Sterling File Gateway



Version 2.2.4.1 Updates

Version 2.24.1

Sterling File Gateway



Version 2.2.4.1 Updates

Version 2.24.1

Note

Before using this information and the product it supports, read the information in "Notices" on page 15.

This edition applies to Version 2 Release 2 Modification 4 of IBM Sterling File Gateway and to all subsequent releases and modifications until otherwise indicated in new editions.

© Copyright IBM Corporation 2008, 2012. US Government Users Restricted Rights – Use, duplication or disclosure restricted by GSA ADP Schedule Contract with IBM Corp.

Contents

Version 2.2.4.1 updates 1	ĺ
filegateway.properties (version 2.2.4.1 and later) 2	2
Handling errors in custom business processes	
(version 2.2.4.1 and later)	1
Deleting a partner (version 2.2.4.1 and later) 5	5
Sending a file using <i>myFileGateway</i>	5
Migrate Sterling File Gateway resources (version	
2.2.4.1 and later)	5
Migrate Sterling B2B Integrator managed resources	
(version 2.2.4.1 and later)	7
Migrate custom protocols (version 2.2.4.1 and later) . 8	3
Migrate Communities, Partner Groups, and Partners	
with Sterling File Gateway Community Resource Tag	
(version 2.2.4.1 and later))

Migrate Sterling File Gateway configurations	
(version 2.2.4.1 and later)	11
Migrate specific Sterling File Gateway resources	
(version 2.2.4.1 and later)	11
Nationa	15
	15
Notices	15 17
Notices Trademarks	17

Version 2.2.4.1 updates

Error handling in custom workflows

When using custom business processes to extend the capabilities of Sterling File Gateway, you can override the default error handling. Normally, for custom layers and delivery protocols, a custom business process that encounters a fault causes processing of the associated file to fail. If

filegateway.extensionBPStatusIndicatorElement is set to IgnoreThisFault and the custom business process creates an element named IgnoreThisFault with value "true", Sterling File Gateway disregards the fault and attempts to continue processing the arrived file or route. See:

- Adding custom protocols (version 2.2.4.1 and later)
- Handling errors in custom business processes
- filegateway.properties (version 2.2.4.1 and later)

New delete partner functionality

You can delete a partner from the Sterling File Gateway Partner page. See *Deleting a partner (version 2.2.4.1 and later).*

Individually selectable items for migration

You can migrate Sterling File Gateway resources from one system to another. You may have a staging system where you test new partners and other resources before you migrate them to a production system. You may also want to migrate resources from one software version to another. In general, you migrate resources two ways, you first migrate everything in you Sterling File Gateway instance, then second you periodically migrate the things that change. The Sterling File Gateway instance includes Sterling B2B Integrator resources, Custom Protocols, and Sterling File Gateway Communities, Partners, and Configurations. The Sterling B2B Integrator and Custom Protocols do not change very often, so you may only need to migrate them once. The Communities, Partners, and Configurations can change frequently and you may need to migrate these resources more frequently. You migrate resources using a Resource File that is an xml file that contains resources. You can use a Resource Tag to create the Resource File or you can manually specify the resources for the Resource File. See:

- Migrate Sterling File Gateway resources (version 2.2.4.1 and later)
- Migrate Sterling B2B Integrator managed resources (version 2.2.4.1 and later)
- Migrate Custom Protocols (version 2.2.4.1 and later)
- Migrate Communities, Partner Groups, and Partners with Sterling File Gateway Community Resource Tag (version 2.2.4.1 and later)
- Migrate Sterling File Gateway Configurations (version 2.2.4.1 and later)
- Migrate specific Sterling File Gateway resources (version 2.2.4.1 and later)

Documentation enhancements

Clarification in myFileGateway documentation that you cannot drag-and-drop, and can only send one file at a time. See *Sending a file from myFileGateway*.

filegateway.properties (version 2.2.4.1 and later)

The filegateway.properties file contains properties which control the operation of Sterling File Gateway.

The following table describes properties in the filegateway.properties file:

Important: Do not edit the filegateway.properties file. Make all changes in the customer_overrides.properties file. For example, to change the pgpCmdline2svcname property, enter the following line into customer_overrides.properties: filegateway.pgpCmdline2svcname=CUSTOM

substituting CUSTOM with the name of your Command Line 2 adapter. See *Using Property Files* in the Sterling B2B Integrator 5.2 online library.

Property	Description
ignoreFilename <i>x</i>	Setting a regex pattern for this will cause any arrived file that matches your regex pattern to be ignored by Sterling File Gateway.
	This is useful for recognizing and ignoring temporary files sent by producers before they are renamed to the expected name. These will not be routed and are not considered failures.
	Specify one or more file name patterns to ignore in the following format:
	 filegateway.ignoreFilename1=<regex expression=""></regex>
	 filegateway.ignoreFilename2=<regex expression=""></regex>
	 filegateway.ignoreFilename3=<regex expression=""></regex>
	 filegateway.ignoreFilenamex=<regex expression=""></regex>
	For example:
	<pre>filegateway.ignoreFilename1=.+[.]tmp\$</pre>
	would have the effect of ignoring all files with an extension of tmp. Note: The regex pattern must match the file name in its entirety. Partial matches are not recognized.
ftpClientAdapterName	The FTP Client Adapter instance or service group that the FileGatewayDeliverFTP business process will use. Override this property in customer_overrides.properties if a custom FTP Client Adapter instance must be used to contact trading partners. You can also specify an adapter group name to load-balance outbound FTP sessions across multiple adapter instances. Default is:
	ftpClientAdapterName=FTPClientAdapter

Property	Description	
bpCompletionProbes.1 bpCompletionSleepMsec.1	Timeouts and sleep intervals that control how long Sterling File Gateway waits for every sub-business process it invokes. These contro the timeouts when a business process is executed synchronously durin routing. Used for consumer identification business and for	
bpCompletionProbes.2	routing. Used for consumer identification business processes and for PGP processing. Enables one set of relatively quick probes followed by	
bpCompletionSleepMsec.2	a second set of slower probes. The first set will be very reactive, but consume more processor time. The second set will activate for longer-running processes and will consume less processor time.	
	First probe 120 times with 100 Milliseconds between, for a total of 12 seconds. Default is:	
	<pre>bpCompletionProbes.1=120 and bpCompletionSleepMsec.1=100</pre>	
	Then probe 600 times with 2000 Milliseconds between, for a total of 1200 seconds (20 minutes). Default is:	
	<pre>bpCompletionProbes.2=600 and bpCompletionSleepMsec.2=2000</pre>	
pgpCmdline2svcname	The name of the Command Line 2 adapter to be used for PGP packaging and unpackaging. Override this property in customer_overrides.properties if a custom Command Line 2 adapter must be used for PGP operations. You can also specify an adapter group name to load-balance outbound PGP sessions across multiple adapter instances. Default is:	
	pgpCmdline2svcname=PGPCmdlineService	
fgRoutePGPCmdLineSocketTimeout	Timeout value, in milliseconds, for PGP package and unpackage operations invoked by Sterling File Gateway. Default value is 240000 milliseconds (4 minutes)	
required_si_build_ver	The build number (version) of Sterling B2B Integrator that Sterling File Gateway requires. This is checked at system start up. If the current version of Sterling B2B Integrator does not equal the required_si_build_ver, a warning is issued and the system is shut down. Required. Do not change or override this property.	
fgmaxBroadcastListSize	Maximum allowed size of the consumer list used for broadcast. If the returned list of consumers exceeds this size, the file is not routed. By default, the maximum size of a broadcast list is set to 100.	
grantIntermediateMailboxPermissions	Controls permissions granted to intermediate mailboxes (those between a partner user's virtual root and the leaf mailbox). These mailboxes are created during routing channel creation or dynamic routing. Setting this property to true grants View & Execute rights to the intermediate mailboxes to eligible partner users. View rights are required to list mailbox contents. Execute rights are required to 'log in' to a mailbox. Setting both rights allows users of the FTP and SFTP protocol adapters to traverse through any intermediate mailboxes to reach the leaf. The default is false.	
	For example:	
	grantIntermediateMailboxPermissions=false	

Property	Description
extensionBPStatusIndicatorElement= IgnoreThisFault	Use in conjunction with custom business processes that extend the capabilities of Sterling File Gateway, to override its default behavior when such a business process fails. Normally, a custom business process that encounters a fault causes processing of the associated file to fail. If extensionBPStatusIndicatorElement is set to <i>IgnoreThisFault</i> and the custom business process has created an element named <i>IgnoreThisFault</i> with value "true", Sterling File Gateway will disregard the fault and attempt to continue processing the arrived file or route. The value <i>IgnoreThisFault</i> is suggested for the element name value, but the value can be any string that is a legal element name in XML. By default, this property is not included in filegateway.properties. Use the following assignment in the custom business process to set the value of the Process Data element:

Handling errors in custom business processes (version 2.2.4.1 and later)

When using custom business processes to extend the capabilities of Sterling File Gateway, you can override the default error handling.

About this task

Sterling File Gateway uses custom business processes in the following scenarios:

- Dynamic consumer identification a custom business process identifies the consumer in each file transfer
- · Custom layers a custom business process defines how to handle a custom layer
- Delivery protocols a custom business process implements the delivery of a file to a listening consumer

For consumer identification, the business process returns the name of the consumer in a Process Data element. If the business process does not return a valid value for the consumer name, the route fails. The solution in this procedure cannot override the failure for consumer identification.

Normally, for custom layers and delivery protocols, a custom business process that encounters a fault causes processing of the associated file to fail. If you set a property and the write the custom business process creates to match the property, Sterling File Gateway disregards the fault and continues processing the route. To set this property:

Procedure

- 1. Stop Sterling File Gateway.
- 2. In the <install_dir>/properties directory, locate customer_overrides.properties.

Important: Do not edit the filegateway.properties file. Change values in the customer_overrides.properties file.

- 3. In a text editor, open customer_overrides.properties.
- 4. Add the following lines:

filegateway.extensionBPStatusIndicatorElement=extensionBPStatusIndicatorElement *IgnoreThisFault* is a suggested value for extensionBPStatusIndicatorElement, but the value can be any string that is a legal element name in XML.

- 5. Save the customer_overrides.properties file with the same name in the same location.
- 6. Restart Sterling File Gateway.
- **7.** Use the following assignment in the custom business process to set the value of the Process Data element:

```
<onFault> : <assign name="Assign" to="extensionBPStatusIndicatorElement">true<
/assign> : <onFault>
```

Match the value of the property with the value returned by the business process associated with the Dynamic Channel. The applicable values from the business process for this property are true and false. For example, if you use filegateway.extensionBPStatusIndicatorElement=IgnoreThisFault for the property, the results that are returned are:

Table 1. Results for Property Values

Value	Result
true	Faults are ignored and processing continues.
false	If a fault is encountered, the route fails.
Incorrect match of business process element with property name	If a fault is encountered, the route fails.
Any other value	If a fault is encountered, the route fails.

8. Edit all custom business processes that raise faults to be disregarded to set filegateway.extensionBPStatusIndicatorElement=IgnoreThisFault to true in the appropriate condition. For a business process to disregard some faults and to terminate the route for other faults, set this element to true to disregard the fault.

Deleting a partner (version 2.2.4.1 and later)

About this task

To delete a partner:

Procedure

- 1. On the **Partners** tab, select the partner to delete from the list.
- 2. Click Delete.

Restriction: You can only delete partners created in Sterling File Gateway or migrated from AFT or Sterling Connect:Enterprise[®] for UNIX.

3. When prompted "Are you sure that you want to delete this partner?" Select **OK** to delete the partner or **Cancel** to keep the partner.

Remember: When you delete a partner, any routing channels that have that partner as the producer or consumer are also deleted. Though the partner is deleted, information about operations that involved the deleted partner are retained until purged.

4. A message is displayed to confirm the deletion or to alert you to a problem during deletion.

Sending a file using myFileGateway

About this task

To send a file:

Procedure

- 1. In *myFileGateway*, click on the **Upload** tab.
- 2. Select the mailbox path where the file should be dropped off.
- 3. Enter the name and location of the file or browse to the file to be uploaded.

Restriction: You cannot drag-and-drop the file. Upload one file at a time.

- 4. If you want to rename the file, enter the new file name.
- 5. Click Send.

Note: Depending on the size of the file and the rate of transfer, you may have to wait for the file transfer to complete.

Migrate Sterling File Gateway resources (version 2.2.4.1 and later)

You can migrate Sterling File Gateway resources from one system to another. You may have a staging system where you test new Partners and other resources before you migrate them to a production system. You may want to migrate resources from one software version to another.

The Sterling File Gateway instance includes Sterling B2B Integrator resources, Custom Protocols, and Sterling File Gateway Communities, Partners, and Configurations. The Sterling B2B Integrator resources and Custom Protocols do not change often, so you usually only need to migrate them once. The Communities, Partners, and Configurations change frequently. You first migrate everything in your Sterling File Gateway instance, then periodically migrate the things that change.

You migrate resources using a Resource File that is an xml file that contains resources. You can use a Resource Tag to create the Resource File or you can individually select the resources when you create the Resource File.

Resource files created with Resource Tags

There are two types of Resource Tags:

Community Resource Tag

When you create a Community in Sterling File Gateway, the user interface creates a Resource Tag with that Community name in Sterling B2B Integrator. The Community Resource Tag contains the Community and all of the Partners that belong to the Community. This Community Resource Tag is updated and maintained by the user interface. The Resource Tag is stored in the system, so that you can repeatedly create Resource Files with the same set of resources.

Custom Resource Tag

A Custom Resource Tag is one that you create. You add the resources to migrate to the tag and only those resources are in the Resource File. The Resource Tag is saved on the system, so that you can repeatedly create

Resource Files with the same set of resources. Custom Resource Tags are not updated by the user interface when Partners are modified, added, or removed from the Community.

Resource files created without Resource Tags

When creating a Resource File, you specify whether to use a Resource Tag. If you specify no Resource Tag, the list of resources you specify for the Resource File is not stored on the system for reuse.

Migrate all of the resources in the Sterling File Gateway instance

When you are migrating all of the resources in Sterling File Gateway the migration order is:

- 1. Sterling B2B Integrator Managed Resources
- 2. Custom Protocols
- 3. Sterling File Gateway Community, all of its Partners, and Partner Groups
- 4. Sterling File Gateway Configurations

Migrate specific resources from the Sterling File Gateway instance

After you have migrated all of the resources in the Sterling File Gateway instance, you only have to migrate resources that have changed. The resources that change most often are Partners. Partners belong to Communities and Partner Groups.

When you migrated all of the resources in the Sterling File Gateway instance, you migrated the Communities and Partner Groups. If you only add Partners to existing Communities or Partner Groups in your instance, you can migrate just the Partners.

If you have added Communities or Partner Groups for the Partners, you must migrate those Communities and Partner Groups before you migrate the Partners.

Migrate Sterling B2B Integrator managed resources (version 2.2.4.1 and later)

Sterling B2B Integrator customized resources used by the Sterling File Gateway Community must exist on the target system before the Community is migrated. You can create these resources on the target system or you can migrate these resources to the target system.

Sterling B2B Integrator managed resources are any resources that are not created within the Sterling File Gateway user interface. These resources are created and managed within Sterling B2B Integrator. These include, but are not limited to the following resources:

- AS2 partners
- SSH profiles
- SSH Authorized User Keys
- Certificates
- Pre- and post-process business processes
- · Customized server adapters

You can migrate the Sterling B2B Integrator managed resources with a Resource File that you create either of the following methods:

- With a Resource Tag that you create for repeated use
- With an export file that you manually create for just one use

Migrate custom protocols (version 2.2.4.1 and later)

Custom protocols are custom configurations within the system, so the migration steps and migrated resources vary between system versions and patches.

Process

Custom protocols should be migrated to the target system before the rest of the Sterling File Gateway resource are migrated to the target system. The Custom protocols are accessed by any Community that is configured to use the protocol. Because they can be used by Partners in all Communities on the system, the custom protocols should not be added to any specific Community Resource Tag. Migrating the custom protocols is a multistep process. Some of the files are migrated with the user interface and some are migrated outside the user interface. After all of the files are migrated, the system must be stopped, redeployed, and restarted.

To migrate custom protocols:

- 1. Use the Sterling B2B Integrator Resource Manager to create a Resource File to migrate custom protocols to the target system. You can create a Resource Tag for just the custom protocols or create an export file. The resource file that you create must include all resources that the custom protocols use.
- 2. Export the custom protocols from the source system.
- 3. Import the custom protocols to the target system.
- 4. Copy the AFTExtensionsCustomer files from the source system to the target system.
- 5. Stop, redeploy, and restart the target system.

Copy the AFTExtensionsCustomer files from the source to the target

After the resources used by the custom protocol have been migrated to the target system through the Resource Manager, both files, located within the Sterling B2B Integrator installation directory, must be copied and moved from the file path specified below on the source system to the same file path on the target system:

Table 2. Files to copy from source system to target system

The AFTExtensionsCustomer.xml is located in the following directory within the Sterling B2B Integrator installation directory:

<installation directory>/container/Applications/aft/WEB-INF/classes/resources/xml

AFTExtensionsCustomer.properties

The AFTExtensionsCustomer.properties is located in the following directory within the Sterling B2B Integrator installation directory:

<installation directory>/container/Applications/aft/WEB-INF/classes/resources/

If these files contain any custom protocol configurations that you do not intend to

migrate, you must remove the unwanted configurations from the files before you migrate them. If the target system already contains either or both of the AFTExtensionsCustomer files, then you must add the entries from the source system files to the target system files.

Important: Only add completely new custom protocol entries to these files. If you add modified versions of previously existing custom protocol entries or update previously existing custom protocol entries, it may lead to unexpected behavior.

Stop, redeploy, and restart the system

After you have migrated the custom protocols and copied the AFTExtensionsCustomer files:

- 1. Stop the system.
- 2. Run setupfiles.
- 3. Run deployer.
- 4. Restart the system.

Migrate Communities, Partner Groups, and Partners with Sterling File Gateway Community Resource Tag (version 2.2.4.1 and later)

After you migrate Custom Protocols, you can migrate the rest of the Sterling File Gateway resources. The Community Resource Tag maintained by the user interface only contains the Community and all of the Partners in that Community. The Communities and Partner Groups that Partners belong to must exist on the target system before you migrate the Partners. You can add the Partner Groups to the Community Resource Tag to migrate the Community, Partner Groups, and Partners in one Resource File. If you add the Partner Groups to the Resource File, the target system imports the resources in the correct order.

Process

To use the Community Resource Tag to migrate the Community, Partners, and Partner Groups:

- 1. Edit the Community Resource Tag to add the Partner Groups to the Community Resource Tag.
- 2. Use the Community Resource Tag to create a Resource File.
- **3**. Check the Export Log to be sure there are no errors.
- 4. Copy the Resource File to an accessible directory.
- 5. Import the Resource File on the target system.

Guidelines and requirements for using Community Resource Tag

The guidelines for migrating a Sterling File Gateway community include:

System	Guidelines and requirements	
Community Management with the Community	When you use the Sterling File Gateway Community Resource Tag:	
Resource Tag	• You need to export and import all resources in that tag.	
	• You cannot specify individual partners to import to the target system. With the Community Resource Tag you automatically export and import all Partners in the Community.	
Community Resource Tag	The Community Resource Tag is managed by the Sterling File Gateway user interface and is updated when Community and Partner additions or updates are made.	
	• Never delete the Resource Tag itself. Recreating a Sterling File Gateway Community Resource Tag requires contacting customer support.	
	• Never remove Partners from a Community Resource Tag. If you must remove a Partner, delete the Partner from the Community using the Sterling File Gateway user interface. This automatically removes the Partner from the Community Resource Tag. During an import where you removed a Partner on the source system, the import does not remove the Partner from the target system Community or the target system Resource Tag. After the migration, you must manually remove the Partner from the Community on the target system.	

Table 3. Guidelines and requirements for migrating by using Community Resource Tags

Resource file export

Always examine the Export Report after generating the Resource File to verify that no errors were generated before you continue with the migration. If errors were generated in the Export Report, contact customer support to open a case. Provide the Export Report and the Resource File generated to customer support.

Resource file import

All resources within the resource file must be imported. All resources within the Resource File are required for the import to be successful, even if you are doing a migration to insert new resources into the target system Community and not changing any existing resources. The Import All Resources option automatically selects all resources in the resource file for importing. Always use the Import All Resources option. If you do not use this option, you will be prompted to manually select all of the resources to import for each resource type.

During the import you are asked **Some objects being imported may exist in the system. Do you wish to update them?** This option can be set to either **Yes** or **No**. When you migrate the Communities, the Partner Groups, and Partners for the first time, set this to **Yes**.

Important: Setting this to **Yes** causes the Resource File being imported to overwrite all the resources within a Sterling File Gateway Community. All of the resources must participate in the import process. There may be planned differences

in configuration for some resources between the source and target systems. For example, the Partner User passwords may differ between the source and target systems.

Always examine the Import Report and verify that no errors were generated. If errors were generated, contact customer support to open a case. Provide the Export Report and the Resource File generated to customer support.

Migrate Sterling File Gateway configurations (version 2.2.4.1 and later)

You can use import to create the rest of the Sterling File Gateway configurations, but not to update them. To update these resources with an import, you must delete them on the target system first. Migrate these resources separately from the Community, Partners, and Partner Groups.

Process

To migrate the rest of the Sterling File Gateway configurations:

- 1. Use the Sterling B2B Integrator Resource Manager to create a Resource File to migrate Consumer Custom File Layers, Producer Custom File Layers, Routing Channels, and Routing Channel Templates to the target system. You can create a Resource Tag for just these configurations or create an export file. The resource file that you create must include all resources that the Configurations use.
- 2. Export the resources from the source system.
- **3**. Check the Export Report for errors.
- 4. Import the resources to the target system.
- 5. Check the Import Report for errors.

Migrate specific Sterling File Gateway resources (version 2.2.4.1 and later)

After you initially migrate your Sterling File Gateway resources to a production system, you only need to migrate changed resources. The resources that change most often are Partners. With Partner changes you may have Community, Partner Groups, and Routing Channel changes. Use the System Administrator user interface on Sterling B2B Integrator to select the specific resources to export from one system to another. Only migrate resources that are not already on the target system or that need to be updated on the target system. If the Community and Partner Groups that the Partners belong to already exist on the target system, only migrate the Partners. If the Community or Partner Groups do not exist on the target system, migrate them with the Partners.

In the user interface, you specify specific Partners to export and one or more Communities to export:

Field	Description
	Sterling File Gateway Partners are part of the Sterling File Gateway Configurations. When you create an export file with File Gateway Configurations, you can select Partners as a resource to export and then specify which partners you want to export.

Table 4. User interface fields

Table 4. User interface fields (continued)

Field	Description
Communities	Communities are selected from the top level export page. When you create an export file and you select Communities, you can specify one or more Communities to include in the export file.

You can specify the Partners and Communities that you want to export from one system to another. There are some constraints on what resources must exist on the target system and what resources must be imported with the Partner or Community.

The import process for migrating Partners and Communities without using the Community Resource Tag has these constraints:

When importing a	If the	Then
Partner	Community for the Partner does not already exist on the target system	The import will fail. Create or import the necessary Community on the target system, then repeat the Partner import.
Partner	Sterling File Gateway Partner Group for the Partner does not already exist on the target system	The Partner is imported with a warning in the Import Report that says the Sterling File Gateway Partner Group could not be found. Create or import the necessary Partner Group on the target system, then repeat the Partner import. Select Yes for Some objects being imported may exist in the system. Do you wish to update them? to add the Partner to the Partner groups you created on the target system.
Partner	Export file contains one or more Partners	You must import everything in the export file to ensure that all dependent objects that the Partner needs are included in the import.
Community	Export file contains one or more Communities	You must import all resources in the export file to ensure that all dependent objects that the Community needs are included in the import.

Table 5. Constraints on importing Partners and Communities without the CommunityResource Tag

When importing a	If the	Then
Partner Groups	Partner Groups contain new Partners for Partner Groups that are already on the target system	Select Yes for Some objects being imported may exist in the system. Do you wish to update them? to add the new Partners to the Partner Groups that exist on the target system.
Consumer Custom File Layers, Producer Custom File Layers, Routing Channels, and Routing Channel Templates	Consumer Custom File Layers, Producer Custom File Layers, Routing Channels, and Routing Channel Templates already exist on the target system	Delete the existing Consumer Custom File Layers, Producer Custom File Layers, Routing Channels, and Routing Channel Templates from the target system before you do the import. These Resources can not be updated. They can only be created. Selecting Yes for Some objects being imported may exist in the system. Do you wish to update them? does not update these resources.

Table 5. Constraints on importing Partners and Communities without the Community Resource Tag (continued)

Notices

This information was developed for products and services offered in the US. This material might be available from IBM in other languages. However, you may be required to own a copy of the product or product version in that language in order to access it.

IBM may not offer the products, services, or features discussed in this document in other countries. Consult your local IBM representative for information on the products and services currently available in your area. Any reference to an IBM product, program, or service is not intended to state or imply that only that IBM product, program, or service may be used. Any functionally equivalent product, program, or service that does not infringe any IBM intellectual property right may be used instead. However, it is the user's responsibility to evaluate and verify the operation of any non-IBM product, program, or service.

IBM may have patents or pending patent applications covering subject matter described in this document. The furnishing of this document does not grant you any license to these patents. You can send license inquiries, in writing, to:

IBM Director of Licensing IBM Corporation North Castle Drive, MD-NC119 Armonk, NY 10504-1785 US

For license inquiries regarding double-byte character set (DBCS) information, contact the IBM Intellectual Property Department in your country or send inquiries, in writing, to:

Intellectual Property Licensing Legal and Intellectual Property Law IBM Japan Ltd. 19-21, Nihonbashi-Hakozakicho, Chuo-ku Tokyo 103-8510, Japan

INTERNATIONAL BUSINESS MACHINES CORPORATION PROVIDES THIS PUBLICATION "AS IS" WITHOUT WARRANTY OF ANY KIND, EITHER EXPRESS OR IMPLIED, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF NON-INFRINGEMENT, MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. Some jurisdictions do not allow disclaimer of express or implied warranties in certain transactions, therefore, this statement may not apply to you.

This information could include technical inaccuracies or typographical errors. Changes are periodically made to the information herein; these changes will be incorporated in new editions of the publication. IBM may make improvements and/or changes in the product(s) and/or the program(s) described in this publication at any time without notice.

Any references in this information to non-IBM websites are provided for convenience only and do not in any manner serve as an endorsement of those websites. The materials at those websites are not part of the materials for this IBM product and use of those websites is at your own risk.

IBM may use or distribute any of the information you provide in any way it believes appropriate without incurring any obligation to you.

Licensees of this program who wish to have information about it for the purpose of enabling: (i) the exchange of information between independently created programs and other programs (including this one) and (ii) the mutual use of the information which has been exchanged, should contact:

IBM Director of Licensing IBM Corporation North Castle Drive, MD-NC119 Armonk, NY 10504-1785 US

Such information may be available, subject to appropriate terms and conditions, including in some cases, payment of a fee.

The licensed program described in this document and all licensed material available for it are provided by IBM under terms of the IBM Customer Agreement, IBM International Program License Agreement or any equivalent agreement between us.

The performance data and client examples cited are presented for illustrative purposes only. Actual performance results may vary depending on specific configurations and operating conditions.

Information concerning non-IBM products was obtained from the suppliers of those products, their published announcements or other publicly available sources. IBM has not tested those products and cannot confirm the accuracy of performance, compatibility or any other claims related to non-IBMproducts. Questions on the capabilities of non-IBM products should be addressed to the suppliers of those products.

Statements regarding IBM's future direction or intent are subject to change or withdrawal without notice, and represent goals and objectives only.

All IBM prices shown are IBM's suggested retail prices, are current and are subject to change without notice. Dealer prices may vary.

This information is for planning purposes only. The information herein is subject to change before the products described become available.

This information contains examples of data and reports used in daily business operations. To illustrate them as completely as possible, the examples include the names of individuals, companies, brands, and products. All of these names are fictitious and any similarity to actual people or business enterprises is entirely coincidental.

COPYRIGHT LICENSE:

This information contains sample application programs in source language, which illustrate programming techniques on various operating platforms. You may copy, modify, and distribute these sample programs in any form without payment to

IBM, for the purposes of developing, using, marketing or distributing application programs conforming to the application programming interface for the operating platform for which the sample programs are written. These examples have not been thoroughly tested under all conditions. IBM, therefore, cannot guarantee or imply reliability, serviceability, or function of these programs. The sample programs are provided "AS IS", without warranty of any kind. IBM shall not be liable for any damages arising out of your use of the sample programs.

Each copy or any portion of these sample programs or any derivative work must include a copyright notice as shown in the next column.

© IBM[®] 2015. Portions of this code are derived from IBM Corp. Sample Programs. © Copyright IBM Corp. 2015.

Trademarks

IBM, the IBM logo, and ibm.com are trademarks or registered trademarks of International Business Machines Corp., registered in many jurisdictions worldwide. Other product and service names might be trademarks of IBM or other companies. A current list of IBM trademarks is available on the web at "Copyright and trademark information" at www.ibm.com/legal/copytrade.shtml.

Adobe, the Adobe logo, PostScript, and the PostScript logo are either registered trademarks or trademarks of Adobe Systems Incorporated in the United States, and/or other countries.

IT Infrastructure Library is a registered trademark of the Central Computer and Telecommunications Agency which is now part of the Office of Government Commerce.

Intel, Intel Iogo, Intel Inside, Intel Inside logo, Intel Centrino, Intel Centrino logo, Celeron, Intel Xeon, Intel SpeedStep, Itanium, and Pentium are trademarks or registered trademarks of Intel Corporation or its subsidiaries in the United States and other countries.

Linux is a registered trademark of Linus Torvalds in the United States, other countries, or both.

Microsoft, Windows, Windows NT, and the Windows logo are trademarks of Microsoft Corporation in the United States, other countries, or both.

ITIL is a registered trademark, and a registered community trademark of the Office of Government Commerce, and is registered in the U.S. Patent and Trademark Office.

UNIX is a registered trademark of The Open Group in the United States and other countries.

Java^m and all Java-based trademarks and logos are trademarks or registered trademarks of Oracle and/or its affiliates.

Cell Broadband Engine is a trademark of Sony Computer Entertainment, Inc. in the United States, other countries, or both and is used under license therefrom.

Linear Tape-Open, LTO, the LTO Logo, Ultrium and the Ultrium Logo are trademarks of HP, IBM Corp. and Quantum in the U.S. and other countries.

Connect Control Center[®], Connect:Direct[®], Connect:Enterprise, Gentran[®], Gentran[®]:Basic[®], Gentran:Control[®], Gentran:Director[®], Gentran:Plus[®], Gentran:Realtime[®], Gentran:Server[®], Gentran:Viewpoint[®], Sterling Commerce[™], Sterling Information Broker[®], and Sterling Integrator[®] are trademarks or registered trademarks of Sterling Commerce[®], Inc., an IBM Company.

Other company, product, and service names may be trademarks or service marks of others.

Terms and conditions for product documentation

Permissions for the use of these publications are granted subject to the following terms and conditions.

Applicability

These terms and conditions are in addition to any terms of use for the IBM website.

Personal use

You may reproduce these publications for your personal, noncommercial use provided that all proprietary notices are preserved. You may not distribute, display or make derivative work of these publications, or any portion thereof, without the express consent of IBM.

Commercial use

You may reproduce, distribute and display these publications solely within your enterprise provided that all proprietary notices are preserved. You may not make derivative works of these publications, or reproduce, distribute or display these publications or any portion thereof outside your enterprise, without the express consent of IBM.

Rights

Except as expressly granted in this permission, no other permissions, licenses or rights are granted, either express or implied, to the publications or any information, data, software or other intellectual property contained therein.

IBM reserves the right to withdraw the permissions granted herein whenever, in its discretion, the use of the publications is detrimental to its interest or, as determined by IBM, the above instructions are not being properly followed.

You may not download, export or re-export this information except in full compliance with all applicable laws and regulations, including all United States export laws and regulations.

IBM MAKES NO GUARANTEE ABOUT THE CONTENT OF THESE PUBLICATIONS. THE PUBLICATIONS ARE PROVIDED "AS-IS" AND WITHOUT WARRANTY OF ANY KIND, EITHER EXPRESSED OR IMPLIED, INCLUDING BUT NOT LIMITED TO IMPLIED WARRANTIES OF MERCHANTABILITY, NON-INFRINGEMENT, AND FITNESS FOR A PARTICULAR PURPOSE.

IBM.®

Product Number:

Printed in USA