

Start with the *IBM Rational Development and Test Environment for System z Installation and Sample Configuration Guide (SC14-7281)* and use this document when you reach the point of obtaining and activating the USB hardware device. After you finish using this document, return to "Installing the z/OS® volume images" in the *IBM Rational Development and Test Environment for System z Installation and Sample Configuration Guide (SC14-7281)* to continue setting up your product instance.

Rational Development and Test Environment for System z is sold under different license entitlements. In general, the procedures for activating the product are similar for all of the entitlements offered. Where there are differences, this document highlights what you need to know for the type of entitlement you purchased.

This document does not describe the available entitlements for Development and Test Environment nor does it describe the terms under which the product can be used. For terms, refer to the license documentation that ships with the product you purchased and to the associated announcement letter.

This guide includes descriptions of technical processes, websites, and procedures that are used to obtain, install, renew, and return license activations. The processes that are described are accurate at the time of this writing. However, all of the processes involve systems and technologies that are subject to change after the publication of this document. For the latest information, see the Rational System z Development and Testing Hub (<http://ibm.co/rationalsystemzdevtest>) at IBM's DeveloperWorks and the Rational Development and Test Environment for System z documentation.

The product documentation is located in the documentation directory on the *IBM Rational Development and Test Environment for System z Quick Start* Disc that is included with the IBM® Rational Development and Test Environment for System z product.

For the most up-to-date versions of the complete documentation, see the IBM Rational Development and Test Environment for System z library page (<http://www-01.ibm.com/support/docview.wss?uid=swg27038434>).

Terminology considerations

The words “license” and “token” have more than one meaning depending on the context in which they are used.

You can encounter at least four different associated meanings for the word “license” as you work with Rational Development and Test Environment for System z:

1. The word “license” can mean the product entitlement that you purchased and the corresponding terms and conditions under which use is allowed.
2. The same word “license” can also refer to a technical indicator on the USB hardware device that is used to activate the hardware device and allow an emulated System z instance to operate. The zPDT[®] Redbooks[®] and System z emulator messages use the words “license” and “licenses” in reference to these indicators stored on the hardware device. There is a “remote license server” that you can optionally use with the offering that derives its name from this particular usage of the word.
3. The Rational License Key Center uses the word “license” and “licenses” in reference to a quantity of product entitlement parts purchased.
4. The file that is generated in the Rational License Key Center that is applied to the USB hardware device to enable Rational Development and Test Environment for System z operation can be construed in the website user interface as a generated “license” file.

In an attempt to clarify the use of the term in the context that is intended, this guide uses the following phrases:

- The phrase “**product entitlement**” refers to the terms and conditions under which the product can be run by the licensee.
- The phrase “**license entitlement**” is used when referencing the Rational License Key Center interface and the quantity of entitlement parts purchased
- The phrase “**USB hardware device activation**” or “**activation**” refers to the condition of the hardware device and its readiness for operation with the emulator
- The phrase “**update file**” refers to the specific file that is generated in the Rational License Key Center and applied to the USB hardware device to activate it.

You can encounter at least two different associated meanings for the phrase “license server” as you work with Rational Development and Test Environment for System z:

1. The phrase “license server” can mean the remote server set up to distribute authentication from a single high capacity USB hardware device to remote instances of the product as an alternative to having discrete USB hardware devices attached to each computer hosting one or more instances of the product.
2. The same phrase “license server” can mean the Rational License Key Server that is used to share license entitlements among several Rational products.

To clarify the context that is intended, this guide uses the following phrases

- The phrase “product license server” refers to the remote Rational Development and Test Environment for System z license server.
- The phrase “Rational License Key Server” refers to the license server used exclusively to share Rational Token license entitlements among a set of Rational products.

You can encounter at least two different associated meanings for the word “token” as you work with Rational Development and Test Environment for System z:

1. The word “token” can mean the USB hardware device that is required by Rational Development and Test Environment for System z. The zPDT Redbooks and System z emulator messages use the words “token” and “tokens” in reference to these hardware devices. In such places, you can find further reference to the 1091 token intended for use with the Rational Development and Test Environment for System z offering.
2. The same word “token” can mean a type of IBM Rational product entitlement that allows great flexibility in the deployment and use of associated, purchased products.

To clarify the context that is intended, this guide uses the following phrases

- The phrase “**USB hardware device**” refers to the hardware part.
- The phrase “**Rational Token**” refers to IBM Rational Token licensing.

In this guide, the word “instance” is used to refer to a single installation of Rational Development and Test Environment for System z on a physical or virtual machine.

Rational Development and Test Environment for System z can be purchased with several different product entitlements. The various types of entitlements allow you to use the product in specific ways.

For details on the product entitlement you purchased, see the documentation that is provided with your copy of the offering or refer to the Product License available at the IBM Software License Agreement website (<http://www-03.ibm.com/software/sla/sladb.nsf>).

The Product License can be found by searching the site for the product name.

Rational Developer for System z Unit Test

Rational Development and Test Environment for System z

An overview of the activation process

Rational Development and Test Environment for System z requires a USB Hardware Device containing a license key that controls the licensee's access to all or portions of the program. The licensee is not authorized to use Rational Development and Test Environment for System z or any of its components except when that key is made available to the program. The key is made available to the program by first obtaining a license key file providing proof of license entitlement from the Rational License Key Center. That file, called an update file, must then be applied to the USB Hardware Device to activate it and allow the licensee to use Rational Development and Test Environment for System z. The update file is specific to a customer account. The update file only works with a single hardware device, which is identified by its unique serial number. The USB hardware device is either installed on the machine hosting the offering or it is installed on a remote product license server that communicates over the network to one or more instances of the offering.

A single high capacity USB hardware device can authenticate many instances of Rational Development and Test Environment for System z. The number of instances that can be authenticated varies based on the number of emulated Central Processors or CPs used in each instance.

When an instance of the offering starts, it seeks an activation for the number of CPs specified in the emulator's device mapping file. When an instance of the emulator is stopped, the CPs authenticated by the USB hardware device become available for another instance.

If you purchase entitlement to Rational Development and Test Environment for System z using Rational Tokens, the offering can also communicate with a Rational License Key Server to share license entitlements among several Rational products. The license entitlements are tracked by temporary use of a given number of Rational Tokens. For information on setting up and using the Rational License Key Server, see the associated documentation available on the offering's installation discs.

Note: Both the USB hardware device and the Rational License Key Server are required for the product to operate with Rational Tokens. Implementing a product license server is recommended when Rational Tokens are used. For more information on using Rational Tokens, see Appendix D, "Rational Tokens," on page 31.

The process for activating the product is similar for all versions of Rational Development and Test Environment for System z. For detailed installation and configuration instructions, see the *IBM Rational Development and Test Environment for System z Installation and Sample Configuration Guide (SC14-7281)*.

1. Purchase the Rational Development and Test Environment for System z offering and license metric that best suits your needs.
2. Obtain one or more USB hardware devices by ordering the appropriate media pack through Passport Advantage®.

Note: USB hardware devices are not tied to a particular release of the offering. If you have a USB hardware device from a different release, renew the activation to obtain the update zip file needed to install the z/OS 2.1 distribution.

3. Obtain an update file to activate the USB hardware device from the Rational License Key Center. If you purchased entitlement using Rational Tokens, you must set up the Rational License Key Server and obtain the corresponding license from the Rational License Key Center.
4. Optionally, you can set up a product license server
 - a. Install Rational Development and Test Environment for System z on the license server.
 - b. Connect the USB hardware device to the license server.
 - c. Apply the update file to the USB hardware device attached to the license server.
 - d. Start the product license server.
5. Install Rational Development and Test Environment for System z on computers that meet the System Requirements.
6. Configure each computer that is hosting the offering to use the product license server you set up earlier or separately connect an activated USB hardware device to each computer
7. If you are not using a product license server, apply the corresponding update file to the locally attached USB hardware device of each computer that is hosting the offering.
8. On the computers that run the emulator, create the device maps used to define your emulated systems
 - a. If you purchased entitlement to Rational Development and Test Environment for System z with Parallel Sysplex[®], include a line to enable the coupling facility.
 - b. If you purchased entitlement using Rational Tokens, include a line to identify the Rational License Key Server to be used.
9. To install z/OS on the emulator, follow the instructions in "Installing the z/OS volume images" section of the *IBM Rational Development and Test Environment for System z Installation and Sample Configuration Guide (SC14-7281)*.

You can now use the emulator.

The USB hardware device

Rational Development and Test Environment for System z always requires access to an activated USB hardware device. The USB hardware device is ordered through Passport Advantage in a media pack that is separate from the DVD media packs or electronic media packs that contain the offering software. It can be connected directly to the USB port on a computer that is hosting the offering or it can be plugged into the USB port of a separate computer on a TCP/IP network that acts as a product license server.

State of the hardware device

The USB hardware device is not activated by default. When activated, the device allows Rational Development and Test Environment for System z to run one or more emulated central processors, referred to as Central Processors or CPs. Most instances of Rational Development and Test Environment for System z run 3 CPs. In some cases, the number of CPs in an instance can be more or less than 3.

Activations are placed on the USB hardware device by using a command to apply an update file to the hardware device. For instructions on obtaining update files and applying the files to your USB hardware devices, see sections “Obtaining an update file” on page 9 and “Activating the USB hardware device” on page 15.

Capacity of the hardware device

While every release of the offering included a USB Hardware device, the maximum number of CPs that can be activated by a single device varied over time. The two variations issued are high capacity devices and low capacity devices.

High capacity devices

High capacity USB hardware devices can activate up to 100 CPs. These parts have a green label. Since an instance is usually 3 CPs, a high capacity device can typically enable up to 33 product instances of the offering. High capacity devices became available for order with Rational Development Unit Test v8.0.3 and subsequent releases. As of IBM Rational Development and Test Environment for System z v8.5, only high capacity devices are packaged with the offering.

Low capacity devices

Low Capacity USB hardware devices can activate up to three CPs. These devices have a blue label. As of IBM Rational Development and Test Environment for System z v8.5, low capacity devices are no longer available for order.

If you are using a low capacity USB hardware device, you can successfully apply an update file that activates more than 3 CPs. However, you can use only three CPs due to the device limit. These hardware devices are intended for direct installation on the computer that hosts the offering. Only one instance of the offering is expected to run on the hosting machine.

Serial number of the USB hardware device

Each USB hardware device has a unique serial number that is required during the activation process. To locate the serial number of a key, turn the key to the side opposite the colored label. You see three rows of numbers. The lowest or bottom row of numbers is the serial number. The serial number is always of the form 03-xxxxx or 02-xxxxx where xxxxx is five hexadecimal digits.



Figure 1. USB hardware device

In Figure 1, the entire serial number is 02-00222.

Expiration dates

USB hardware device activations expire after one year from the date they were generated or less if entitlement is from a term license that expires in less than a year. If your purchase entitles you to use the product for more than one year, you need to renew the USB hardware device activation each year. Renewal activates the USB hardware device for a subsequent year or until the end of the fixed term if less than a year as applicable.

You can check the expiration date of an activation by using the token command. You can run the token command only while the emulator is running, and you must run the command from the same user ID that started the emulator. For information on receiving automated expiration notifications, see Appendix E, “Expiration notification example,” on page 33

Capability configuration of the USB hardware device

Based on details in the update file applied to the USB hardware device, the device is configured to make Rational Development and Test Environment for System z capable of operating within one and only one of the following parameters:

1. Parallel Sysplex® support is not enabled and there is no requirement to use Rational Tokens.
2. Parallel Sysplex support is enabled and there is no requirement to use Rational Tokens.
3. Parallel Sysplex support is not enabled and Rational Tokens are required.
4. Parallel Sysplex support is enabled and Rational Tokens are required.

Although the hardware device itself permits the application of more than one update file, it is best to avoid mixing Sysplex and Non-Sysplex update files on the same USB hardware device. Mixing the update files can make it difficult to manage and track the deployment of license entitlements as well as potentially separate expiration dates for each update file applied to the device. Because of these concerns, the Rational License Key Center does not allow you to generate multiple update files for the same USB hardware device.

Parallel Sysplex Activations

Some entitlements of Rational Development and Test Environment for System z enable emulation of the Coupling Facility under z/VM[®] while others do not. Entitlements that enable the coupling facility are referred to in Rational Development and Test Environment for System z documentation as Sysplex activations.

Although a coupling facility is not related to an individual processor in real System z hardware, every CP in a Rational Development and Test Environment for System z instance requires a corresponding Sysplex CP activation to enable the coupling facility for the instance.

Similarly, instances that do not enable the coupling facility require non-Sysplex CP activations for every CP in the instance. The update file that you receive to activate your USB hardware device is based on the type of license you purchased. With non-Sysplex CP activations, you can create instances that use up to 3 CPs. With Sysplex CP activations, you can create instances that use up to 8 CPs.

Rational Token Activations

USB activations that are specific to Rational Tokens must be used when Rational Token licensing is implemented. The emulator uses the USB hardware device activation stored on the USB hardware device to determine whether Rational Tokens are required.

Attention: When you are using multiple USB hardware devices, especially in a product license server, you must not mix activations that require Rational Tokens with activations that are not intended for Rational Tokens.

If the emulator receives inconsistent USB activations, your environment might be out of compliance with your licensing terms or you might be unable to access some of the CPs to which you are entitled.

Rational Development and Test Environment for System z usage can be governed by Rational Tokens. When you use Rational Tokens, the emulator coordinates with a Rational License Key Server instance and starts or continues to run only if sufficient Rational Tokens are available.

Use of Rational Tokens does not replace the USB hardware device. A USB hardware device that is activated with a valid update file is still required.

When Rational Development and Test Environment for System z is started, the emulator verifies that a valid USB hardware device activation is found and enough Rational Tokens are available from the Rational License Key Server to run the emulator. Rational Tokens control product operation as long as a sufficient number of CPs are available from the USB hardware device or devices used. Each high capacity USB hardware device activated for use with Rational Tokens has a limit of 100 CPs. If you need to serve more than 100 CPs across all product instances, you can obtain additional high capacity USB hardware devices and activate them for use with Rational Tokens. The Rational License Key Center allows you to generate as many additional update files as needed to activate such additional USB hardware devices. Multiple USB hardware devices may be attached to the product license server.

Both the activated USB hardware device and the Rational Tokens must be available to the emulator while the emulator is running. The emulator suspends operation if either becomes unavailable.

Obtaining an update file

To activate a USB hardware device and enable the Rational Development and Test Environment for System z to run, you must first obtain a unique "update file" for each USB hardware device you will be using. Updates to the processes are published on the IBM Development and Test Environment Hub on developerWorks® (<http://ibm.co/rationalsystemzdevtest>).

Important: The method for obtaining update files for the Rational Development and Test Environment for System z USB hardware device is different than the method described in the Redbooks.

Most update files are now distributed as part of an archive with a file extension of .zip. These files are obtained through the Rational License Key Center. The *.upw file that used to be delivered alone to update the USB hardware device for all entitlements is now in the zip file along with other files necessary for version 9.1.0 and later releases of the offering. If you are using earlier releases of the offering and receive a zip file, you can unzip the zip file and continue to use the *.upw file alone with your USB hardware device just as you have in the past. Offering releases before version 9.1.0 do not require any other content in the zip file.

To obtain an update file the first time, log in to the Rational License Key Center at <https://licensing.subscribenet.com/control/ibmr/login>, select your account and use the **Get Keys** screen to select the order for which you want to generate and download an update file.

If you want to use a previously activated USB hardware device to install Rational Development and Test Environment for System z v9.1 and the z/OS 2.1 distribution, you need to renew the update file to obtain a replacement in the new zip file format. To renew an update file, log in to the Rational License Key Center, select your account and use the **Return Keys** link to return the old update file. Then use the **Get Keys** link to generate a new one. The return function does not require that you provide the old update file. The return function tells the Rational License Key Center to allow you to regenerate a new update file. .

Before you sign in to the Rational License Key Center, locate the serial number of your USB hardware device. You have to know this number to generate an update file. To locate the serial number of a key, turn the key to the side opposite the colored label. There are three rows of numbers etched on the device. The lowest or bottom row of numbers is the serial number. The serial number is always of the form 03-xxxxx or 02-xxxxx where xxxxx is five hexadecimal digits.



Figure 2. USB hardware device

In Figure 2 on page 9, the entire serial number is **02-00222**.

If you are unable to read the etched serial number from the USB hardware device contact IBM support. They ask for a “request file” created by the SecureUpdateUtility or the Z1091_token_update command with the -r switch. From this request file, IBM can determine the serial number of the USB hardware device.

Note: The Rational License Key Center now requires the entire serial number of the USB Hardware Device, not just the last (5) digits. For example, 03-00123.

If you are going to apply an update file that enables the coupling facility, see Appendix C, “Enabling the coupling facility,” on page 29.

Getting the update file from the Rational License Key Center

The following section describes the process for using the Rational License Key Center to obtain update files. If your installation is using Rational Tokens to govern entitlement to Rational Development and Test Environment for System z, see “Obtaining update files for Rational Tokens” on page 12.

Steps to get the initial file

Use the following steps to obtain an update file from the Rational License Key Center.

1. Log in to the Rational License Key Center at <https://licensing.subscribenet.com/control/ibmr/login> and select your account.
2. On the left side of the screen, select **Get Keys**
3. Select the product line for Rational Development and Test Environment for System z. You see a list of license key names that show the Rational Development and Test Environment for System z licenses that are available.
4. Select the Rational Development and Test Environment for System z license type that you want to apply to the key.
5. You see one or more boxes that show the separate orders that you can apply to one or more USB hardware devices.

Important: For some license entitlements, you can combine multiple orders on a single USB hardware device or spread the licenses across multiple USB hardware devices. Regardless of how many Rational Test and Development Environment for System z instances you deploy for your licensed users, you must make sure you maintain proper entitlement for the number of end users accessing each instance of the product. License entitlements based on Resource Value Units (RVUs) do not limit the number for end users accessing the offering. All other types of License entitlements require at least one product entitlement for each end user accessing the product.

6. Check the box next to all of the orders from which you would like to use licenses and click **Next**.
7. A screen is displayed showing a table that you must complete with the USB hardware device serial numbers you want to activate. Depending on the license entitlement selected, you might also be asked for the number of instances, the number of licenses to associate with each USB hardware device, and the number of Emulated Central Processors you intend to use for the specific USB Hardware Device activation.

You can enter information for more than one USB hardware device. A separate update file is generated for each key specified. You can download the generated update files either during this process or from the **View keys by host** screen.

More help is available by clicking the column headings in the table, but briefly stated:

- a. The **Serial Number of USB Hardware Key** field is where you specify the full eight character serial number that is etched on the last line of the USB hardware device. It has a format of 02-xxxxx or 03-xxxxx where xxxxx is five hexadecimal digits. The two-digit prefix and the dash must be included when you specify the serial number.
 - b. The **Number of Server Instances** field refers to the number of separate emulated systems you plan to enable with each USB hardware device. The number of central processors (CPs) that is available is automatically calculated for you. For some older entitlements, this value is forced to one.
 - c. The **Number of Licenses** field is applicable to some offering entitlements. Where applicable, each user accessing a separate instance of a virtual System z machine requires a separate license. Individual users are licensed to a specific instance of a virtualized System z. The total number of licenses for all serial numbers must not exceed the number of licenses to which you are entitled. For example, if you are entitled to five Authorized User licenses, you might enable 2 instances, and 5 licenses so that one workstation can be used by two people and another workstation can be used three people. Designating the number of licenses that are associated with a USB hardware device ensures that you are tracking the number of entitlements used.
 - d. The **Emulated Central Processor** field is applicable only to entitlements metered as Resource Value Units (RVUs). For this entitlement, each emulated central processor within an instance of a virtual System z machine requires a separate RVU entitlement. For each serial number, you should enter the total number of emulated central processors that you intend to enable with that specific USB hardware device. The total number of emulated CPs for all serial numbers must not exceed your total number of RVU entitlements.
8. After you indicate how you want to distribute license entitlements across USB hardware devices, select **Generate** at the bottom of the page and you are presented with a screen where you can download the update files.
 9. Click **Download** for each update file generated to save the update files. If you need to download the update files in the future, use the **View Keys by Host** link on the left side of the Rational License Key Center web page.

Note: You cannot generate separate activations for the same USB hardware device at the same time. Before you generate update files for a given USB hardware device that you wish to reuse, be sure to return the update file that was previously created for that device. Returning license entitlements that are assigned to the USB hardware device also makes the corresponding active entitlements available for assignment to a USB hardware device again.

Steps to get the replacement file

For perpetual license entitlements, USB hardware device activations are set to expire one year from the date an update file is generated. For this type of entitlement, you can return previously generated update files at any time and generate a new update file.

For term license entitlements, if term expiration occurs in more than one year, USB hardware device activations are set to expire one year from the date an update file is generated. Update files can be returned and generated again before term expiration. If term expiration occurs in less than one year, USB hardware device activations are set to expire at term end. After term end, update files cannot be generated in the Rational License Key Center.

To generate a new update file, you must first return the existing license entitlement in the Rational License Key Center, and then generate a new update file. Returning the license entitlements is a process of telling the Rational License Key Center that you are no longer using the license entitlements that you previously assigned to your USB hardware device. You do *not* need to return the physical update file to the Rational License Key Center.

There are several ways to return a license entitlement in the Rational License Key Center. The easiest method is to use the **View Keys by Host** link. You can also use the **Return Keys** link.

For Rational Development and Test Environment for System z the term **host** in the Rational License Key Center refers to the USB hardware device that is uniquely identified by its serial number.

1. Log in to Rational License Key Center at <https://licensing.subscribenet.com/control/ibmr/login> and select your account.
2. On the left side of the screen, select **View Keys by Host**.
3. Select the serial number of the USB hardware device you want to work with. This serial number is in the **Host** column.
4. A table is displayed with data for the USB hardware device selected. At the far right of the table, click the **Change** link.
5. You see a list of devices with license entitlements that are assigned to them from the same Order Line. Locate the serial number of the USB hardware device you are working with and click **Return**. A message is displayed to confirm that the license entitlements have been successfully returned.
6. Use the **Get Keys** link on the left side of the page to generate a new license. For detailed instruction on generating new licenses, see “Steps to get the initial file” on page 10

Obtaining update files for Rational Tokens

The following section shows the process for using the Rational License Key Center to obtain update files if your installation is using Rational Tokens to govern entitlement to Rational Development and Test Environment for System z.

Use of Rational Token licensing requires purchase of Rational Tokens. After the Rational Tokens are purchased, follow these instructions for obtaining Rational Token license files and update files for your USB hardware devices.

Steps to get the initial update file and Rational Token license

Use the following steps to get an update file for your USB hardware device and a Rational token license file from the Rational License Key Center.

1. Log in to the Rational License Key Center at <https://licensing.subscribenet.com/control/ibmr/login> and select your account.
2. On the left side of the screen, click **Get Keys**

3. Select a product line that contains your Rational Token orders with Rational Development and Test Environment for System z.
4. On the "Select License Keys" screen, you see one or more boxes for orders. Find the order that includes Rational Development and Test Environment for System z. Make a note of the part number for the Development and Test Environment product you want to activate. Select the order that contains the parts you noted and click **Next**.
5. Enter the required information to create the Rational Token license file for your host. Additional information for each field is available by clicking the descriptive link next to the input field. Fields with a red star are required fields.
6. Click **Generate** to generate the Rational Token license file. You are presented with a screen with the generated license information.
7. Click **Download License Keys** to download the Rational Token license file to your computer. This token license file is the file that is applied to your Rational License Key Server. It is named `license.dat` by default.
8. On the same screen, press **Generate Token License Keys for USB Hardware Device** to generate and download the update file for your USB hardware device.
9. A **Required Information** screen is displayed showing a table that you must complete with the USB hardware device serial numbers and associated Development and Test Environment product you want to activate with each device.

You can enter information for more than one USB hardware device. A separate update file is generated for each key and can be downloaded either during this process or at some time in the future from the **View keys by host** screen.

The serial number is the full eight character serial number that is etched on the last line of the USB hardware device. It has a format of 02-xxxxx or 03-xxxxx where xxxxx is five hexadecimal digits. The two-digit prefix and the dash must be included when you specify the serial number.

The Catalog Item select list allows you to confirm the part you want to use to generate an update file. This is important if you have entitlement to both Rational Development and Test Environment for System z and Rational Development and Test Environment for System z with Parallel Sysplex. You cannot combine Token and Sysplex Token activations on a single USB hardware device. From the drop-down list available, select the entitlement part number that corresponds to the activation you want on the specified USB hardware device.

10. After you indicate how you want to distribute licenses across USB hardware devices, click **Generate** at the bottom of the screen and you will be presented with a screen where you can download the update files.
11. Click **Download** for each update file to save the update files. If you need to download the update files at some time in the future, use the **View Keys by Host** link on the left side of the page.

Note: You cannot generate separate activations for the same USB hardware device at the same time. Before you generate update files for a given USB hardware device that you want to reuse, be sure to return the update file that was previously created for that device. Returning license entitlements that are assigned to the USB hardware device also makes the corresponding active entitlements available for assignment to a USB hardware device again.

Steps to get a replacement update file and Rational Token license

To return and regenerate your update file and existing Rational Token license files, use the **Return Keys** function in the Rational License Key Center. This is the process you use to renew the USB hardware device activation for another year.

Use the following steps:

1. Go to the Rational License Key Center at <https://licensing.subscribenet.com/control/ibmr/login> to return the existing USB hardware device update file. For more information about returning update files, see “Steps to get the replacement file” on page 11.
2. After you return the update file, click **Get Keys** on the left side of the screen.
3. Click the product line for IBM Rational Tokens.
4. You see a screen titled **Select license keys**. Keys that include Rational Development and Test Environment for System z have a link to generate update files for USB hardware devices.

Click the link titled **Generate Token License Keys for USB Hardware Device** and complete the form to generate and download the new update file.

Activating the USB hardware device

Applying the update file you obtained from the Rational License Key Center to your USB hardware device activates the device. Each time you apply an update file, it overwrites the previous activation on the USB hardware device. To change the activation of a USB hardware device, you must obtain and apply a new update file that activates the total number of license entitlements you intend to use on that device. Changing the activation of a USB hardware device involves returning and regenerating licenses in the Rational License Key Center.

The process for applying update files to USB hardware devices recently changed. For instructions on applying update files to USB hardware devices for Rational Development and Test Environment for System z version 9.1 or later, see “Steps to activate a USB hardware device for version 9.1 or later”

For instructions on applying update files to USB hardware devices for Rational Development and Test Environment for System z version 9.0 or earlier, see “Steps to activate a USB hardware device for version 9.0 or earlier” on page 17

Steps to activate a USB hardware device for version 9.1 or later

Before you insert the USB hardware device into a computer's USB port, verify that the computer's clock is set correctly. If your computer is new or recently repaired, ensure that the clock is correct before you insert the USB hardware device.

Note: Never set the system clock to a future date or time when the USB hardware device is plugged in or you will damage the hardware device.

Note: Verify that the Linux system clock is correct. If the USB hardware device is attached to a computer with a clock set to a future date, the device remembers the future date, will become inoperable when the clock is restored to the current time, and will remain inoperable until the computer's clock again reaches that future date. If Development and Test Environment is unable to authenticate with the USB hardware device because the clock was set to a future time or date, you receive a message that indicates a "time cheat" state.

IBM recommends setting your system clock to Coordinated Universal Time (UTC) to avoid errors that are caused by semi-annual time changes (for example, Daylight Savings Time).

The update file that you obtain from the Rational License Key Center is an archive file with the extension .zip. With Rational Development and Test Environment for System z version 9.1 or later, you do not need to extract the contents of the archive.

In Rational Development and Test Environment for System z 9.1, the `Z1091_token_update` command replaces the `SecureUpdateUtility` command that is used in previous releases.

To activate your USB hardware device, connect it to a computer that has Rational Development and Test Environment for System z version 9.1 installed and run the `Z1091_token_update` command. The step by step procedure to activate your USB hardware device is as follows:

1. Connect the USB hardware device to the computer that is running Rational Development and Test Environment for System z.

Note: Update files are written for specific USB hardware devices, so it is acceptable to have more than one USB hardware device attached to the computer during this process.

2. Use a browser on your Linux system to download the update file directly from the Rational License Key Center or use whatever method is available to copy your update file to that computer (for example, FTP, SFTP, or an external hard disk).

Note: Be sure to use the binary transfer mode and not a text mode such as ASCII.

3. Log in to the computer and, if you are not running as root, enter su followed by the root password.
4. Change to the /usr/z1090/bin directory

```
cd /usr/z1090/bin
```

5. Run the `./Z1091_token_update -u update-file.zip` command where `update-file.zip` is the full path and file name of the update file. This command produces several messages but should indicate that the update was successful.
6. After the update is successfully applied, unplug the USB hardware key. Wait at least 10 seconds and then reconnect the hardware key. It is now ready for routine zPDT operation.
7. To ensure that the system sees the newly applied licenses, from root, restart the local product license server: `/opt/safenet_sentinel/common_files/sentinel_keys_server/loadserv restart`
8. Optionally, you can verify that licenses are now available on your USB hardware device by using the command:

```
./Z1091_token_update -status
```

Stand-alone .upw update files

Before IBM started to distribute compressed file archives containing update files, stand alone update files with an extension of .upw were distributed. If you have an update file with an extension of .upw, you can use the `Z1090_token_update` command to apply the update file to your USB hardware device. The activated hardware device will still allow the emulator to run. However, you will not be able to install the z/OS 2.1 distribution with this kind of activation.

USB hardware device and Sysplex activation

When you are using the `Z1091_token_update` command to apply an update file for Parallel Sysplex operation provided in compressed file format, it is no longer necessary to apply the `RDT_SP.NLF` file to prepare the USB hardware device. That step is done automatically by the `Z1091_token_update` command.

For instructions on enabling the coupling facility after you have an activated USB hardware device, see Appendix C, “Enabling the coupling facility,” on page 29.

Steps to activate a USB hardware device for version 9.0 or earlier

Before you insert the USB hardware device into a computer's USB port, verify that the computer's clock is set correctly. If your computer is new or recently repaired, ensure that the clock is correct before you insert the USB hardware device.

Note: Never set the system clock to a future date or time when the USB hardware device is plugged in or you will damage the USB hardware device.

Note: If the USB hardware device is attached to a computer with a clock set to a future date, the device remembers that future date, will become inoperable when the clock is restored to the current time, and will remain inoperable until the computer's clock reaches that future date. If Rational Development and Test Environment for System z is unable to authenticate with the USB hardware device because the clock was set to a previous time or date, you receive a message that indicates a "time cheat" state.

If the update file you obtain from the Rational License Key Center is an archive file with the extension .zip, you need to extract the contents of the archive to a temporary directory during the process that is described here to get the *.upw file needed for Rational Development and Test Environment for System z version 9.0 or earlier releases.

If you have an older update file that has an extension of .upw, you can use that file with the SecureUpdateUtility as described in steps 4, steps 5 and steps 7 below.

If you follow the method described below, your USB hardware device might not be able to install the z/OS 2.1 volumes as described in the *IBM Rational Development and Test Environment for System z Installation and Sample Configuration Guide* (SC14-7281). This is true if the hardware key has never been activated for Rational Development and Test Environment for System z v9.1.0 or later.

Read the entire set of instructions before you start activating your USB hardware device. In summary, you connect the device to a computer that has Rational Development and Test Environment for System z or Rational Developer for System z Unit Test installed. Extract the contents of your update compressed file and run the SecureUpdateUtility command against the *.upw file that was extracted from the zip file. The entire procedure is described here:

1. Connect the USB hardware device to the computer that is running Rational Development and Test Environment for System z.

Note: Update files are written for specific USB hardware devices, so it is acceptable to have more than one USB hardware device attached to the computer during this process.

2. Use a browser on your Linux computer to download the update file directly from the Rational License Key Center or use whatever method is available (for example, FTP, SFTP, or an external hard disk) to copy your update file to that computer.

Note: Be sure to use the binary transfer mode and not a text mode such as ASCII.

3. Log in to the computer, create a new, temporary directory and extract the contents of your update file to that directory. For example:

```
mkdir /tmp/myupdatedir
cd /tmp/myupdatedir
```

```
unzip update-file.zip ls
```

You see a list of file names. Note the name of the file that ends in .upw. The upw file has a name similar to RDT-xxxxx-yyyyymmddhmm-Lcc.upw or RDT-xxxxx-yyyyymmddhmm-Lcc.-Sysplex.upw where:

xxxxx Is your device's serial number

yyyyymmddhmm

Is the expiration date of the activation

cc Is the number of licensed CPs in hexadecimal format

4. If you are not running as root, enter su followed by the root password.
5. Change to the /usr/z1090/bin directory

```
cd /usr/z1090/bin
```

6. If you are applying an update file for Parallel Sysplex, run the SecureUpdateUtility command with the n switch and the full path of the adcd.NLF file: For example (all on one line),

```
./SecureUpdateUtility n /tmp/myupdatedir/adcd.NLF
```

This command produces several messages but indicates that the update was successful or that the license exists, meaning the update file has already been applied. You need to run this command only one time for a USB hardware device.

Note: Running this command each time you apply an update file does not cause problems.

7. Run the ./SecureUpdateUtility u *update-file.upw* command where update-file.upw is the full path and file name of the update file. For example (all on one line),

```
./SecureUpdateUtility u /tmp/myupdatedir/RDT-00DF0-201502152359-L03-Sysplex.upw
```

This command produces several messages but indicates that the update was successful.

8. To ensure that the system sees newly applied licenses, run the following command to restart the local product license server:

```
/opt/safenet_sentinel/common_files/sentinel_keys_server/loadserv restart
```

For answers to common errors related to USB hardware device activation, see Appendix B, "Troubleshooting USB hardware device activation," on page 25.

Stand-alone .upw update files.

IBM recently changed the way that it distributes update files. Update files are now distributed as compressed file archives that contain, among other things, update files with the upw extension. Previously, IBM distributed just the update file. You can still use the SecureUpdateUtility command with the stand-alone update files that have the .upw extension.

Preparing the USB hardware device for Sysplex activation

If you follow the steps to apply the adcd.NLF file, your USB hardware device accepts Sysplex activation. If you have only an update file with a .upw extension, and you do not have the adcd.NLF file, you can either obtain a new compressed file

update file by logging in to the Rational License Key Center, or you can apply the file that is named RDT_SP.NLF that was installed in the directory you specified during the installation of Rational Development and Test Environment for System z. If you do not know the installation location, you can locate the RDT_SP.NLF file on your system by running the command:

```
find / -name RDT_SP.NLF 2>/dev/null
```

For example, if the find command returns the location /opt/IBM/Rational Development and Test Environment for System z/RDT_SP.NLF, then prepare your USB hardware device by using the following command:

```
./SecureUpdateUtility n "/opt/IBM/Development and Test Environment/RDT_SP.NLF"
```

This is a single command, even if it appears as multiple lines in some formats of this documentation. Double quotation marks are used in this example because the file name contains spaces.

For instructions on enabling Parallel Sysplex operation after you have activated your USB hardware device, see Appendix C, “Enabling the coupling facility,” on page 29.

Next steps

If you have worked through the previous sections of this document, you now have one or more activated USB hardware devices that are ready to enable operation of one or more instances of IBM Rational Development and Test Environment for System z. The next steps you should follow to use the offering are found in section "Installing the z/OS volume images" in the *IBM Rational Development and Test Environment for System z Installation and Sample Configuration Guide (SC14-7281)*.

Appendix A. Quick setup instructions for using the product license server

Setting up the product license server

Configuring a product license server can be accomplished with the following steps:

1. Obtain the update files for the USB hardware devices you want to use with the product license server.
2. Install Rational Development and Test Environment for System z on the computer you want to function as the product license server. This computer can be a virtual machine.
3. Connect the USB hardware device to the product license server computer. If you are running the product license server in a virtual machine, be sure that the USB hardware device is routed to that virtual machine.
4. Activate the attached USB hardware device. This process is described in "Activating the USB hardware device" on page 15.
5. Log in to the computer as a non-root user and enter the `uimserverstart` command.

You might want to alter the server configuration to allow remote access to the browser-based configuration interface, to restrict access to specific hosts to enable logging, or to complete other tasks. For details on configuring product license servers and to familiarize yourself with the product license server, see the "License Server" chapter in the latest edition of the *zPDT Guide and Reference (SG24-8205)*.

Setting up computers to access the product license server

The computers that will authenticate from a product license server instead of a locally attached USB hardware device can be set up by running the `clientconfig` program as root. This process assumes that your product license server is using all of the default ports.

1. Log in to each computer that runs the emulator with authentication from a product license server.
2. Enter the following commands:

```
su    (enter root password when prompted)
cd /usr/z1090/bin
./clientconfig
```
3. You see a window that asks for the License ContactServer. Enter the full DNS name or IP address of the product license server.
4. Press **Enter** twice.

For details on configuring clients to the product license server, see the "License Server" chapter in the latest edition of the *zPDT Guide and Reference (SG24-8205)*.

Appendix B. Troubleshooting USB hardware device activation

Configuration and usage for Rational Development and Test Environment for System z is described in the *IBM Rational Development and Test Environment for System z Installation and Sample Configuration Guide (SC14-7281)* and the *zPDT Guide and Reference (SG24-8205)* Redbook that are included with the product. Copies of the Redbook are also available online at <http://www.redbooks.ibm.com/redbooks.nsf/searchsite?SearchView&query=zPDT> and the configuration guide is available on the product support page (<http://www-01.ibm.com/support/docview.wss?uid=swg27038434>).

If you experience difficulty with Rational Development and Test Environment for System z, you can find the following table helpful for problem determination. These instructions assume a working knowledge of the Linux command line environment.

Table 1. Problem determination

Issue	Problem determination
All errors	Before you start troubleshooting other problems, validate the installation by running the <code>z1090instcheck</code> command and fixing errors. Ignore errors that are related to <code>kernel.core_pattern</code> unless the emulator is ending abnormally.
Update file does not apply to USB hardware device	Ensure that the last 5 hexadecimal digits of the serial number that is etched on the USB hardware device match the serial number in the file name of the update file you are applying. Sometimes the etched number is hard to read. If you are unable to read the etched serial number, IBM support can assist you with an alternative method of obtaining the serial number. Ensure that the hardware device is recognized by your Linux system by plugging in the device and entering the <code>lsusb</code> command. If the device is available, you see an entry that shows "Rainbow Technologies Inc".

Table 1. Problem determination (continued)

Issue	Problem determination
License is unavailable when you are running awsstart.	Ensure that the USB key has a valid update file applied. The SecureUpdateUtility-u command or the Z1091_token_update -u command must respond with a Success message. Validate that you are requesting the correct type of license. If your device map includes the cpuoptyvm_couplingfacility directive, your USB hardware key must include a sysplex activation. If a sysplex activation is not available, your device map cannot enable sysplex operation. Similarly, if your device map includes the RDTSERVER= directive or you have an RDTSERVER your USB hardware key must have a Rational Token activation. If a Rational Token activation is not available on your USB hardware key, your Rational Development and Test Environment for System z instance cannot participate in a Rational Token licensing system. Verify that the system clock is correct on the system with the USB hardware device plugged in to it. Note: Never set the system clock to a future date or time when the USB hardware key is plugged in or you will damage the USB hardware key. Verify that you are directing your emulator client to the correct product license server or to the local computer as needed. You can direct your emulator client to the correct product license server or to the local computer by running the /usr/z1090/bin/clientconfig program as root and validating that the License ContactServer field points to either your product license server or localhost. Verify that /usr/z1090/bin/sntlconfig.xml is "world readable". If it is not, use chmod to change the permission bits to 644. If you are using a product license server, ensure that the server was started by a non-root id with the uimserverstart command. In some cases, it can be helpful to restart the license daemon where the USB key is plugged in. You can restart the license daemon (as root) with the command: <pre> /opt/safenet_sentinel/common_files /sentinel_keys_server/loadserv restart </pre> You can check to see whether all licenses on a product license server are already in use by pointing a Java™ 1.6 enabled web browser to (http://localhost:7002) on the system that is running the product license server.

Table 1. Problem determination (continued)

Issue	Problem determination
Time Cheat errors	Time cheat errors occur when the time stored on the USB hardware device is in the future compared to the system clock of the hosting Linux system. The USB device stores the latest date of the system clock it sees and does not provide licenses until the Linux system clock matches. Verify that the Linux system clock is correct. Set your system clock to Coordinated Universal Time (UTC) to avoid errors that are caused by semi-annual time changes. There is no way to inspect the time on the USB key. However, you can wait a short time to see whether the Linux clock catches up to the time stored on the USB key. Do NOT set the Linux clock ahead of the actual time. If you suspect that the time stored on the USB key is in the future, contact IBM support. They can analyze a request file that is obtained with the SecureUpdateUtility -r command or the Z1091_token_update -r command.

Appendix C. Enabling the coupling facility

Rational Development and Test Environment for System z can be used to enable a Sysplex environment that is running within z/VM. To run a Sysplex environment, you must purchase entitlement to Rational Development and Test Environment for System z with Parallel Sysplex, apply a Sysplex activation to your USB hardware device, and add a line to your device map.

If you purchased a Sysplex entitlement, you need to obtain an associated update file for your USB hardware device. The USB hardware device holds licenses for each processor in an instance. Sysplex activations are different from other activations. All processors in an instance require the same type of license activation. Therefore you cannot start a single instance based on a combination of Sysplex and other activations.

For instructions on obtaining update files, see [Obtaining an update file](#).

For instructions on activating your USB hardware device to enable the coupling facility, see [Activating the USB hardware device](#). If you are working with Rational Development and Test Environment for System z version 9.0 or earlier, follow the instructions to ensure that your USB hardware device is prepared to accept the Sysplex activation.

USB hardware device considerations when you use the coupling facility

You can mix multiple USB hardware devices on the same product license server, such as one with Sysplex and others with non-Sysplex activations. However, it is best to serve such activations from separate product license servers to control which product instances get Sysplex activations and which product instances get non-Sysplex activations.

Enabling the coupling facility in the device map

Configuration of each instance of Rational Development and Test Environment for System z is done through a file that is called a device map or devmap. The device map can be created manually or use the `create_devmap.pl` sample that is included with Rational Development and Test Environment for System z to create the device map semi-automatically.

To enable the use of the coupling facility, you must add one entry to your device map. In the `[system]` stanza, add the following line.

```
cpuopt zvm_couplingfacility
```

If you start a Rational Development and Test Environment for System z instance with `cpuopt zvm_couplingfacility` specified in the `[system]` stanza and are unable to obtain a license, your USB hardware device might not be activated to enable the coupling facility.

Any instance that is defined with `cpuopt zvm_couplingfacility` in the device map requires one coupling facility license from the USB hardware device for each CP in

the instance. If `cpuopt zvm_couplingfacility` is not specified in the device map, then a standard, non-coupling license activation is required from the USB hardware device.

Device maps that include the `cpuopt zvm_couplingfacility` definition can define up to eight processors in the `[system]` stanza. The number of processors cannot exceed the number of physical cores available on your system.

The coupling facility

The coupling facility feature is only available to z/OS when z/OS is running within virtual machines under z/VM. A disc shipped in addition to the z/OS distribution contains z/VM 6.2. Volumes from the main z/OS 2.1 distribution can then be added to create as many virtual z/OS systems as needed.

For instructions on configuring your system to use the coupling facility, see the *zPDT Guide and Reference (SG24-8205)* Redbook located on the *IBM Rational Development and Test Environment for System z Quick Start* CD.

A sample Parallel Sysplex configuration is available for download through Passport Advantage. This sample system, supplied on two DVDs, consists of a z/VM 6.2 system hosting two virtual coupling facilities and two z/OS 1.13 systems. For information on how to obtain this media pack through Passport Advantage, see *Rational Development and Test Environment for System z* e-assemblies to be downloaded from Passport Advantage.

Appendix D. Rational Tokens

Rational Token licensing is an entitlement you can purchase and use to run Rational Development and Test Environment for System z. With Rational Tokens, Rational Development and Test Environment for System z maintains a connection to a Rational License Key Server and starts and continues to run only when sufficient Rational Tokens are available.

Use of Rational Tokens does not replace the USB hardware device. A USB hardware device with a valid update file is still required. The update file applied to the USB hardware device indicates that Rational Tokens are required.

Use the same procedures that are documented in “Activating the USB hardware device” on page 15 to apply the update file to your USB hardware device.

Important: In a product license server configuration, do not mix USB hardware devices that require Rational Tokens with USB hardware devices that do not require Rational Tokens. This approach is not supported and can result in unpredictable behavior. For more information about Rational Tokens and activating the USB hardware device, see “Activating the USB hardware device” on page 15.

Pointing to a Rational License Key Server

The Rational License Key Server that is used to distribute Rational Tokens must be available through TCP/IP. It is likely that your installation already has such a server configured. Installation materials and documentation for the server are available on separate discs that are included with the Rational Development and Test Environment for System z offering.

When you are using Rational Tokens, an instance of Rational Development and Test Environment for System z must be able to locate the specific Rational License Key Server you intend to use with that instance. The port and location of the server is specified either in the Linux environment variable that is named `RDTSERVER` or in the device map. If both are specified, the device map setting is used.

To have Rational Development and Test Environment for System z retrieve Rational Tokens from port 27000 on a server at address `sampsrvr.yournetwork.com`, you can export the `RDTSERVER` environment variable in your `.bashrc` script. For example, if you run Rational Development and Test Environment for System z with ID `ibmsys1`, you would edit `/home/ibmsys1/.bashrc`, and add the line:

```
export RDTSERVER=27000@sampsrvr.yournetwork.com
```

Rational License Key Server configuration

Setting up the Rational License Key Server is beyond the scope of this document, but additional information can be found in the Rational License Key Server documentation provided in the Rational License Key Server media. If you need to use configuration files to specify extra Rational licensing configurations, you must specify the variable `RDTCNF` to point to a directory that contains the Rational configuration files. For example:

```
export RDTCONF=/etc/yourconffiles/
```

Troubleshooting connections with Rational License Key Servers

Activity that is associated with the use of Rational Tokens is logged for diagnostic purposes in the log directory `$HOME/z1090/logs` in files that start with the name `feutlicm`. Messages from a Rational License Key Server and diagnostic information can be found in these logs. These logs are intended for use by IBM service but might provide useful information for quick diagnosis of problems when Rational Tokens cannot be obtained. In some cases when Rational Tokens cannot be obtained, the messages that are issued by the Rational License Key Server are also written to the Linux console on which the `awsstart` command was entered. The `feutlicm` log can be viewed with the `less` command while Rational Development and Test Environment for System z is running.

Two environment variables can be used to help in troubleshooting connections to Rational License Key Servers and problems that occur when you are obtaining Rational Tokens.

Variable `RDTLOG=TTY`, if set before you start Rational Development and Test Environment for System z, routes all Rational Token-related logging to the Linux terminal in addition to the log.

Variable `RDTDEBUG=DEBUG`, if set before you start Rational Development and Test Environment for System z, adds more information to the logs. If `RDTLOG=TTY` is also set, these additional messages are also written to the Linux terminal.

Do not set `RDTLOG=TTY` in everyday use, because it sends frequent unsolicited messages to your Linux terminal. Setting `RDTDEBUG=DEBUG` in regular use has no negative side effects, other than slightly larger logs.

Rational Tokens are checked out and checked back in so that they will become available automatically after 30 minutes unless Rational Development and Test Environment for System z renews them before that time. Rational Development and Test Environment for System z renews tokens approximately every half hour.

When Rational Development and Test Environment for System z ends, tokens are returned immediately. However, it can take up to 2 minutes for those tokens to become available for use again. If network connectivity is lost to the Rational License Key Server, or if anything prevents a normal return, the Rational Tokens become available within 30 minutes.

To limit unnecessary log file growth, logging of successful interactions with the Rational License Key Server is suspended after about 30 successful token renewal cycles. Logging resumes if any errors are encountered.

Appendix E. Expiration notification example

USB hardware device activations last for up to one year. If you are entitled to use Rational Development and Test Environment for System z beyond that period, the USB hardware device must be reactivated by obtaining and applying a new update file. For more information on expiration dates, see “Expiration dates” on page 6.

The example below shows how you can set up a system to automatically send you an email each day when the expiration date for your current activation is approaching. The example is a bash shell script that is run on a Linux computer hosting an instance of Rational Development and Test Environment for System z. Do not run this script on your product license server because it requires the product to run on the same system. You cannot operate a product license server and the product simultaneously on the same system.

This command works only with a single USB hardware device. If your product license server has multiple USB hardware devices attached, the results of this example are unpredictable because the example uses only the device activation used by the product. It does not search for or examine all attached USB hardware devices.

This example uses the token command to determine the expiration date of the USB hardware device activation. If the expiration date is within a specified number of days, then it formats an email and sends that email to the specified user.

Sample Expiration Notification Script

```
#!/bin/bash
#
# Send an e-mail when a RDT USB hardware key activation is about to expire.
# This works with Rational Development and Test Environment only.
# For previous releases (RDzUT), the EXPDATE and SERIAL regular expressions
# would need to be modified because the format of the "token" command changed.
#
# This script should not be run on the product license server.
# This script runs on the machine running the emulator
#
# This is a sample only and may need modification on your system.
#
# If you would prefer notification other than email, you might want to
# - FTP a file to your z/OS system through the tunnel address.
# - Run a z/OS console command through "oprmsg".
# - Take other actions appropriate for your installation.

EMAILADDRESS=USERID@YOUR.EMAIL.ADDRESS # email address to receive emails
THRESHOLD=30 # number of days before expiration to start notification

export PATH=/usr/z1090/bin:$PATH # path to token command
export LD_LIBRARY_PATH=/usr/z1090/bin:$LD_LIBRARY_PATH # path to libman.so

SERIAL=`token |grep 'EXP='|head -n 1 | sed -e "s/.*Lic=.*(/" -e "s/).*//"`
```

```

if [ ! -z $SERIAL ]; then                                     # if serial number was found

    EXPDT=$(token | grep "EXP=" | head -n 1 | sed -e 's/.*EXP=\([^\ ]*\).*/\1/g')
    TOKENDATE=`date -d $EXPDT +%s`                           # get expire date
    TODAY=`date +%s`                                          # get today date in seconds
    DAYSLEFT=$(( ($TOKENDATE-$TODAY)/(24*3600) ))             # get days left

    NOTE=`mktemp`
    echo Hostname ..... : `hostname` >> $NOTE
    echo DNS Name ..... : $(nslookup `hostname` | \
grep -i "Name:" | sed -e 's/Name:\s*//') >> $NOTE
    echo >> $NOTE
    echo Today's Date: ..... : $(date +"%m/%d/%Y") \ (mm/dd/yyyy) >> $NOTE
    echo Expiration date .... : $EXPDT >> $NOTE
    echo Days remaining ..... : $DAYSLEFT Days >> $NOTE

    if [ $THRESHOLD -ge $DAYSLEFT ]; then                     # if days left <= threshold
                                                                # send mail or other actions.
        # This is where you would send an email or take other actions.
        echo >> $NOTE
        echo "**** USB Serial $SERIAL will expire within $THRESHOLD" \
            " days. ($DAYSLEFT remaining)" >> $NOTE
        echo "**** A new license file is required by $EXPDATE" >> $NOTE
        echo >> $NOTE ; token >> $NOTE ; echo >> $NOTE
        echo Sending $NOTE to $EMAILADDRESS for serial $SERIAL...
        mail -s "RDT $SERIAL expiration warning: $DAYSLEFT days ($EXPDT)" \
$EMAILADDRESS < $NOTE
    fi
    cat $NOTE
    rm $NOTE
fi

```

Sample Expiration Notification Script Setup

1. This example assumes that the mail command on your Linux system already works with your network. Before you try this example, verify that mail can be sent from your Linux system with the commands:

```

echo Testing>/tmp/mymail mail s "a test subject line"
userid@your.email.address

```

2. Copy the "Sample Expiration Notification Script" on page 33 to your computer and make it available to the user ID that runs it. For example, if ibmsys1 is running the emulator, you can copy this script to /home/ibmsys1/expiredTokenCheck.sh
3. Set the executable flag

```

chmod 755 /home/ibmsys1/expiredTokenCheck.sh

```

4. Set the EMAILADDRESS and THRESHOLD variables in the script to contain the email address to be notified and the number of days before expiration that notification is to begin.
5. Ensure PATH and LD_LIBRARY_PATH variable exports are set correctly.

Note: Changing the variable exports is probably not necessary.

6. Ensure that `awsstart` is running continuously on the computer on which the script runs. The script might be modified to start a small instance temporarily if `awsstart` is not running, but that would require that a license be available.
7. Create a cron job to run this command each day. For example, under the user ID that is running the emulator and this script, enter the command

```
crontab e
```

Next, add a line to your cron file that points to your script. For example, if this script is named `expiredTokenCheck.sh` and is to be run by user `ibmsys1`, then your crontab entry would include:

```
@daily /home/ibmsys1/expiredTokenCheck.sh
```

Sample Expiration Notification Script Output

This example, as shown, would send a note to `USERID@YOUR.EMAIL.ADDRESS` with a subject line similar to

```
RDT 0xDF0 expiration warning: 27 days (3/20/2014)
```

The body of the note is similar to the information shown in Table 2.

Table 2. Output of the sample expiration notification script

```
Hostname ..... : rdtesys1
DNS Name ..... : rdtesys1.example.dnsname

Today's Date: ..... : 02/20/2015 (mm/dd/yyyy)
Expiration date .... : 3/20/2015
Days remaining ..... : 27 Days

**** USB Serial 0xDF0 will expire within 30 days. (27 remaining)
**** A new license file is required by

CPU 0, zPDTA(1091) available and working. Serial=4380(0x111C)
    Lic=3568(0xDF0) EXP=3/20/2015
CPU 1, zPDTA(1091) available and working. Serial=4380(0x111C)
    Lic=3568(0xDF0) EXP=3/20/2015
CPU 2, zPDTA(1091) available and working. Serial=4380(0x111C)
    Lic=3568(0xDF0) EXP=3/20/2015

End of zPDTA Status display
```

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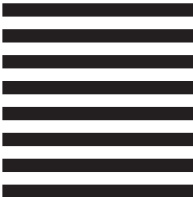
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