VMware vCenter Orchestrator 5.5 Release Notes

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vCenter Orchestrator 5.5 | 22 September 2013 | Build 1281930

vCenter Orchestrator Appliance 5.5 | 22 September 2013 | Build 1282845

Release notes last updated on 08 October 2014.

Check frequently for additions and updates to these release notes.

What's in the Release Notes

The release notes cover the following topics:

What's New in vCenter Orchestrator 5.5

With this release, vCenter Orchestrator is greatly optimized for growing clouds because of significant improvements in scalability and high availability. Workflow developers can benefit from a more simplified and efficient development experience provided by the new debugging and failure diagnostic capabilities in the vCenter Orchestrator client.

- **More efficient workflow development experience**

  The new workflow debugger enables workflow developers to troubleshoot and test their automated use cases quickly and easily, which improves the development experience. The developers can re-run their workflows in debug mode without typing the last known values for the workflow input parameters. The inputs are automatically stored and populated for the consequent workflow execution. Workflow developers are also able to set breakpoints on workflow activities, step into them and watch variable values at various steps of the debugging process. In addition, the developers can resume a workflow from a failed state for the consequent execution of their custom workflows. Finally, the new workflow icon libraries also make the vCenter Orchestrator client usage more intuitive and customizable.

- **Improved Workflow Schema**

  In addition to the auto-scaling and auto-placing capabilities, experienced workflow developers can also use non-stick placement while designing the workflow activity diagram.

- **Improved Scripting API Explorer**

Consistent navigation is an essential component of the workflow development. The Scripting API Explorer is now enhanced with out-of-the-box browsing history. The new **Back** button, available in the explorer allows workflow developers to navigate in reverse chronological order through the history of scripting objects they have recently worked with.

- **Improved scalability and high availability**

  Cloud architects are now able to plan vCenter Orchestrator deployments with cloud scalability in mind by using the clustering capabilities of the Orchestrator platform. The new Orchestrator cluster mode provides high availability of the engine and enables dynamic scale-up and scale-down of orchestration capacity when used in conjunction with external load balancer. If an Orchestrator server becomes unavailable during a workflow run, another Orchestrator server can take over and complete the workflow run with no service interruption.

- **vSAN support in the vCenter Server 5.5 plug-in**

  The vCenter Server 5.5 plug-in now also supports vSAN which currently is being shipped with Beta quality. vCenter Orchestrator users can select vSAN objects while running a workflow requiring a datastore input. Meanwhile, a few management options around the distributed storage are also supported. During the creation of a cluster, you can select to enable or disable a distributed storage.

- **Security Improvements**

  The new build of the vCenter Orchestrator Appliance contains a complete set of security improvements, including Operating System updates and security hardening script enhancements.

- **Improved integration with the vSphere Web Client**

  Besides the auto-discovery options for vCenter Orchestrator in the vSphere Web Client, virtual infrastructure administrators can manage and monitor the vCenter Orchestrator instances or add them on demand directly from the vSphere Web Client.

- **REST API enhancements**

  Release 5.5 facilitates the usage of vCenter Orchestrator REST API because of enhancements in the JSON support and simplified integration with vCenter Single Sign-On.
  The Orchestrator environment can now be programmatically configured to easily deploy Orchestrator instances not only for test and development purposes, but also to scale up the automation capacity. The REST API also provides the capability to leverage Orchestrator workflows in a localized environment if the dedicated property files are used for the specific language.

vCenter Orchestrator 5.5 Feature and Support Notice

The use of OGNL expressions in workflow presentations is supported.

vCenter Orchestrator 5.5 introduces a new JSON format that can be used by providing the `application/json` value for both `Accept` and `Content-Type` header types.

Installing VMware vCenter Orchestrator 5.5

You can download the vCenter Server 5.5 installer and install Orchestrator together with vCenter Server or standalone.

Read *Installing and Configuring VMware vCenter Orchestrator* for step-by-step guidance on installing and configuring vCenter Orchestrator.

Upgrading to vCenter Orchestrator 5.5 and Migrating the Orchestrator Configuration Data

To upgrade an installation of Orchestrator 4.2.x or 5.1 on a 64-bit Microsoft Windows server that is different from the server on which vCenter Server runs, run the latest version of the Orchestrator standalone installer.

If vCenter Orchestrator 4.0.x is installed on the same 64-bit machine as vCenter Server 4.0.x, you cannot upgrade to Orchestrator 5.5 by upgrading to vCenter Server 5.5. VMware does not support the in-place upgrade of a standalone Orchestrator instance running on a 64-bit machine. To upgrade to vCenter Orchestrator 5.5, you must export the Orchestrator configuration settings, uninstall the existing Orchestrator instance, run the 64-bit Orchestrator installer, and import the configuration settings.

Read *Installing and Configuring VMware vCenter Orchestrator* for step-by-step guidance on migrating the Orchestrator configuration settings.

IMPORTANT Orchestrator 5.5 does not support Single Sign-On 1.0 when using vCenter Server 5.1. If you are upgrading Orchestrator 5.1 that is registered with Single Sign-On to Orchestrator 5.5, you must register the instance with Single Sign-On 2.0 after the upgrade.

If you have developed workflows, actions, plug-ins, policies, and so on, by using a previous version of Orchestrator, perform the following steps:

1. Export packages of all the custom workflows, actions, policies, and so on, that you developed with the earlier version of Orchestrator.
2. Create a new instance of an empty database for Orchestrator 5.5.
3. Install and configure Orchestrator 5.5 by following the instructions in the *Installing and Configuring VMware vCenter Orchestrator* documentation.
4. Connect Orchestrator 5.5 to the new Orchestrator database.
5. Import the packages you exported from the earlier version of Orchestrator.

Downloading and Deploying the VMware vCenter Orchestrator Appliance 5.5

VMware vCenter Orchestrator is available as a preconfigured virtual appliance. The appliance significantly reduces the time and skills required to deploy vCenter Orchestrator and provides a low-cost alternative to the traditional Windows-based installation. You can download the vCenter Orchestrator Appliance 5.5 from the Orchestrator Appliance download link.

The Orchestrator Appliance 5.5 is distributed in OVF (Open Virtual Machine Format), OVA (Open Virtualization Appliance), and VMDK (Virtual Machine Disk) formats. It is pre-built and pre-configured with Novell SUSE Linux Enterprise Server, PostgreSQL, and OpenLDAP, and it can be used with vCenter Server 5.5.

The Orchestrator Appliance offers great flexibility and uncompromised performance, making it ideal for any use case from lab evaluation to large-scale production use. The appliance offers all of the components included in the regular Windows-based installation, along with the flexibility to use either the pre-built directory services and database, or external ones like Active Directory or Oracle. What's more, the Orchestrator appliance has been certified to run at the same performance level as the Windows-based installation.

The Orchestrator Appliance makes it even faster, easier, and more affordable to integrate the VMware cloud stack, including vCenter Server and vCloud Director, with your IT processes and environment.

Important: You cannot perform an in-place upgrade of previous versions of the Orchestrator Appliance to Orchestrator Appliance 5.5. You can download and deploy the latest version of the appliance, and migrate the data from a previous appliance version. For instructions about upgrading the Orchestrator Appliance to version 5.5, see *Installing and Configuring VMware vCenter Orchestrator*.

Important: For security reasons, the password expiry of the root account of the Orchestrator Appliance is set to 365 days. To increase the expiry time for an account, log into the Orchestrator Appliance as root, and run:

```
passwd -x number_of_days name_of_account
```

To make your Orchestrator Appliance root password last forever, run:

```
passwd -x 99999 root
```

For instructions about deploying and using the Orchestrator Appliance, see *Installing and Configuring VMware vCenter Orchestrator*.

Internationalization Support

vCenter Orchestrator 5.5 supports internationalization level 1. Although Orchestrator is not localized, it can run on non-English operating systems and handle non-English text.

How to Provide Feedback

Your active feedback over the next few weeks is appreciated. Provide your feedback by:

- Support Requests (SRs)
- Orchestrator Discussion Forum

Support Requests

File all issues that you find as Support Requests (SRs), even if you report them to VMware by other means.

You can find the VMware Support's commitment to SRs filed by customers and instructions on how to file an SR at http://www.vmware.com/support/services/.

Experienced SR users can file support requests by using the vCenter Orchestrator support link.

Use your registered VMware store account to log in.

Include log files in your SRs. To gather log files from Orchestrator:

1. Go to the Orchestrator configuration interface at `https://orchestrator_server_ip_address:8283`.
2. Log in with your username and password.
3. Click **Logs**.
4. Click **Generate log report**.
5. Save the generated ZIP file.
6. Upload the saved ZIP file to VMware Support.

For Orchestrator configuration issues, include an exported configuration file in your SRs. To export your configuration from the Orchestrator configuration interface:

1. Go to the Orchestrator configuration interface at `https://orchestrator_server_ip_address:8283`.
2. Log in with your username and password.
3. Click **General**.
4. Click the **Export Configuration** tab.
5. Type your password and press Enter.
6. Save the `*.vmoconfig` file.
7. Upload the saved files to VMware Support.

Orchestrator Discussion Forum

View the Orchestrator 5.5 forum at https://communities.vmware.com/community/vmtn/vcenter/orchestrator.

Prior Releases of vCenter Orchestrator

Features and issues from earlier releases of vCenter Orchestrator are described in the release notes for each release. To review release notes for earlier releases of vCenter Orchestrator, click one of the following links:

- vCenter Orchestrator 5.1.1b
- vCenter Orchestrator 5.1.1
- vCenter Orchestrator 5.1
- vCenter Orchestrator 4.2.2
- vCenter Orchestrator 4.2.1
- vCenter Orchestrator 4.2
- vCenter Orchestrator 4.1.3
- vCenter Orchestrator 4.1.2
- vCenter Orchestrator 4.1.1
- vCenter Orchestrator 4.1
- vCenter Orchestrator 4.0.4
- vCenter Orchestrator 4.0.3
- vCenter Orchestrator 4.0.2
- vCenter Orchestrator 4.0.1
- vCenter Orchestrator 4.0

Resolved Issues

The following list of issues are resolved in this release:

- **Only one vCenter Orchestrator server instance appears in the vSphere Web Client**
  When you use the vSphere Web Client to connect to multiple vCenter Orchestrator servers to manage multiple vCenter Server instances, only one of the connected vCenter Orchestrator servers is displayed in the vSphere Web Client.

- **You cannot upgrade Orchestrator during a vCenter Server upgrade**
  You cannot upgrade Orchestrator 4.2 to version 5.1 during the upgrade of vCenter Server.

  The issue is fixed and you can upgrade Orchestrator 4.2.x to Orchestrator 5.5 during the upgrade of vCenter Server.

- **When you drag and drop a Throw exception element on a decision box, an End workflow element is added to the schema**
  In the Workflow Schema of the Orchestrator client, when you drag and drop a **Throw exception element** on a decision box, an **End workflow** element is added instead.

  The issue is fixed in this release.

- **The Filter tab in the Select an inventory object window might stay empty with no objects populated**
  When you run a workflow through the vSphere Web Client and you use the **Filter** tab to select an inventory object, the tab might stay empty and return no results. If loading the inventory objects takes more than the default vSphere Web Client time (one minute), the task is canceled without any error message and no objects are displayed.

  The issue is fixed in this release.

- **You cannot access the administration settings in the Orchestrator Appliance Web console under Mozilla Firefox 14.0.1**
  If your Web browser is Mozilla Firefox 14.0.1, when you navigate to the IP address that your Orchestrator Appliance virtual machine provides (http://*orchestrator_appliance_ip*), and you click **Appliance Configuration** to go to the appliance Web console, you cannot see the administration settings text boxes under the **Admin** tab.

  The issue is fixed in this release.

- **The Orchestrator client might stop displaying the vCenter Server inventory**
  A running environment of Orchestrator and vCenter Server plug-in might stop working properly. For example, you might not be able to browse the inventory, or when you run a workflow, instead of being able to search the vCenter Server inventory by filtered objects, the whole vCenter Server inventory is displayed. This issue occurs when Orchestrator is configured to work with the vCenter Server Virtual Appliance. When the Orchestrator session with vCenter Server becomes invalid, you cannot browse the inventory.

  The issue is fixed in this release.

- **Orchestrator Web interfaces use SSL/TLS algorithms that include Triple DES (3DES) to allow backward compatibility with older browsers and operation systems**
  Orchestrator Web interfaces use SSL/TLS algorithms that include Triple DES (3DES) to allow backward compatibility with older browsers and operation systems. This includes Internet Explorer and Chrome under Windows XP, Internet Explorer 9 under Windows Vista, and other.

  The issue is fixed in this release.

- **When you upgrade from Orchestrator 4.2.1 to Orchestrator 5.5, the database configuration might be lost**
  After you upgrade from Orchestrator 4.2.1 to Orchestrator 5.5, and your database is an Oracle database, the database configuration might be lost. When you log in to the Orchestrator configuration interface, the **Database** tab is red and you can see that the database IP and database name are missing.

Known Issues

The known issues are grouped as follows:

- Installation and Upgrade Issues
- Internationalization Issues
- Configuration Issues
- Networking Issues
- Miscellaneous Issues

Installation and Upgrade Issues

- **Restarting Orchestrator server service after reinstalling plug-ins adds Java exceptions to the logs**
  In the **Troubleshooting** tab of the Orchestrator configuration interface, if you reinstall plug-ins by clicking **Reset current version** and then restart the Orchestrator server, several Java exceptions are written to the Orchestrator server logs.
- **Orchestrator registry keys remain after you uninstall Orchestrator by using Windows Control Panel**
  If you uninstall Orchestrator using the Windows Control Panel, some Orchestrator registry entries are not removed.

  Workaround: To remove the Orchestrator entries manually:

  1. Click **Start** > **Run**.
  2. Type `regedit` and press Enter.
  3. In the **Registry Editor**, click **File** > **Export** to back up the current registry settings.
  4. Navigate to `HKEY_LOCAL_MACHINE\SOFTWARE\VMware`.
  5. Right-click the Orchestrator entries and select **Delete**.

- **After upgrading Orchestrator as part of vCenter Server to 5.5, you might not be able to start the Orchestrator server.**
  If the Orchestrator Administrators group and the Administrators group of the vCenter Server local machine are identical, and the local machine name has been changed after the latest vCenter Server installation, the Orchestrator server migh

not start successfully after the upgrade to Orchestrator 5.5. **Workaround**: Before starting the Orchestrator server after the upgrade to 5.5, configure the authentication settings and upgrade the database from the Orchestrator configuration interface.

- **If you upgrade Orchestrator as part of vCenter Server to 5.5 and start the Orchestrator server right after the upgrade, you might experience performance issues with tasks, policies, and other Orchestrator components.**
  During the upgrade to Orchestrator 5.5 an error with the Single Sign-On configuration occurs, which prevents Orchestrator from upgrading the database. For information about the error, see the log file *`vSphere_installation_directory`*`\Infrastructure\Orchestrator\app-server\logs\post_installer_action_errors.log`. **Workaround**: Before starting the Orchestrator server after the upgrade to 5.5, upgrade the database from the Orchestrator configuration interface.

- **After upgrading to Orchestrator 5.5, scheduled tasks might not run.**
  After upgrading to Orchestrator 5.5 and starting the Orchestrator server, scheduled tasks might not run because Orchestrator cannot retrieve tokens from Single Sign-On for the users who scheduled the tasks.

  Workaround: Edit the tasks and re-enter the user credentials.

- **After upgrading to Orchestrator 5.5 and if Single Sign-On authentication is used, running workflows might not complete successfully.**
  After upgrading to Orchestrator 5.5 and starting the Orchestrator server, workflows that were in running state or waiting on user interactions before the upgrade might not complete successfully if Single Sign-On authentication is used.

  Workaround: Restart the workflows.

Internationalization Issues

- **You might not be able to configure the LDAP settings if your LDAP password contains non-ASCII characters**
  When you try to configure the LDAP settings in the Orchestrator configuration interface and the LDAP password that you enter contains non-ASCII characters, the process of configuring might fail with an error message of the type `Unable to connect to LDAP Server`. This issue appears under the following conditions:
  - When the LDAP password contains characters such as ß and ÿ in German and French locales.
  - When the LDAP password contains any native characters in Japanese, Korean, and Simplified Chinese locales.

- **Problems handling non-ASCII characters in certain contexts**
  Using non-ASCII characters in input parameters results in incorrect behavior in the following contexts:
  - If you run the SCP put or SCP get workflows from the SSH folder on a file with a name that contains non-ASCII characters, the workflow runs, but name of the resulting file on the destination machine is garbled.
  - If you try to insert non-ASCII characters into attribute names, the characters do not appear. The issue occurs for Web view attributes, workflow attributes and action attributes.

Configuration Issues

- **The Orchestrator authentication configuration might become invalid**
  When Orchestrator is configured to use vCenter Single Sign-On, if the certificate of the vCenter Single Sign-On server changes or regenerates, the Orchestrator authentication configuration becomes invalid and the Orchestrator server cannot start.

  Workaround: To fix this issue, import the new vCenter Single Sign-On certificate:

  1. Log in to the Orchestrator configuration interface as `vmware`.
  2. Click **Network**.
  3. In the right pane, click the **SSL Trust Manager** tab

3. In the right pane, click the **SSL Trust Manager** tab.
4. Load the vCenter Single Sign-On SSL certificate from a URL or a file.
5. Click **Import**.
6. Click **Startup Options**.
7. Click **Restart the Orchestrator configuration server** to restart the Orchestrator Configuration service after adding the new SSL certificate.

- **Orchestrator does not work with forest and external trusts in Active Directory**

  Multiple domains that are not in the same tree but have a two-way trust, are not supported and do not work with Orchestrator. The only configuration supported for multi-domain Active Directory is domain tree. Forest and external trusts are unsupported.

- **Support for TNSNames missing when you connect to an Oracle database**
  You cannot use TNSNames to connect to an Oracle database. You can connect to an Oracle database using an IP address or a DNS name.

  Workaround: Add support for RAC and TNS configuration for Oracle 11g Database instances to vCenter Orchestrator (KB 1022828).

- **SSL certificate is lost when you import configuration from previous installation**
  If you import the configuration of a previous installation into the current installation, the SSL certificate from the old installation is not loaded. In the Orchestrator configuration interface the **Server Certificate** tab shows a red triangle.

  Workaround: You must import the certificate manually.

- **Restricted access to vCenter Server inventory can cause errors if you set Session per user**
  If you select the **Session per user** option in the **vCenter Server** tab of the configuration interface, accessing the vCenter Server inventory can result in some errors if the connected user has restricted access to inventory objects.
- **No error message is displayed on the Network tab of the Orchestrator configuration interface when a network port is already in use**
  The Network configuration is saved successfully without errors even when the port numbers that you enter are already taken on your host.

  Workaround: Make sure the port numbers you enter on the **Network** tab are free.

Networking Issues

- **Loss of network connection to vCenter Server can cause workflows to stop**
  If Orchestrator loses the network connection to vCenter Server while a workflow is running, and if the workflow attempts to access vCenter Server, that workflow stops and does not attempt to restart. Furthermore, the vCenter Server plug-in flushes its cache if it loses the connection to vCenter Server. Consequently, when the Orchestrator server restarts, it fetches all running objects again from the vCenter Server rather than reloading them from the cache. Fetching the objects again can cause peaks in CPU usage, and increases the load on vCenter Server. An intermittent connection to vCenter Server causes frequent workflow failures. If the network connection to vCenter Server is intermittent, then constantly fetching the objects can consume vCenter Server memory, leading to drops in performance.

  Workaround: Ensure that the network connection to vCenter Server is stable.

Client Issues

- **You might not be able to start the Orchestrator client from the Orchestrator Appliance home page on Windows XP**
  You might not be able to start the Orchestrator client from the appliance home page by using the Java Web Start on Windows XP. The error message that you receive states that there is an unsigned `.jar` file found in the application. This is an issue of the Java Web Start software.

Workaround: Enable caching of temporary files in the Java Web Start configuration. To do this:

1. On the Windows XP machine, click **Start > Settings > Control Panel > Java**. The Java Control Panel window opens.
2. On the **General** tab, under Temporary Internet files, click **Settings**.
3. Select **Keep temporary files on my computer**.
4. Set the amount of disk space for storing temporary files to maximum, and click **OK**.
5. Under Temporary Internet files, click **View**.
6. In the Java Cache Viewer, select **Applications**.
7. Select all items and remove them by clicking the **Remove selected items** button in the toolbar.
8. Click **Close**.
9. Click **OK** to close the Java Control Panel window.
10. Click **Start Orchestrator Client** on the appliance home page to try to start the Orchestrator client by using the Java Web Start.

- **Usage of the Orchestrator client through Java WebStart if the Orchestrator Appliance is behind Network Address Translation (NAT) is not supported**

- **Importing a package using the Orchestrator client fails occasionally**
  Occasionally, when your database is a MySQL database, importing a package using the Orchestrator client results in the error `Unable to import a certificate, reason : Unable to save keystore`.

  Workaround: Close the error message and attempt the import again.

- **The Revert option for the parameters table on the Scripting tab of the Edit Actions view does not revert to the last saved state**
  When you add a parameter to an action script, you cannot remove it using the **Revert** option.

  Workaround: Right-click the parameter and click **Delete Selected**.

- **Characters are accepted as the input value for workflow attributes of number type**
  Format validation has been disabled on workflow attributes that are of the number type. Invalid input values are accepted without any warning, and workflows are saved successfully, which can lead to unpredictable results.
- **Changes to input parameter descriptions are not propagated to the presentation**
  If you change the description of an input parameter for a workflow, the change is not propagated to the description in the presentation.

  Workaround: Copy the description to the presentation manually.

Miscellaneous Issues

A generated URL might lead to an error of the type: Page not found
When you run a workflow that sends an email with a URL requiring a user interaction, after you click the URL, it opens the weboperator Web view page with an error of the type: `Page not found`. This issue occurs when Orchestrator is configured to use 0.0.0.0 as an IP address.

Workaround: Configure Orchestrator to use another IP address:

1. Log in to the Orchestrator configuration interface as `vmware`.
2. On the **Network** tab configure the Orchestrator IP address.
3. Click **Apply changes**.

- **Orchestrator does not support slashes in workflow names**
  If you have a workflow with a slash in its name, when you run the workflow, the workflow token might never change to completed, although the workflow itself has completed running.

  Workaround: Remove the slash from the name of the workflow.

- **Web views does not support multiple level of presentation field binding**
  Web views does not support multiple levels of presentation field binding. For example, suppose the presentation consists of the following fields and bindings:
    - sourceField
    - aField bound to sourceField by using a DefaultValue attribute
    - bField bound to aField by using a DefaultValue attribute

  When you change the value of sourceField, the value of aField is also updated, but the value of bField remains the same.
- **You cannot collect Orchestrator log bundle together with the vCenter Server log bundle**
  When Orchestrator and vCenter Server are installed on the same machine, and you collect the vCenter Server log bundle, the Orchestrator log files are not included in the bundle ZIP file. You can collect the Orchestrator log files only from the Orchestrator configuration interface. To gather log files from Orchestrator:

  1. Go to the Orchestrator configuration interface at `https://orchestrator_server_ip_address:8283`.
  2. Log in with your username and password.
  3. Click **Logs**.
  4. Click **Generate log report**.
  5. Save the generated ZIP file.

- **The Convert disks to thin provisioning workflow does not handle virtual machines with snapshots correctly and does not convert the thick-provisioned disks**
  On completion, the Convert disks to thin provisioning workflow reports that the thick-provisioned disks of virtual machines with snapshots are successfully converted to thin-provisioned, when they are actually not.

  Workaround: Do not include virtual machines with snapshots in the workflow.

- **Windows Server 2008 automatically renames VMOAPP and DAR files to ZIP causing the application installation and plug-in upload in the Orchestrator configuration interface to fail**
  If you are running Orchestrator on Windows Server 2008, the extension of the archives you download is automatically changed to ZIP. When you are installing an application or uploading a plug-in by using the Orchestrator configuration interface, you must use a VMOAPP or DAR file.

  Workaround: Change the ZIP extension back to either VMOAPP or DAR to use the downloaded archive in the Orchestrator configuration interface.

- **Repeatedly publishing and unpublishing Web views can cause memory issues**
  Publishing and unpublishing of Web views restarts the Tapestry framework, which regenerates new meta-class information without cleaning up the previous meta-class information. Publishing and unpublishing a Web view by repeatedly calling the methods `Webview.enable()` and `Webview.disable()` in a loop in scripts can consume large quantities of memory and eventually leads to performance issues.
- **Adding values to vCenter Server data object properties of type Array is impossible**
  When Orchestrator runs scripts, the vCenter Server plug-in converts JavaScript arrays to Java arrays of a fixed size. As a consequence, you cannot add new values to vCenter Server data objects that take arrays as property values. You can create an object that takes an array as a property if you instantiate that object by passing it a pre-filled array. However, after you have instantiated the object, you cannot add values to the array.

  For example, the following code does not work:

```
var spec = new VcVirtualMachineConfigSpec();
spec.deviceChange = [];
spec.deviceChange[0] = new VcVirtualDeviceConfigSpec();
System.log(spec.deviceChange[0]);
```

In the above code, Orchestrator converts the empty `spec.deviceChange` JavaScript array into the fixed-size Java array `VirtualDeviceConfigSpec[]` before it calls `setDeviceChange()`. When calling `spec.deviceChange[0] = new VcVirtualDeviceConfigSpec()`, Orchestrator calls `getDeviceChange()` and the array remains a fixed, empty Java array. Calling s`pec.deviceChange.add()` results in the same behavior.

Workaround: Declare the array as a local variable, as follows:

```
var spec = new VcVirtualMachineConfigSpec();
var deviceSpec = [];
deviceSpec[0] = new VcVirtualDeviceConfigSpec();
spec.deviceChange = deviceSpec;
System.log(spec.deviceChange[0]);
```

- **Workflow input parameters of type SecureString cannot take a null value**
  You cannot start a workflow with a null value if that workflow takes a `SecureString` as an input parameter, unless you start the workflow from within another workflow. If you start a workflow with a null value when that workflow takes a `SecureString` as an input parameter, the server loads attributes from the cache rather than from the Orchestrator database, resulting in a null input parameter. If you then change the workflow state to passive by implementing a long-running workflow element, the attributes are reloaded from the database, converting the null value into an empty string. This is the only way you can use a null value to start a workflow that requires a `SecureString` input parameter.

[an error occurred while processing this directive]