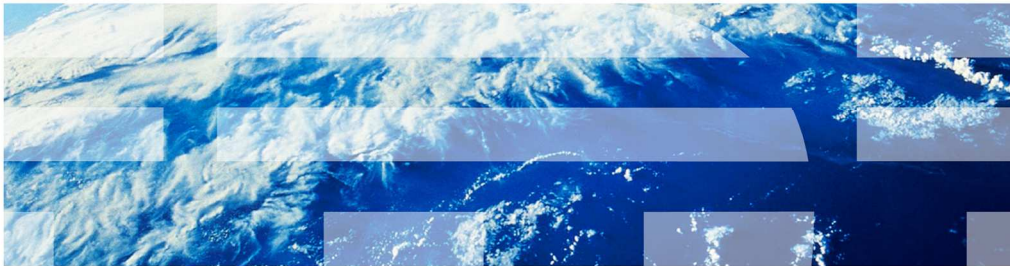


# IBM PureApplication System

## Data-at-rest encryption



This presentation covers the support for data-at-rest encryption in IBM PureApplication™ System V1.1.

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- Overview
- Installing encryption support
- Using encryption with patterns
  - Virtual system patterns
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This presentation begins with a brief introduction to data-at-rest encryption, followed by sections on installing encryption support, using encryption with patterns, and troubleshooting.

## Integrated file system encryption

- Ensure security of data-at-rest with integrated file system encryption
  - Specify paths to be encrypted using the pattern editor interface
- Support for all virtual application patterns and virtual system patterns
  - Virtual application support through encryption policy
  - Virtual system support through script package
- Requires separate purchase
  - IBM Encryption Pattern for Guardium® Encryption Expert
    - Policy-based encryption service
    - Managed using Guardium Data Security Manager (DSM)
    - <http://www-01.ibm.com/software/data/guardium/encryption-expert/>
  - IBM Encryption Pattern for Security First SPxBitFiler
    - Standalone encryption service
    - [http://www.securityfirstcorp.com/spx\\_bitfiler.html](http://www.securityfirstcorp.com/spx_bitfiler.html)



This slide introduces you to the data-at-rest encryption support in PureApplication System V1.1.

PureApplication System V1.1 includes support for protecting your data-at-rest by using integrated file system encryption products that can be configured using the pattern editors in the workload console. These products are purchased separately and provide data-at-rest encryption for both your virtual application patterns and virtual system patterns. IBM Encryption Pattern for Guardium Encryption Expert provides support for integrating your patterns with Guardium Data Security Manager, which enables centralized, policy-based management of data encryption services. IBM Encryption Pattern for Security First SPxBitFiler provides a stand-alone encryption service for your patterns and exposes configuration parameters for setting encryption rules for each virtual machine.



Section

## ***Installing encryption support***

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Data-at-rest encryption

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This section covers installing encryption products for use with PureApplication System.

## Encryption product installation

- IBM Encryption Pattern for Security First SPxBitFiler
  - Download package from PureSystems™ Centre
  - Import the Security First pattern type
  - Add the Security First script packages to the catalog
  - Accept the script package license agreements
- IBM Encryption Pattern for Guardium Encryption Expert
  - Download package from PureSystems Centre
  - Purchase Guardium key through Passport Advantage®
  - Use key to download Guardium from Vormetric
  - Unzip the pattern package and repackage with the Guardium download
  - Import the Guardium pattern type
  - Configure the Guardium plug-in
  - Add the Guardium script packages to the catalog
  - Accept the script package license agreements

File system encryption support for patterns requires one of these two supported encryption products to be installed on your system. If one of the supported encryption products is not yet installed on your system, your organization will need to purchase and install one of the products from PureSystems Centre. After downloading and decompressing one of the security products from PureSystems Centre, install it by importing the pattern type and adding the included script packages to the catalog. Before you can import the Guardium pattern type, you must also purchase a Guardium key, use the key to download Guardium from Vormetric, and then repackage your downloaded pattern with the Guardium code.

## Configuring the Guardium plug-in

- Configure the Guardium plug-in with information about Data Security Manager
  - All virtual application patterns will use this configuration
  - Virtual system patterns use script packages for Data Security Manager configuration
- Workload console > Cloud > System plug-ins



The screenshot shows the 'Configuration' dialog box for the Guardium plug-in. It contains the following fields and values:

DSM Host IP:	9.3.1.2
DSM Host Name:	testserver.ibm.com
DSM Domain:	IPAS-QA
Login Name:	admin
Pass Phrase:	*****
Operation Policy:	DSM_Operational_Policy
Encryption Policy:	DSM_Encrypt_Directory_Poli
Decryption Policy:	DSM_Decrypt_Directory_Pol

At the bottom right of the dialog box, there are two buttons: 'Update' and 'Cancel'.

To enable file system encryption for your virtual application patterns, you must first add the pattern type for the product that you purchased to your system. If you are using the Guardium pattern, then you need to provide the information for connecting to your Data Security Manager and the policies that you want to use as configuration properties of the Guardium plug-in. All virtual application patterns with an attached Guardium security policy will use this configuration. When working with virtual system patterns, script packages are used to provide the Data Security Manager and policy configuration information.



Section

## ***Using encryption with patterns***

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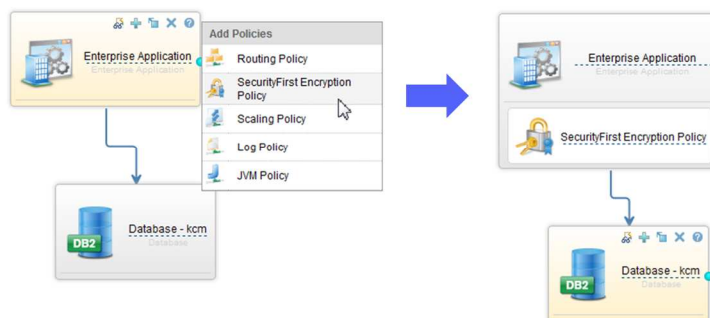
Data-at-rest encryption

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This section covers using data-at-rest encryption with virtual application and virtual system patterns.

## Encryption support for virtual application patterns

- Encryption support is provided by encryption policies
  - Security First Encryption Policy
  - Guardium Encryption Policy
- Add policies at component or application level



Encryption policies are used to add encryption support to your virtual application patterns and can be attached to your virtual applications in the same way as other types of policies. This slide shows a Security First encryption policy being attached to an enterprise application component. Like other policies, encryption policies can also be attached at the application level, to provide encryption support for all components in a pattern.



## Encryption policy configuration

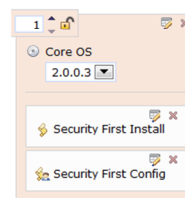
- Define deployment-time encryption options in the policy configuration panel
- Options can be changed after deployment using the “Operations” panel

The screenshot displays two panels for configuring an encryption policy. The left panel, titled "SecurityFirst Encryption Policy", contains four input fields: "Paths to encrypt" (with "/opt/ibm" entered), "Paths to decrypt", "Paths to blacklist", and "Paths to remove from blacklist". The right panel, titled "UPDATE\_ENC", shows a "Paths to decrypt" field with a text input area and a "Submit" button. Below the "Submit" button are three expandable sections: "Paths to encrypt", "Paths to blacklist", and "Paths to remove from blacklist".

When an encryption policy has been attached to a component or application, configuration options for the policy are displayed in the virtual application pattern editor. These options are used to define deployment-time parameters, including the directories on the file system that should be encrypted. To change these options after deployment, use the “operations” panel for the deployed instance.

## Encryption support for virtual system patterns

- Encryption support is provided by script packages
  - Attach script packages to parts in a pattern
  - Configure options using script package parameters
- Script package order is important
  - Guardium
    - Install Guardium
    - Configure Guardium
    - Delete Guardium
  - Security First
    - Security First Install
    - Security First Config
- “Delete Guardium” removes the virtual machine from the Guardium Data Security Manager domain



File system encryption support can be added to virtual system patterns by using script packages. To add file system encryption support to a part in a virtual system pattern, attach the script packages that were provided with the pattern that you downloaded from the PureSystems Centre. Script ordering is important—the “install” script must always run before the “configure” script. Deployment-time configuration options for the encryption products are exposed as parameters on the script packages. Script packages must be attached and configured individually for each part that requires file system encryption support. There is no mechanism for applying encryption support at the pattern level.

## Security First configuration options

- Paths to encrypt
  - Directories to encrypt
- Paths to decrypt
  - Previously encrypted directories to decrypt and disable encryption
- Paths to blacklist
  - Subdirectories of directories listed under “paths to encrypt”
  - Will not be encrypted
- Paths to remove from blacklist
  - Previously blacklisted directories to remove from blacklist
  - Will be encrypted
- Notes:
  - All options are comma-separated lists of paths
  - Paths are not required to exist
    - Specified paths are encrypted if created in the future

Security First BitFiler is configured using the four options shown here. These are configured either as properties on the security policy for virtual application patterns or as script package parameters for virtual system patterns. Each option takes a comma-separated list of paths as input. The “paths to encrypt” option is where you specify the list of paths to be encrypted. The “paths to decrypt” option is where you specify the list of previously-encrypted directories that should no longer be encrypted. The “paths to blacklist” option is used to specify subdirectories within the directories that are listed in “paths to encrypt” that should be excluded from encryption. The “paths to remove from blacklist” option is used to remove previously-blacklisted paths. These will now be encrypted, since they are covered by the “paths to encrypt” option.

## Guardium Data Security Manager configuration options

- Data Security Manager host IP
  - IP address of Guardium Data Security Manager server
- Data Security Manager host name
  - Hostname of Guardium Data Security Manager server
- Data Security Manager login
  - User ID for connecting to Guardium Data Security Manager
- Data Security Manager password
  - Password for connecting to Guardium Data Security Manager
- Data Security Manager domain
  - Domain to use for accessing policies
- Data Security Manager operational policy
  - Operational policy from Data Security Manager domain
- Data Security Manager encryption policy
  - Encryption policy from Data Security Manager domain
- Data Security Manager decryption policy
  - Decryption policy from Data Security Manager domain

These options are configured for virtual system patterns using the “install guardium” script package and for virtual application patterns using the configuration panel for the Guardium plug-in. This means that a single Data Security Manager configuration is used for all virtual application patterns, while each part of each virtual system pattern can use a different Data Security Manager configuration. These options are used to specify how to connect to the Data Security Manager and which domains and policies should be used.

## Guardium configuration options

- Paths to encrypt
  - Directories to encrypt using the selected encryption policy
- Paths to decrypt
  - Previously-encrypted directories to decrypt and disable encryption
- Notes:
  - Specified paths must exist
  - Decrypted paths cannot be re-encrypted

You can provide deployment-specific options for Guardium by using the Guardium encryption policy for virtual application patterns and by using the “configure guardium” script package for virtual system patterns. You can specify paths to encrypt and previously-encrypted paths to decrypt and disable encryption. Note that the paths specified in these parameters must exist and that you cannot re-encrypt a decrypted path when using Guardium encryption.

## ***Troubleshooting and summary***

This section covers basic troubleshooting for encryption patterns and provides a summary of the presentation.

## Troubleshooting

- Virtual system script package stdout and stderr contain only JSON data
  - Script packages write JSON configuration data to the file system
  - Encryption products are installed using plug-in injection
- Log data for encryption products
  - /opt/IBM/maestro/agent/usr/servers/<part>/logs/<product>/trace.log
    - <part> is the part name (for example: CoreOS.11372265769694)
    - <product> is ENCRYPTION.GUARDIUM or ENCRYPTION.SECURITYFIRST
- Instances that use Guardium must be deleted while running to be automatically removed from Data Security Manager domain
  - Otherwise, must be removed manually using the Data Security Manager web interface
  - IP address cannot be reused unless instance is removed from the domain

Both of the supported encryption products are installed on virtual system instances using plug-in injection after the attached script packages write configuration data to JSON files on the instance. This means that when troubleshooting installation or configuration problems with the encryption products, only the JSON data is contained in the script package log files. For more information about installation and configuration of the encryption products, locate the trace.log file at the path shown on this slide. When using Guardium, the “delete guardium” script is designed to run when the instance is deleted and removes the instance from the Data Security Manager domain. For the script package to run as designed, the instance must be deleted while running. If the instance is deleted while stopped, you must manually remove the IP address of the instance from the Data Security Manager domain using the Guardium web interface. Otherwise, the IP address that was used by the deleted instance cannot be reused.

## Summary

- Data-at-rest encryption support in V1.1:
  - File system encryption support for virtual application and virtual system patterns
  - IBM Encryption Pattern for Guardium Encryption Expert
    - Policy-based encryption service
    - Managed using Guardium Data Security Manager
    - <http://www-01.ibm.com/software/data/guardium/encryption-expert/>
  - IBM Encryption Pattern for Security First SPxBitFiler
    - Standalone encryption service
    - [http://www.securityfirstcorp.com/spx\\_bitfiler.html](http://www.securityfirstcorp.com/spx_bitfiler.html)

PureApplication System V1.1 provides support for two data-at-rest encryption products, which can be purchased from PureSystems Centre separately and installed onto your system. IBM Encryption Pattern for Guardium Encryption Expert and IBM Encryption Pattern for Security First SPxBitFiler both provide integrated file system encryption for virtual system patterns and virtual application patterns.





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