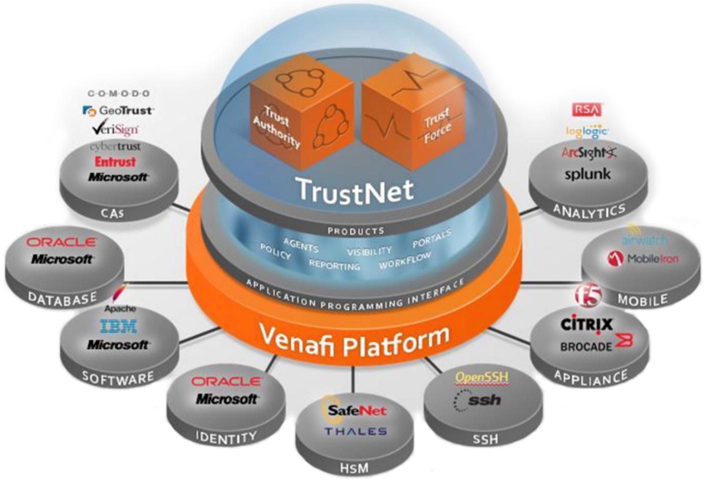
UrbanCode Deploy plugin for Venafi Trust Protection Platform

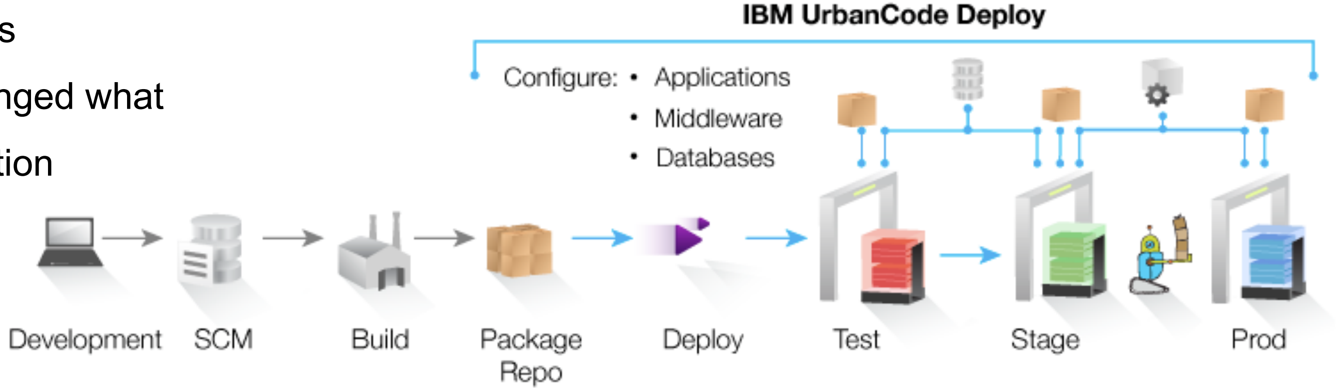
Mark Roberts
UrbanCode Technical Specialist

December, 2016

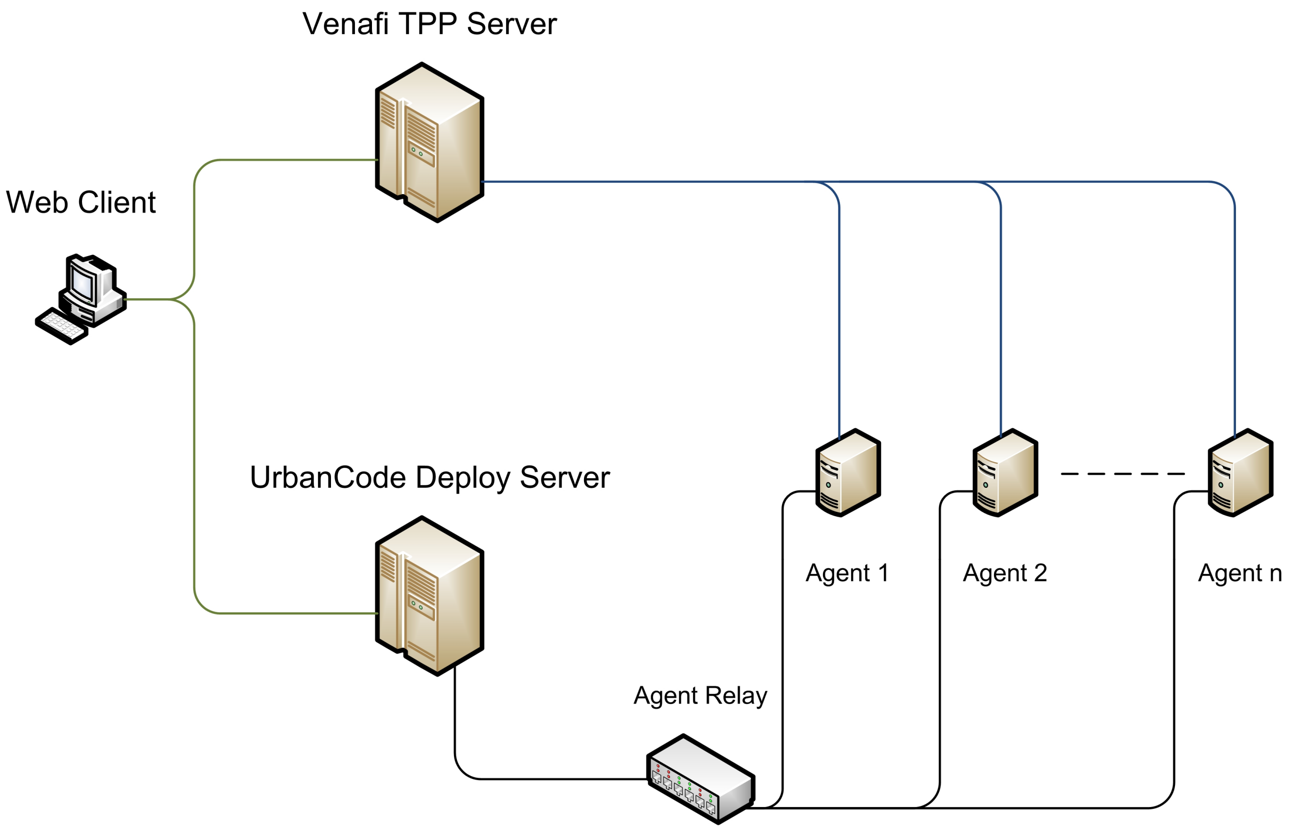
Venafi Trust Protection Platform & UrbanCode Deploy

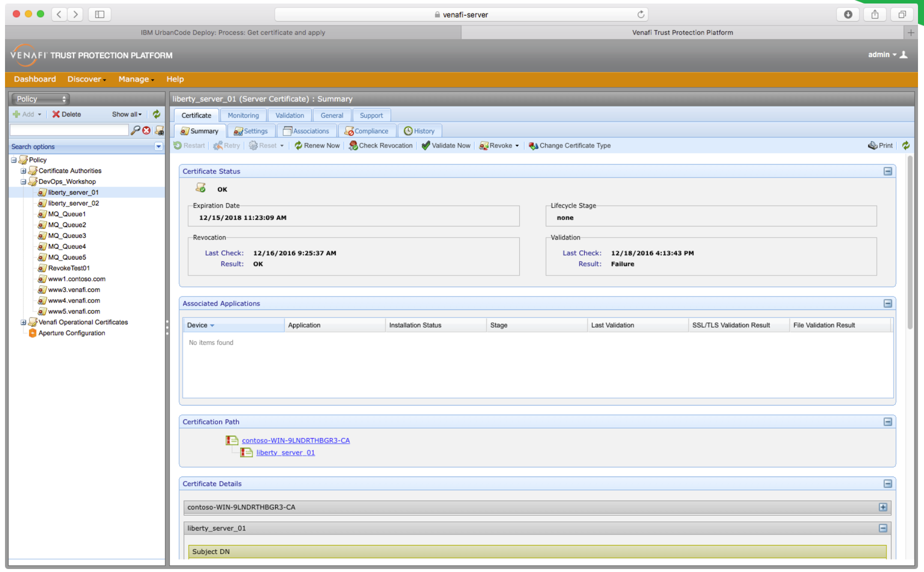
- Venafi Trust Protection Platform provides
  - – Visibility and control over keys and certificates
  - – Management of keys and certificates across mobile, desktops, application servers, devices
  - – An ever-evolving intelligent response
  - – Enforce security policy
  - – Continuous monitoring of keys and certificates
- IBM UrbanCode Deploy provides
  - – Automated, consistent deployments and rollbacks of application
  - – Automated provisioning, updating, and de-provisioning of cloud environments
  - – A plugin framework for technology specific extensions – Over 180 plugins available
  - – Orchestration of changes across servers, tiers and components
  - – Clear inventory visibility: what is deployed where and who changed what
  - – Integrated with middleware, provisioning and service virtualization
  - – Configuration and security differences across environments
  - – Underpin your DevOps strategy





Physical Infrastructure and Interaction





liberty_server_01 (Server Certificate) : Summary

Certificate Status

OK

Expiration Date: 12/15/2018 11:23:09 AM

Lifecycle Stage: none

Revocation
Last Check: 12/16/2016 9:25:37 AM
Result: OK

Validation
Last Check: 12/18/2016 4:13:43 PM
Result: Failure

Associated Applications

Device	Application	Installation Status	Stage	Last Validation	SSL/TLS Validation Result	File Validation Result
No items found						

Certification Path

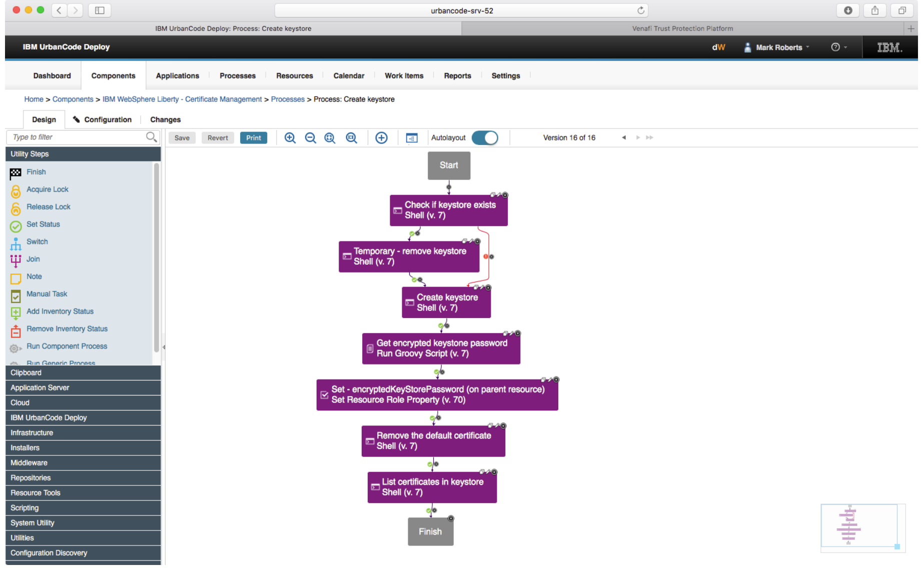
contoso-WIN-9LNDRTHBGR3-CA
liberty_server_01

Certificate Details

contoso-WIN-9LNDRTHBGR3-CA

liberty_server_01

Subject DN



UrbanCode Deploy Plugins

- Over 180 plugins available
- Provided by IBM, UrbanCode user community, partner organisations, IBM specialists
- Written in Groovy
- Interact with third parties using direct API's, REST interfaces, HTTPS communication
- Customers are encouraged to create plugins for their specific needs
- Development process
  - Create standard plugin file and directory structure
  - Add technology specific libraries and interfaces
  - Create test harness scripts and simulated input data files
  - Validate plugin code
  - Create plugin.xml file to connect plugin code to the UrbanCode Deploy user interface to create steps

Example UrbanCode Deploy Plugin Step

- Authentication test step
- Input properties:
  - Venafi TPP server name
  - Venafi TPP user name
  - Venafi TPP user password

Groovy script : authenticationTest.groovy

Creates instance of Groovy class VenafiHelper()

Calls VenafiHelper.authenticate() function

Creates instance of Groovy class VenafiRESTAPI()

Calls VenafiRESTAPI.authenticate() function

High level function for plugin to call

Main plugin code to create messages and interpret responses

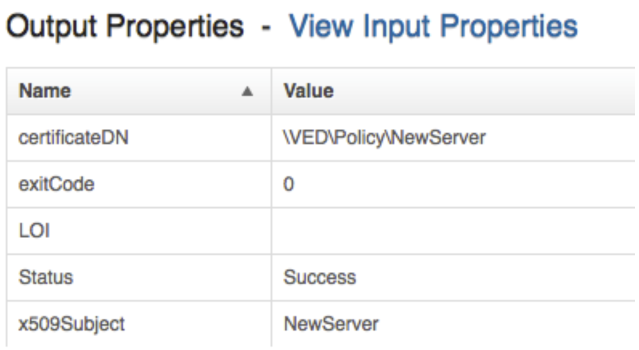
Functions to interface directly with Venafi server

Functions available in the Venafi plugin

- Authentication test – Validate communications with the Venafi TPP server
- Request certificate – Request a certificate from the Venafi TPP. The certificate is not delivered as a part of this step
- Retrieve certificate – Retrieve a certificate from the Venafi TPP server
- Request certificate wait – Request a certificate and wait for it to be returned by the Venafi TPP server
- Get certificate status – Gather information about a specific certificate
- Validate remaining days – Validate whether a certificate will stil be valid after a specific number of days
- Revoke certificate – Revoke a certificate on the Venafi TPP server
- Renew certificate – Renew a certificate on the Venafi TPP server. The certificate is not delivered as a part of this step

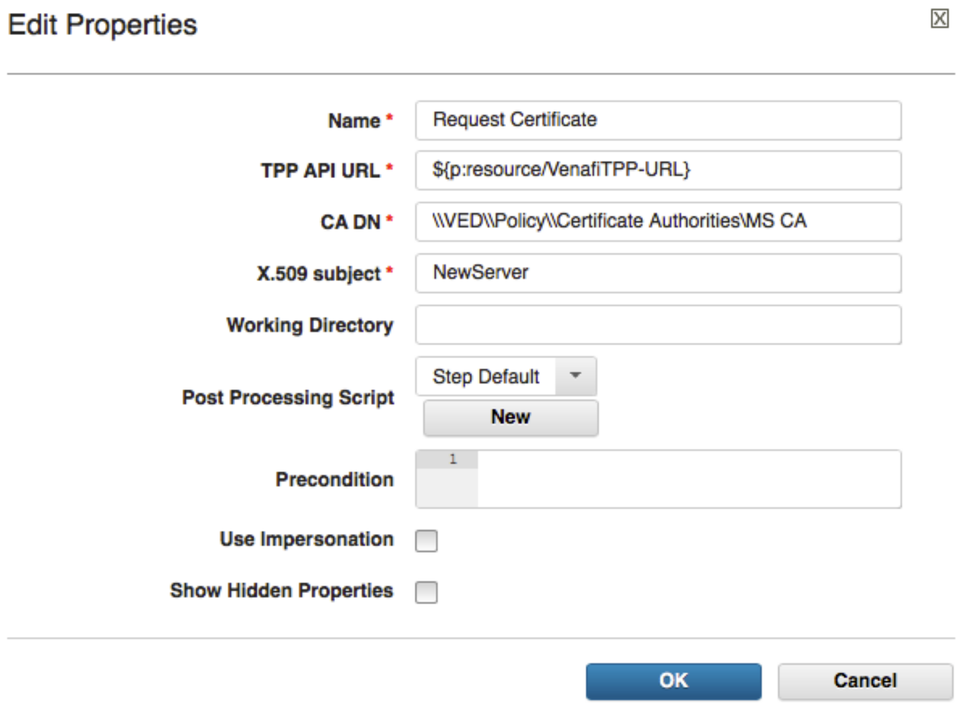
Request certificate

- Request a new certificate is created
- Certificate is not downloaded at this time
- Provide
  - – URL to the TPP Server and username / password
  - – Certificate authority distinguished name
  - – X.509 Subject (server or service for which the certificate is required)
- Output



Output Properties - View Input Properties

Name ▲	Value
certificateDN	\VED\Policy\NewServer
exitCode	0
LOI	
Status	Success
x509Subject	NewServer

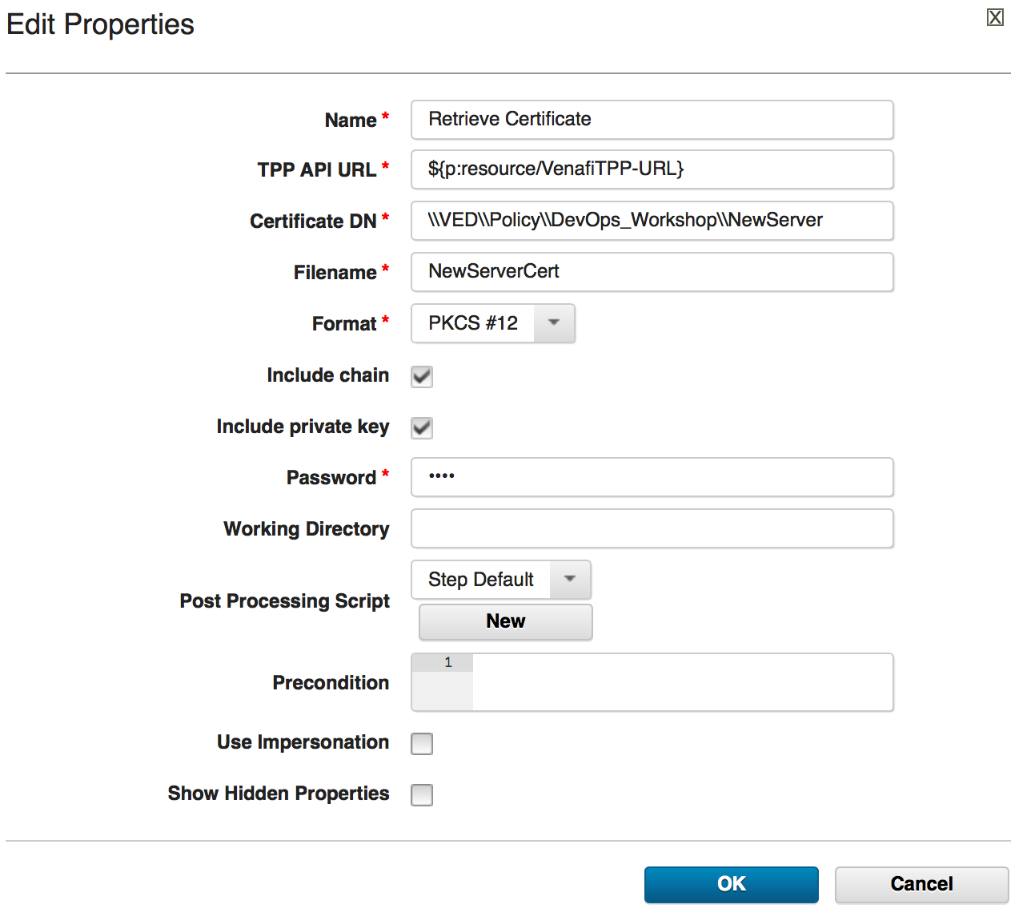


Edit Properties ☒

Name *	Request Certificate
TPP API URL *	${p:resource/VenafiTPP-URL}
CA DN *	\\VED\\Policy\\Certificate Authorities\MS CA
X.509 subject *	NewServer
Working Directory	
Post Processing Script	Step Default
Precondition	1
Use Impersonation	□
Show Hidden Properties	□

Retrieve certificate

- Retrieve an existing certificate from the Venafi TPP server
- Option to download the certificate chain and the private key
- Provide
  - URL to the TPP Server and username / password
  - Certificate authority distinguished name
  - Filename – Note that the extension is based on certificate format
  - Format – currently only P12
  - Password - A password to protect the downloaded package
- Output
  - Includes the filename for reference by further steps
  - Includes status to show successful retrieval

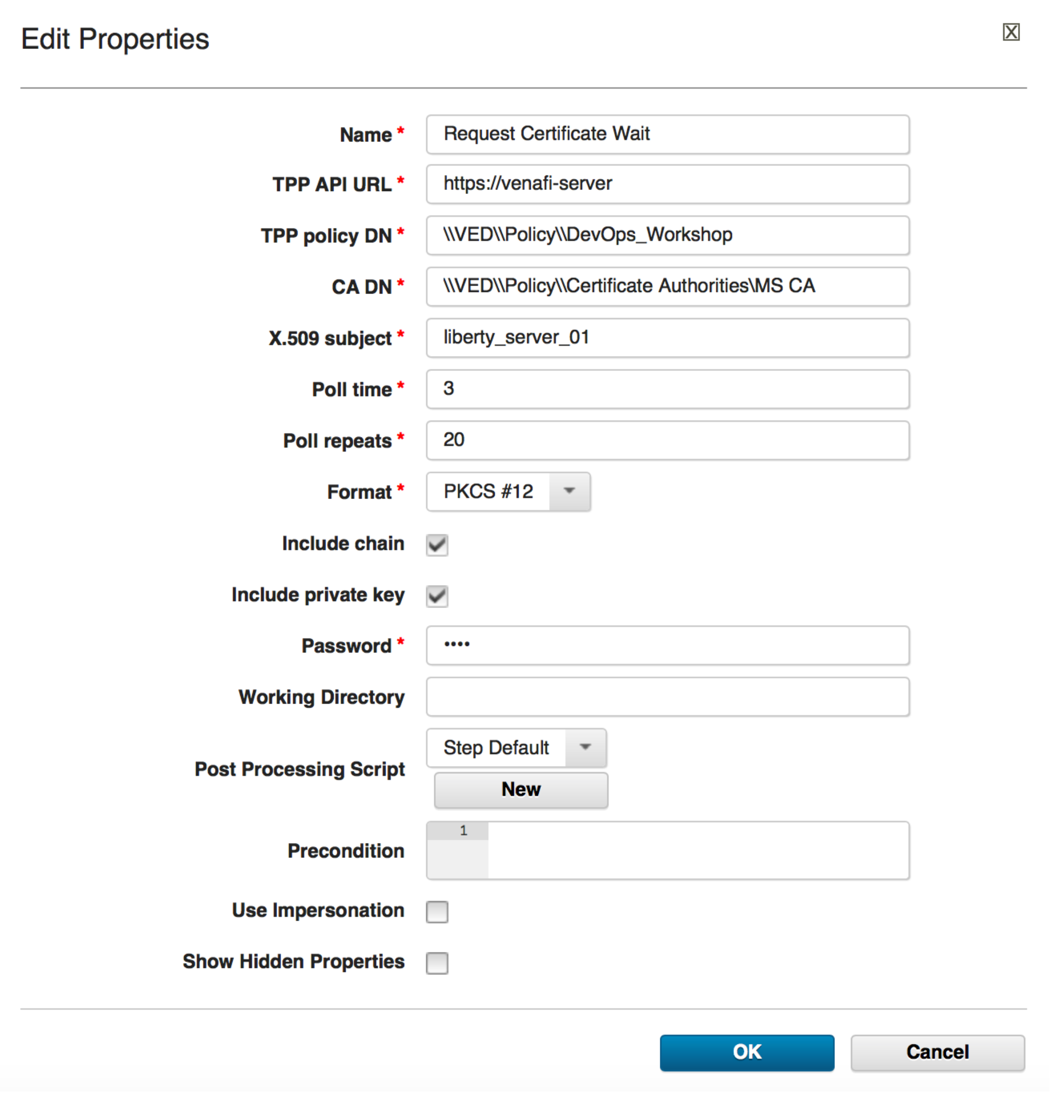


Edit Properties

Name *	Retrieve Certificate
TPP API URL *	${p:resource/VenafiTPP-URL}
Certificate DN *	\\VED\\Policy\\DevOps_Workshop\\NewServer
Filename *	NewServerCert
Format *	PKCS #12
Include chain	☑
Include private key	☑
Password *	••••
Working Directory	
Post Processing Script	Step Default
Precondition	
Use Impersonation	☐
Show Hidden Properties	☐

Request certificate - Wait

- Request a certificate from the Venafi TPP server and wait for it to be available
- Option to download the certificate chain and the private key
- Provide
  - URL to the TPP Server and username / password
  - Certificate authority distinguished name
  - Policy distinguished name – folder in TPP to hold the certificate
  - Filename – Note that the extension is based on certificate format
  - Format – currently only P12
  - Password - A password to protect the downloaded package
  - Poll time (wait between tries to get certificate)
  - Poll repeats (number of times to ask
- Output
  - Includes the filename for reference by further steps
  - Includes status to show successful retrieval



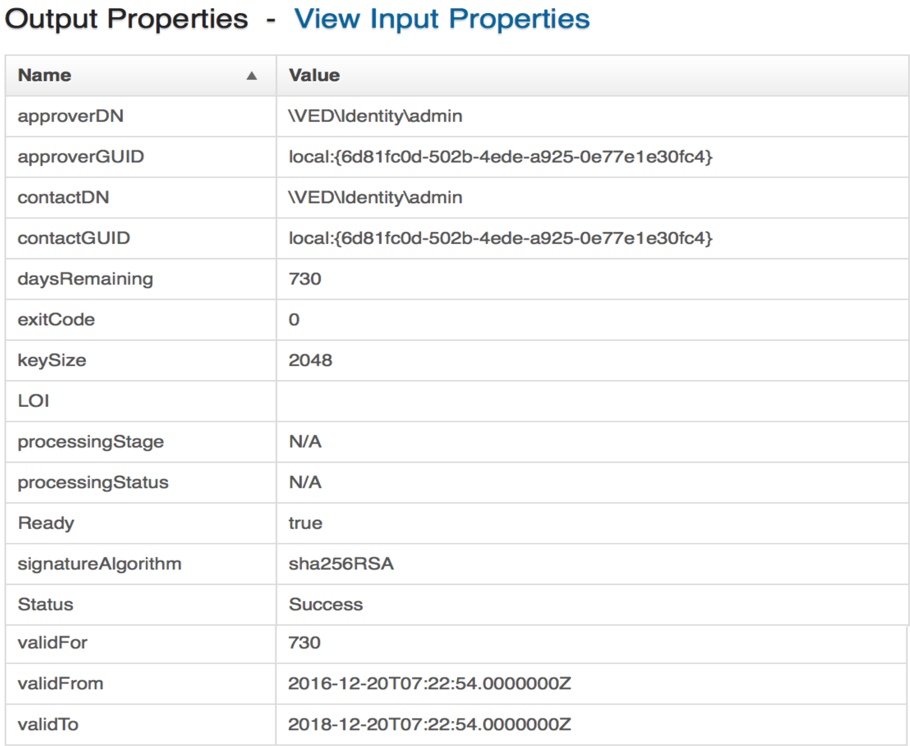
Edit Properties ☒

Name *	Request Certificate Wait
TPP API URL *	https://venafi-server
TPP policy DN *	\\VED\\Policy\\DevOps_Workshop
CA DN *	\\VED\\Policy\\Certificate Authorities\MS CA
X.509 subject *	liberty_server_01
Poll time *	3
Poll repeats *	20
Format *	PKCS #12
Include chain	☑
Include private key	☑
Password *	••••
Working Directory	
Post Processing Script	Step Default New
Precondition	1
Use Impersonation	□
Show Hidden Properties	□

OK Cancel

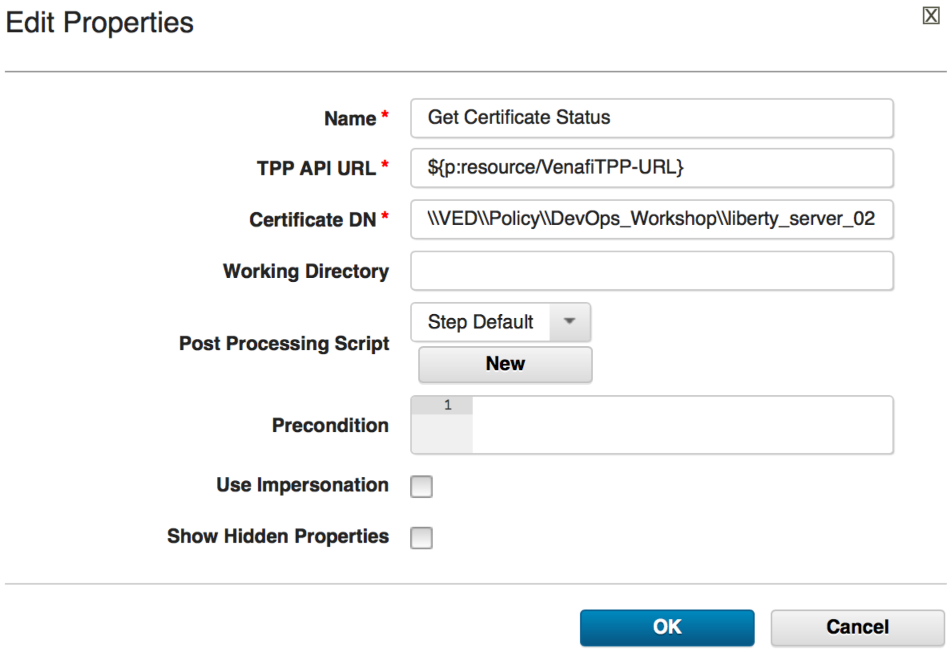
Get certificate status

- Gather information about a certificate
- Provide
  - – URL to the TPP Server and username / password
  - – Certificate distinguished name



Output Properties - View Input Properties

Name ▲	Value
approverDN	\VED\Identity\admin
approverGUID	local:{6d81fc0d-502b-4ede-a925-0e77e1e30fc4}
contactDN	\VED\Identity\admin
contactGUID	local:{6d81fc0d-502b-4ede-a925-0e77e1e30fc4}
daysRemaining	730
exitCode	0
keySize	2048
LOI	
processingStage	N/A
processingStatus	N/A
Ready	true
signatureAlgorithm	sha256RSA
Status	Success
validFor	730
validFrom	2016-12-20T07:22:54.0000000Z
validTo	2018-12-20T07:22:54.0000000Z

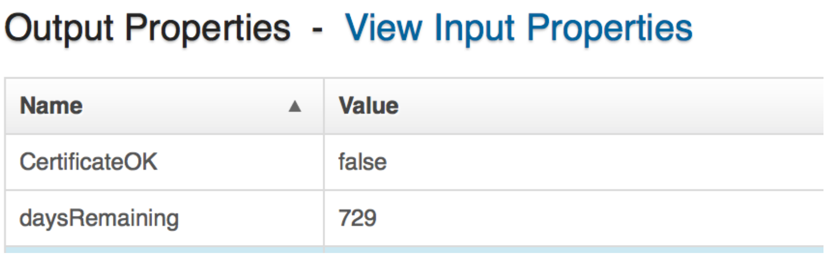


Edit Properties

Name *	Get Certificate Status
TPP API URL *	${p:resource/VenafiTPP-URL}
Certificate DN *	\\VED\\Policy\\DevOps_Workshop\\liberty_server_02
Working Directory	
Post Processing Script	Step Default
Precondition	1
Use Impersonation	□
Show Hidden Properties	□

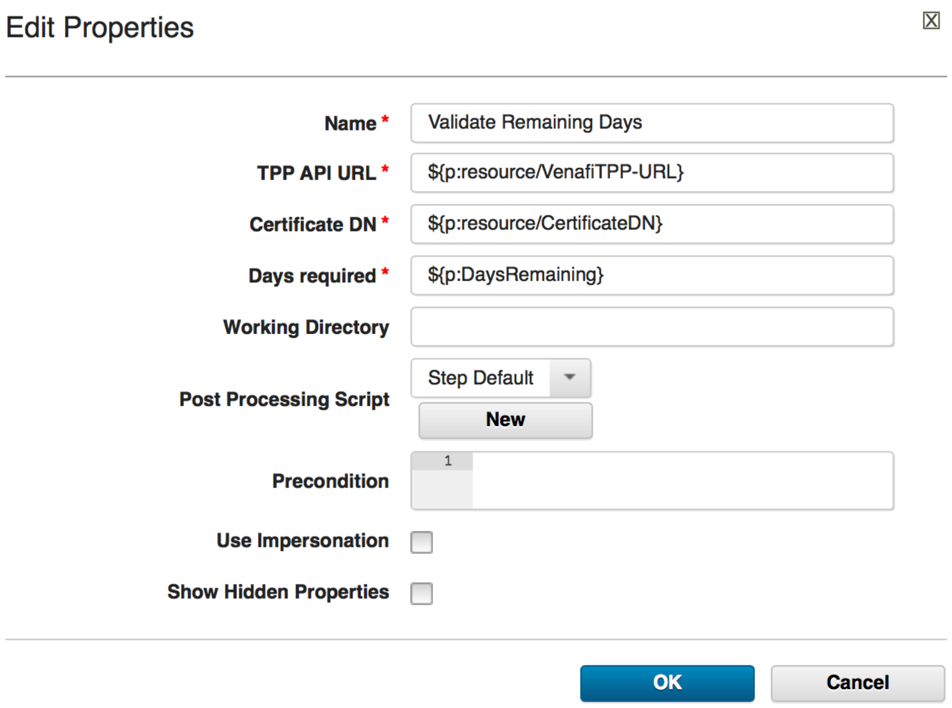
Validate remaining days

- Validate that a certificate is valid for at least a specific number of days
- Provide
  - URL to the TPP Server and username / password
  - Certificate distinguished name
  - Number of days for which the certificate should be valid
  - Dremaining is passed as a component process property in this example
- Step result
  - Step will fail if it cannot connect to Venafi server of find the certificate
  - Step will pass and report validity in ‘CertificateOK’
- Output



Output Properties - View Input Properties

Name ▲	Value
CertificateOK	false
daysRemaining	729

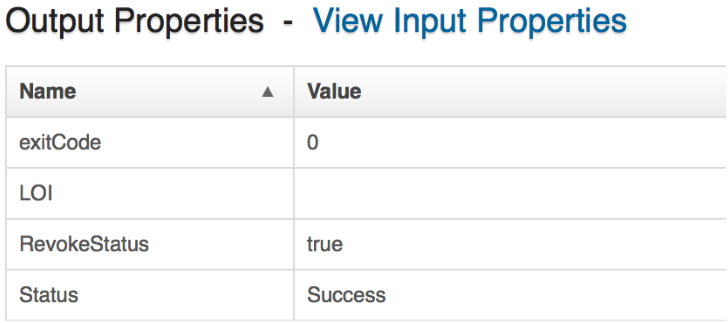


Edit Properties ☒

Name *	Validate Remaining Days
TPP API URL *	${p:resource/VenafiTPP-URL}
Certificate DN *	${p:resource/CertificateDN}
Days required *	${p:DaysRemaining}
Working Directory	
Post Processing Script	Step Default New
Precondition	1
Use Impersonation	□
Show Hidden Properties	□

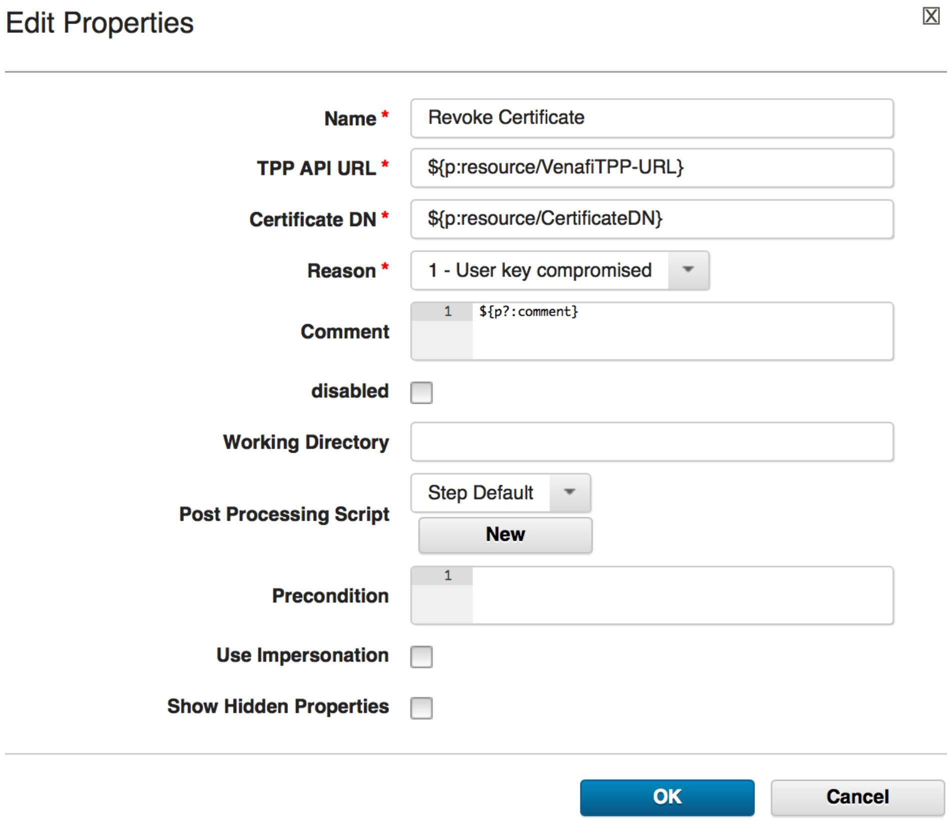
Revoke certificate

- Revoke a certificate on the Venafi TPP server
- Provide
  - URL to the TPP Server and username / password
  - Certificate distinguished name
  - Reason :
    - 1 – User key compromised
    - 2 – CA key compromised
    - 3 – User changed affiliation
    - 4 – Certificate superseded
    - 5 – Original use no longer valid
  - Comment – Optional component process property in example
- Step result



Output Properties - View Input Properties

Name ▲	Value
exitCode	0
LOI	
RevokeStatus	true
Status	Success

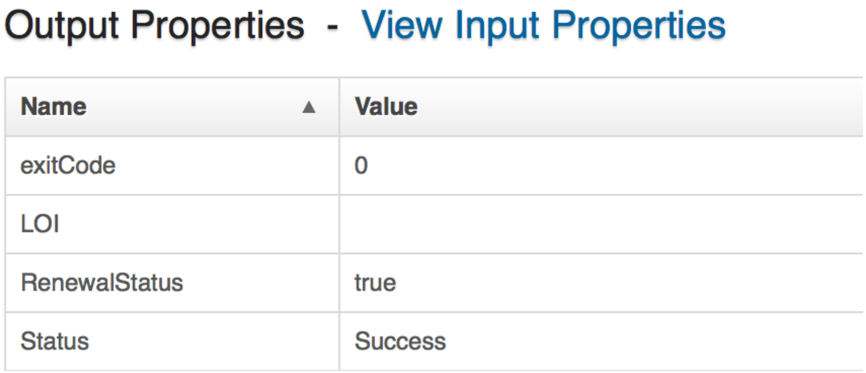


Edit Properties ☒

Name *	Revoke Certificate
TPP API URL *	${p:resource/VenafiTPP-URL}
Certificate DN *	${p:resource/CertificateDN}
Reason *	1 - User key compromised
Comment	${p?:comment}
disabled	□
Working Directory	
Post Processing Script	Step Default New
Precondition	
Use Impersonation	□
Show Hidden Properties	□

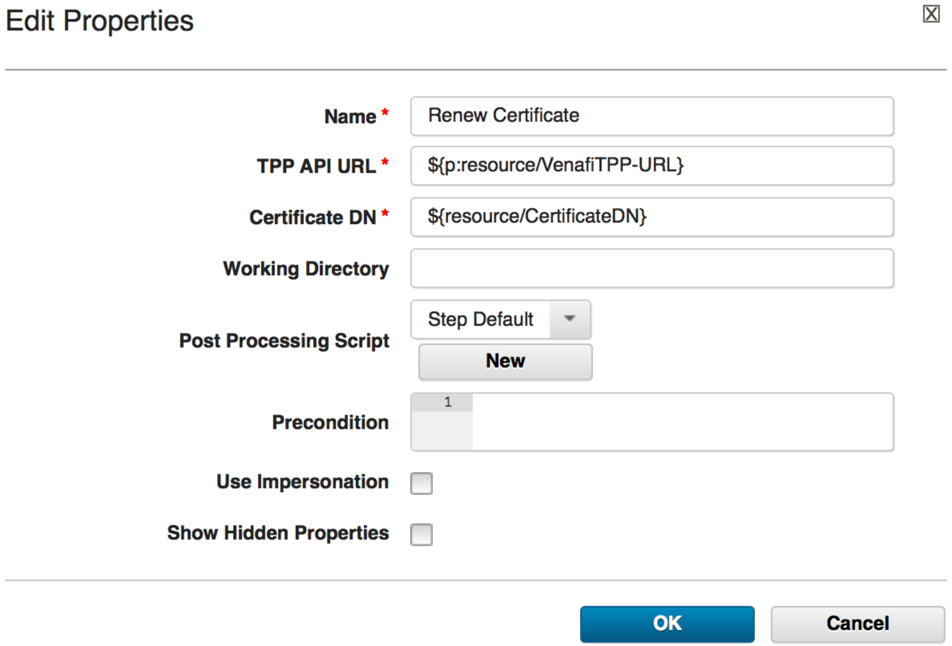
Renew certificate

- Renew a certificate on the Venafi TPP server
- Does not necessarily have to be a revoked certificate
- Does not download the certificate – need a retrieve certificate step
- Provide
  - URL to the TPP Server and username / password
  - Certificate distinguished name
- Step result



Output Properties - View Input Properties

Name ▲	Value
exitCode	0
LOI	
RenewalStatus	true
Status	Success

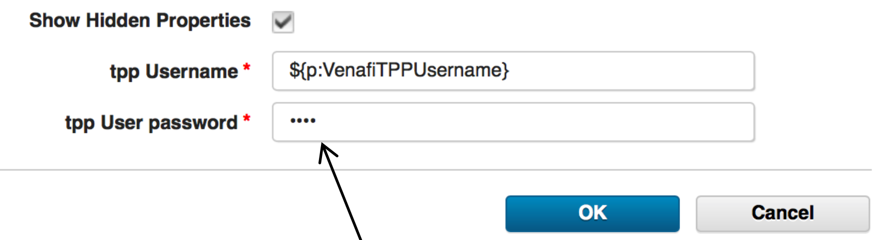


Edit Properties ☒

Name *	Renew Certificate
TPP API URL *	${p:resource/VenafiTPP-URL}
Certificate DN *	${resource/CertificateDN}
Working Directory	
Post Processing Script	Step Default ▾ New
Precondition	1
Use Impersonation	□
Show Hidden Properties	□

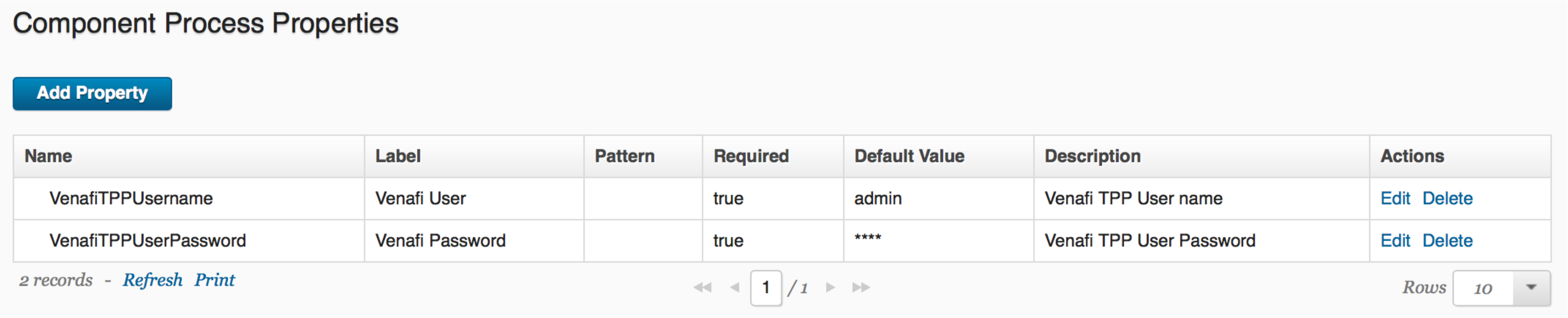
Venafi TPP User and password management

- All plugin steps require a login to the Venafi TPP server
- All requests for certificate actions are audited against each user
- Each plugin step requires Venafi username and password
  - – tpp Username and tpp User password fields
  - – Password field is a secure property
- Username and password values can be:
  - – Typed into each step – not ideal as passwords change and would require one ‘generic’ user
  - – Stored in the UrbanCode resource tree – not ideal from a security position
  - – Typed in for ach process execution – Not stored in UrbanCode and each user requesting a deployment must enter their credentials
- Create process properties to request passwords at deploy time



Show Hidden Properties	☑
tpp Username *	${p:VenafiTPPUsername}
tpp User password *	••••

Note this field value is actually :
${p:VenafiTPPUserPassword}



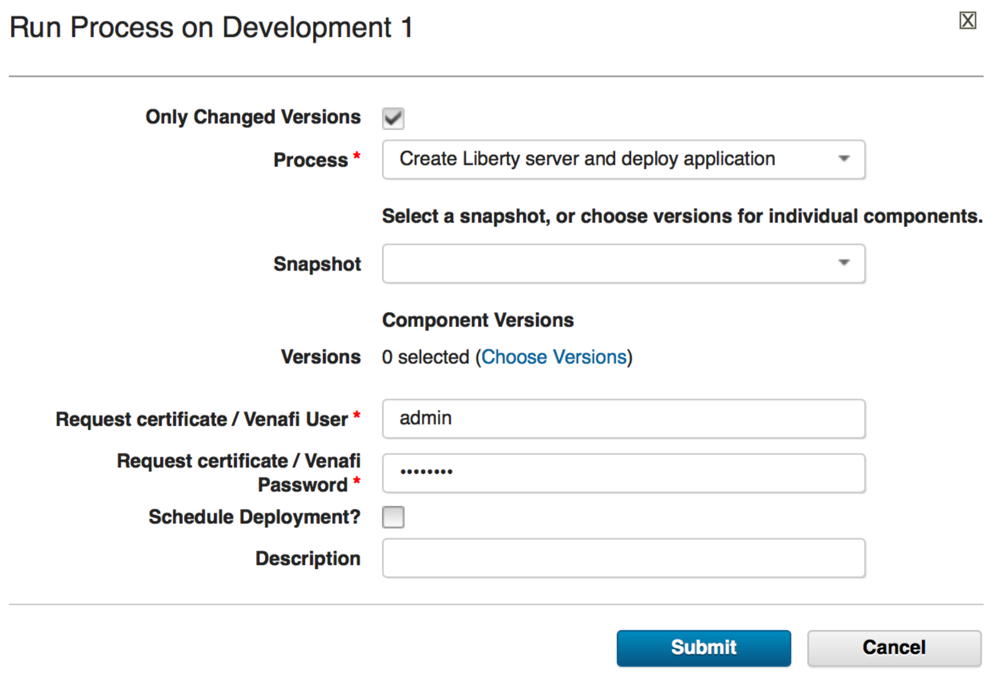
Component Process Properties

Name	Label	Pattern	Required	Default Value	Description	Actions
VenafiTPPUsername	Venafi User		true	admin	Venafi TPP User name	Edit Delete
VenafiTPPUserPassword	Venafi Password		true	****	Venafi TPP User Password	Edit Delete

2 records - Refresh Print

Venafi TPP User and password management

- At ’deploy’ time (execution of a process) the username and password for Venafi TPP are requested
- Password is stored as a secure property and passed to the relevant agents in an encrypted format
- Passwords are redacted in logs
- Each interaction between UrbanCode and Venafi is managed under a specific user ID
- Maintains Venafi audit trails with automation from UrbanCode

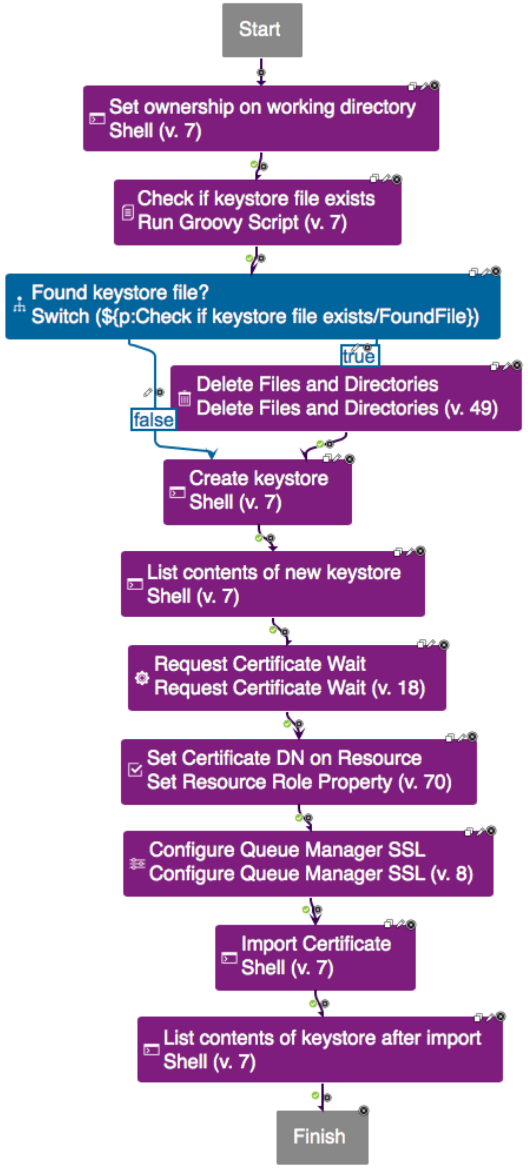


Run Process on Development 1 ☒

Only Changed Versions	☑
Process *	Create Liberty server and deploy application
	Select a snapshot, or choose versions for individual components.
Snapshot	
	Component Versions
Versions	0 selected (Choose Versions)
Request certificate / Venafi User *	admin
Request certificate / Venafi Password *	••••••••
Schedule Deployment?	□
Description	

Example process : Request a new certificate and apply to WebSphere MQ

- Complete certificate management process for WebSphere MQ
  - If a keystore is found it is removed and replaced
  - The Certificate DN is stored on the UrbanCode Deploy resource for further interaction wit Venafi later such as a certificate validation or renewal
  - Certificates are listed after importing so the user can validate if required
- No need to connect remotely to the target machine



Start

Set ownership on working directory
Shell (v. 7)

Check if keystore file exists
Run Groovy Script (v. 7)

Found keystore file?
Switch (${p:Check if keystore file exists/FoundFile})

Delete Files and Directories
Delete Files and Directories (v. 49)

Create keystore
Shell (v. 7)

List contents of new keystore
Shell (v. 7)

Request Certificate Wait
Request Certificate Wait (v. 18)

Set Certificate DN on Resource
Set Resource Role Property (v. 70)

Configure Queue Manager SSL
Configure Queue Manager SSL (v. 8)

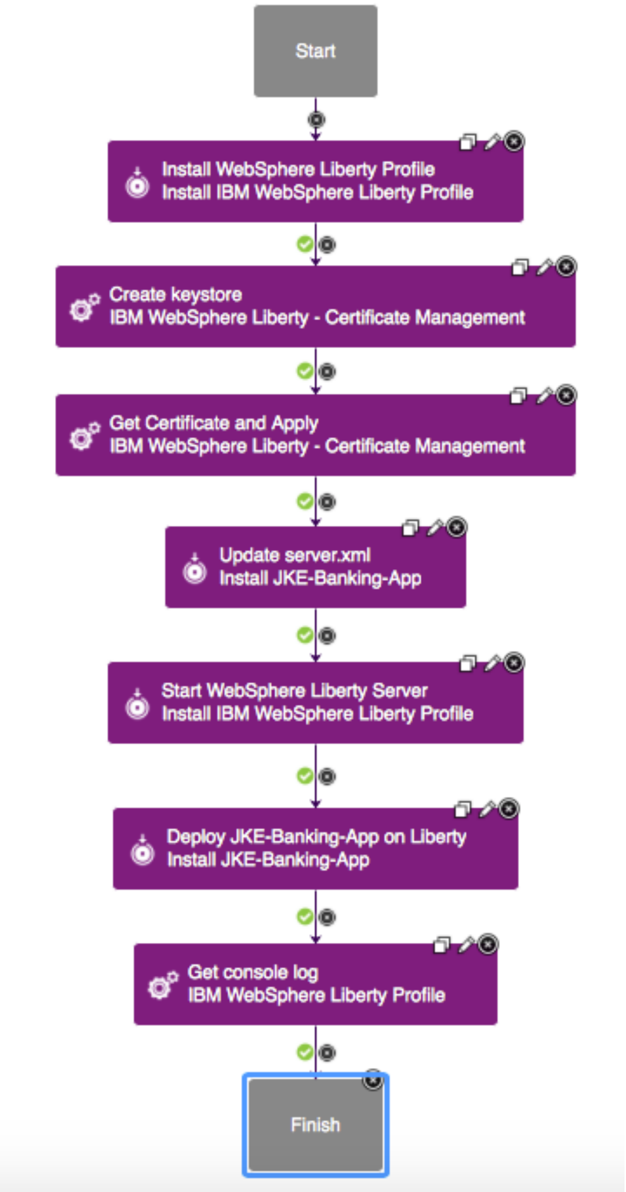
Import Certificate
Shell (v. 7)

List contents of keystore after import
Shell (v. 7)

Finish

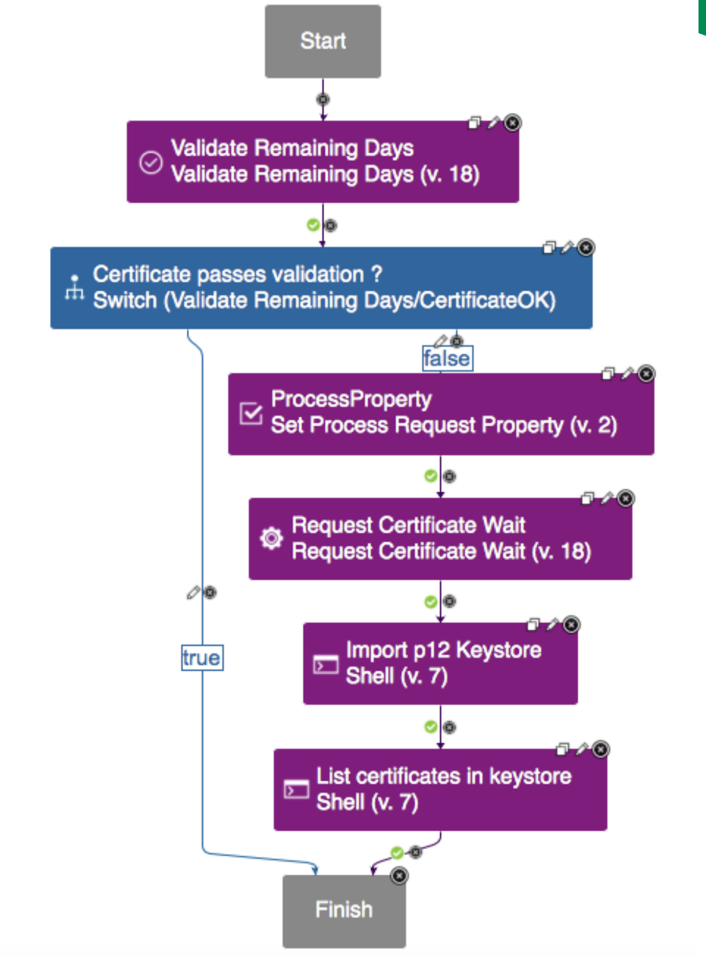
Example process : Install WebSphere Liberty, Certificate and Application

- Install WebSphere Liberty Application Server
- Create a keystore
- Request a certificate and apply to Liberty server
- Update server.xml based on developer requirement for specific features
- Start the Liberty server
- Deploy the application
- Get console log to view status and result of deployment
  – Removes the need to connect to the remote machine


Start
Install WebSphere Liberty Profile
Install IBM WebSphere Liberty Profile
Create keystore
IBM WebSphere Liberty - Certificate Management
Get Certificate and Apply
IBM WebSphere Liberty - Certificate Management
Update server.xml
Install JKE-Banking-App
Start WebSphere Liberty Server
Install IBM WebSphere Liberty Profile
Deploy JKE-Banking-App on Liberty
Install JKE-Banking-App
Get console log
IBM WebSphere Liberty Profile
Finish

Maintain certificate process

- Check a certificate expiry date in Venafi TPP server records
  - – Validate the number of days remaining on the certificate (uses the stored Certificate DN)
  - – If the certificate has enough days left then do nothing, otherwise:
    - Request a new certificate on Venafi server
    - Import the new certificate
    - List the new certificate


Start
Validate Remaining Days
Validate Remaining Days (v. 18)
Certificate passes validation ?
Switch (Validate Remaining Days/CertificateOK)
false
ProcessProperty
Set Process Request Property (v. 2)
Request Certificate Wait
Request Certificate Wait (v. 18)
true
Import p12 Keystore
Shell (v. 7)
List certificates in keystore
Shell (v. 7)
Finish