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What's New in This Release

If you're upgrading, see also Upgrade Notes and Issues Resolved in This Release.

In this topic

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- Cloud cost optimization and governance
- Workflow automation
- Capacity and resource management
- Lifecycle and policy management
- Microsoft® SCVMM updates
- New supported platforms
- REST API enhancements

Prior enhancements in release 6

This section includes information on all new features introduced in previous 6.0.x and 6.1.x releases.

This release brings a brand-new Service Portal user interface and an updated Embotics® vCommander® user interface to match. It also provides new cloud governance and cost optimization features. We've extended our Azure support to include Azure Resource Manager (ARM), with full support for ARM templates. And because even that wasn't enough to keep our passionate development team busy, we've also included several customer-requested enhancements.

You can now associate key pair credentials with users or organizations and have the proper key pair assigned to a requested instance based on who made the service request. This enables better control over who can open a secure SSH connection to an AWS Linux instance. It also enables automatic user authentication when opening a secure SSH connection using a key pair.
Configure multiple VM Access Proxies to target subsets of your infrastructure

The vCommander VM Access Proxy secures your virtualized infrastructure behind a firewall while still permitting your users remote access to their VMs. When you configure one or more VM Access Proxies, your users can access their VMs within a browser, without the need for a network connection to the managed system. To minimize geographical distance and network lag, you can configure multiple proxies; for example, you can configure a separate proxy for each public cloud region.

Note that to take advantage of key pair assignment, you must deploy the VM Access Proxy version 3.1 or later. To learn more, see "Using Key Pairs to Connect to Amazon EC2 Instances" and "Configuring the VM Access Proxy for Secure VM Connections" in the vCommander User Guide.
This feature requires version 3.0 or later of the VM Access Proxy, as well as vCommander 6.1.5 or later. To learn more, see "Configuring the VM Access Proxy for Secure VM Connections" in the vCommander User Guide.

**All-new Service Portal user interface**

Our Service Portal for end users and delegated admins has a brand-new UI. Our goal was to create a more modern look and feel, remove the need for legacy technology (such as Flash) and provide a richer self-service experience. Here are just a few highlights:

**Intuitive design**

Our new UI is elegant, clean and effective.
Enhanced navigation

Our new collapsible left-side menu provides a faster and more intuitive user experience for navigating all aspects of the Service Portal. You can collapse the menu to increase screen real estate.
We use split-menu buttons for easy access to commands, rather than right-mouse-click menus. Here's the new VM Details page, showing the context-sensitive command menus.
New dashboard

As in the previous release, the Dashboard provides a quick view of your VMs and Services, reports, service requests, costs, VM performance and quota usage.

Flash technology is no longer used; all previous Flash elements have been replaced by HTML5.

Task messages

The Service Portal provides messages on the status of your long-running task. A small pop-up appears next to the task menu item when a task is started, completed or failed.

You can check on the status of a task by navigating to the Tasks page.
**Extensibility**

In a previous release, it was possible to provide access to a global external web page for Service Portal users with permission. In this release, we've enhanced this functionality: you can now use a vCommander variable to create organization-specific (that is, per-tenant) external web pages. You might use this page to provide information on other service offerings, or a summary of information for this organization.

![Custom External Page](image)

Once you've configured this URL, users with the Show External Page permission will see a link in the left menu.
You can also display custom VM-specific information on a VM's details page, such as third-party VM metrics. vCommander variables are supported in this URL as well, including custom attribute variables.

To learn more, see "Providing Access to External Web Pages" and "Providing Access to External VM-Specific Information" in the vCommander User Guide.
**Service requests**

Easily request new services by clicking **Service Catalog** in the left menu. As in previous releases, users can select services to request and fill out a request form.

The Service Requests page allows you to filter the list, choose and rearrange columns, and export to .csv format.

**Easy service management**

You can manage VMs from the VMs and Services page as well as from each VM's details page.
You can perform tasks such as running power commands, opening a console connection, setting an expiry date and assigning ownership.

Easier custom theming

Creating a custom theme is now more straightforward. We recommend the use of jQuery ThemeRoller, a curated set of themes built on top of the jQuery JavaScript Library, as a quick way to get started. You can pick a pre-built theme or build your own. You can then download the ThemeRoller files, copy the content to branding files installed with vCommander, and customize the files further as required. If you prefer not to use ThemeRoller, you can edit the sample files. As long as you're using CSS built on the jQuery framework, your custom theme will work with the Service Portal. Embotics® Support would be happy to help you try out the new theming options; contact support@embotics.com.

If you're upgrading from release 5.7 and your Service Portal already had a custom theme, your previous theme will not be used after upgrade to release 6.x.

To learn more, see "Branding the Service Portal" in the vCommander User Guide.

Enhanced vCommander user interface

The vCommander UI has been updated to match the look and feel of the Service Portal's UI. This provides vCommander with the same clean look given to the Service Portal, and it provides administrators with a consistent management experience.

New vCommander UI examples

The tabs, buttons and fonts in the updated vCommander UI now match the look and feel of those used by the Service Portal.
The redesigned vCommander interface has a cleaner look and updated icons to make it even easier for you to navigate between user tasks.
Enhancements to Recommendations

We've improved the Recommendations page in several ways, to make it easier for you to find, apply and manage recommendations.

- You can now multi-select recommendations in the Table view, so that you can apply or ignore multiple recommendations simultaneously, as well as exclude multiple VMs from recommendations at the same time.
- You can use quick search and advanced search filters in the Table view, to narrow down a long list of recommendations. Your filters are saved between vCommander sessions.

- You can make the Recommendations page your landing page.
- We've made it easier to distinguish recommendations that will cost you money from those that will save you money. We've renamed the Cost column to Savings, and savings are now expressed as a positive number. Previously, for example, to find all VMs with recommendations that would save more than $200, you had to filter by Recommendation Cost Difference < -200. Now, you can simply filter by Recommendation Annual Cost Savings > 200. If you had saved searches using the Recommendation Annual Cost Savings filter, they are automatically updated during upgrade.

To learn more, see "Managing Recommendations" in the vCommander User Guide.

vCommander now uses HTML5 technology

The platform used for displaying graphics has been changed from Adobe Flash to HTML5. This includes all areas of the product, such as reports, dashboards, and forms for both the Service Portal and the vCommander admin UI. Aside from a cleaner look, the product works exactly as it did in the previous release.
Azure Resource Manager support

Support for Azure Resource Manager (ARM) as a virtualization platform

vCommander now manages Azure Resource Manager (ARM), adding to our previous support for Azure Service Manager (ASM). This release provides full service request automation, costing, reporting and our self-service portal capabilities for ARM. You can add ARM templates to the service catalog, with the option to deploy into a new resource group, or an existing one. vCommander also provides a configurable set of common public images that can be manually deployed or added to the service catalog.

To learn more, see "Managing Microsoft® Azure with Embotics® vCommander®" in the vCommander User Guide.

Cloud cost optimization and governance

vCommander cloud governance and cost optimization help reduce your public cloud costs as well as your private infrastructure costs. vCommander not only makes cost-reduction recommendations—it can also implement the recommended changes to your underlying cloud infrastructure. And vCommander helps ensure good public cloud governance through best-practice AWS tagging policies.

Watch our vCommander Cloud Cost Optimization video on YouTube.

New Getting Started with Cost Optimization wizard

Go to Help > Getting Started with Cost Optimization for an overview of the steps involved in cost optimization with vCommander.

<table>
<thead>
<tr>
<th>Step</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Configure Cost Models</td>
</tr>
<tr>
<td>2</td>
<td>Check Recommendations</td>
</tr>
<tr>
<td>3</td>
<td>Run the VM Billing Report</td>
</tr>
<tr>
<td>4</td>
<td>Run the VM Comparative Economics Report</td>
</tr>
<tr>
<td>5</td>
<td>Run the Reserved Instance Planner Report (AWS)</td>
</tr>
<tr>
<td>6</td>
<td>Go to Chargeback &amp; IT Costing Dashboard</td>
</tr>
</tbody>
</table>
Memory usage monitoring and memory rightsizing for Amazon EC2 instances

vCommander administrators and VM owners can now monitor memory usage for Amazon EC2 instances in both vCommander and the Service Portal.

While Amazon CloudWatch provides CPU, network and disk usage metrics for Amazon EC2 instances, it does not provide memory usage metrics by default. vCommander now provides the ability to monitor memory usage through the use of custom CloudWatch scripts.

Memory usage monitoring for new VMs also means that vCommander bases rightsizing recommendations on memory usage as well as CPU usage data.

To learn more, see "Monitoring Memory Metrics for Amazon EC2 Linux Instances", "Monitoring Memory Metrics for Amazon EC2 Windows Instances" and "Rightsizing VMs" in the vCommander User Guide.

Reserved Instance purchase recommendations to reduce on-demand costs

With AWS Reserved Instances, you can pre-purchase instances for a set term, as opposed to buying "on-demand" instances. vCommander now recommends Reserved Instance purchases for each AWS region.
Recommendations are also shown on the Summary tab for each AWS region.

Viewing the details of a recommendation takes you to the new Reserved Instance Planner Report. The report recommends EC2 Reserved Instance purchases for each combination of operating system, instance type and region, and shows you the projected savings for each purchase.
Reserved Instance Planner Report
Creation Date: Tuesday, October 17, 2017 13:13:12
Report Parameters:
- Report Period: is 30 days
- Purchase Model: is No Upfront
- Include Detailed Data: is Yes
- Limit Spending To: is 0
- Required Savings %: is 20
- Sort Purchases By: is Projected Savings

Report Notes:
Total number of hours in reporting period: 720

On Demand Costs
Total Cost $2820.11
- Linux (Amazon VPC) - m1.small - ap-northeast-1 - Default
  Tenancy $1309.18
- Linux - m1.small - us-east-1 - Default
  Tenancy $1510.92

Reserved Instance Costs
Total Cost $1953.48
- Linux (Amazon VPC) - m1.small - ap-northeast-1 - Default
  Tenancy $972.35
- Linux - m1.small - us-east-1 - Default
  Tenancy $981.12

Savings $866.63
To learn more, see "Configuring and Managing Reserved Instance Recommendations" and "Reserved Instance Planner Report" in the vCommander User Guide.

**Synchronize AWS tags with custom attributes and metadata**

Synch your AWS tags, such as cost center, business unit, tier or version, with vCommander custom attributes, as well as ownership and expiry information. Custom attributes allow you to assign an unlimited amount of metadata to services and cloud infrastructure. Once assigned, this metadata persists throughout a service's lifecycle, enabling administrators to know exactly what a workload is being used for. vCommander can also issue power schedule recommendations based on AWS tag values.

Note that tags aren't synchronized unless you configure synchronization.

To learn more, see "Synchronizing AWS Tags and Embotics® vCommander® Metadata" in the vCommander User Guide.
Apply VM power schedule recommendations to increase elasticity

Power schedule groups help to ensure that VMs are powered on when needed and powered off when not needed, to minimize cost without hindering productivity. vCommander now issues power schedule recommendations for VMs and instances based on custom attributes or AWS tags.

By default, power schedule recommendations are generated for public cloud instances that:

- do not belong to a power schedule group
- have an uninterrupted uptime greater than 24 hours
- have any custom attribute or AWS tag whose value is dev, qa, sandbox, staging, or test

You can customize this behavior for your public cloud instances, and you can also enable power schedule recommendations for your private cloud VMs.

Both vCommander and Service Portal users with permission can view the power schedule recommendation details and decide whether to apply the recommendation.

To learn more, see "Configuring and Applying Power Schedule Recommendations" in the vCommander User Guide.
Use AWS tags to enforce cloud governance policy

Public cloud best practices dictate that your AWS instances have appropriate tags, to ensure that your instances have been assigned the metadata important to your organization. With vCommander’s new AWS tagging synchronization and vCommander’s previously existing Compliance Policy, you can ensure that all your AWS instances adhere to these best practices. You can make policy enforcement as strict or lenient as you like—by simply reporting on non-compliant instances, by ensuring that they’re always powered off, or by running custom workflows that can perform any task you’d like upon detection of an offending instance.

Use your AWS billing data for accurate VM billing records and reporting

vCommander can use your AWS account billing data to ensure accurate cost calculations and VM billing records. This data is then used in reports such as the VM Billing Report and the new Reserved Instance Planner report.

### AWS Billing Data Settings

Provide information to locate your AWS billing report. A maximum of 60 days of billing data is retrieved immediately. Only full days of data are updated. Once configured, data is updated during a nightly task.

**Billing Report Location**

- Disabled
- S3 Bucket

S3 Bucket Name: corpbilling

Report Prefix: corp/eng

Report Name: eng_billing_hourly

**Consolidated Billing Accounts**

- AWS Dev

Associated GovCloud Account: AWS - GovCIC

Billing data found
vCommander supports AWS consolidated billing as well as GovCloud account billing, and retrieves billing data for VMs that have never been managed by vCommander too. To learn more, see "Retrieving Billing Data for AWS Managed Systems" in the vCommander User Guide.

**Improved Chargeback & IT Costing Dashboard**

We've added some great features to our Chargeback & IT Costing solutions page. You can now filter the entire page by cloud type (private or public) and by managed system name. We've also added a Recommendations panel, to show the cost savings you can reap if you apply rightsizing recommendations, power schedule recommendations, and Reserved Instance recommendations.

![Chargeback & IT Costing Dashboard](image)

We've improved the storage costs information on the dashboard too. Now the Storage panel includes costs for both storage tiers and disk types.

![Storage Dashboard](image)

To access this dashboard, go to Views > Solutions > Chargeback & IT Costing. To learn more about our chargeback and IT costing solutions, see "Chargeback and IT Costing" in the vCommander User Guide.
This release of the new cloud cost optimization functionality is a technology preview. We encourage you to reach out to support@embotics.com to provide your input.

**Workflow automation**

**Modify VM storage resources during a new service request or a change request**

This release enhances the ability to automate requests to change VM storage resources—a time-consuming and potentially error-prone process. Users may occasionally request disks that they don't need, or that are larger than they need. It was already possible to add disks through a change request, but users can now submit a change request to:

- expand disks for vCenter VMs (as long as the disks aren't involved in a snapshot or linked clone chain)
- delete disks for vCenter and SCVMM VMs

We've made it easier to tailor storage resources for new service requests as well. When requesting a new vCenter VM, requesters can:

- shrink a disk that an administrator added to the service catalog blueprint
- expand existing disks (as long as the disks aren't involved in a snapshot or linked clone chain)
- delete existing disks

You can control this ability for both change requests and new service requests with the Storage form element, which now has three allowed actions: Add, Change, and Remove:
Notice that the Service Portal user can now use the trash can 🗑️ to delete existing disks when requesting a new service.

![Storage Configuration](image)

To learn more, see "Adding a vCenter Service to the Catalog", "Adding an AWS Service to the Catalog", "Adding an SCVMM Service to the Catalog" and "Customizing Service Request Forms" in the vCommander User Guide.

**Reconfigure Network Resources in the Service Portal**

You can now add a network adapter or reconfigure an existing one in the Service Portal using the Reconfigure Resources command. Select a VM on the VMs and Services page and select Reconfigure Resources from the ▼ Commands drop-down menu. You can then modify the network settings as required.

You can now to add a new network adapter or reconfigure an existing one in the Service Portal. Highlight a VM on the VMs and Services page and select Reconfigure Resources from the ▼ Commands drop-down.

To learn more, see "Reconfigure VM Resources in the Service Portal" in the Service Portal User Guide.

**Attach a completion workflow to shared VMs**

You can now create completion workflows for shared VMs, which are service catalog items added by users who want to share an exact copy of a VM with other users. This allows you to customize a completion workflow for post-deployment tasks specific to shared VMs, such as resolving IP and DNS conflicts. For example, you could create a completion workflow for shared VMs that deletes all network adapters on the deployed VM, waits for 30 seconds, and adds a new network adapter, so that the VM receives a new IP address from DHCP.
A new type of component-level completion workflow makes it easier to create workflows that target only shared VMs.

To learn more, see "Creating a Completion Workflow" and "Sharing VMs with Other Users" in the vCommander User Guide.

**Provision Amazon EC2 VMs with an IAM role**

AWS provides the ability to delegate access to resources through Identity and Access Management (IAM) roles. With this release of vCommander, you can assign IAM roles to new VMs in several ways, depending on what works best in your situation. You can assign the required IAM role to the catalog blueprint for each template (AMI), or if you deploy the same template to multiple destinations, you can configure an IAM role for each deployment destination. Administrators can also assign an IAM role during manual deployment. Using variable substitution, you can assign the IAM role based on information users provide on the request form.

For example, let's say you use Amazon EC2 Run Command to execute a Shell script on a Linux instance. In AWS, you configure an IAM role with appropriate permissions, called RunCommand. In the vCommander catalog blueprint for this AMI, you add the IAM role, so that images deployed from this service catalog entry are automatically configured with this IAM role.
What's New in This Release

To learn more, see "Managing Amazon Web Services with vCommander" in the vCommander User Guide.

Support for latest AWS VM storage types

We've added support for two new AWS storage types: Throughput Optimized HDD and Cold HDD. The HDD-backed volumes are optimized for large streaming workloads where throughput (measured in MiB/s) is a better performance measure than IOPS.

You can add disks with the new storage types when reconfiguring VM resources (as shown in the image above), when configuring a VM blueprint in the service catalog, when configuring the Storage-AWS request form element, when requesting new AWS VMs and when manually deploying AWS VMs. Costs for these new storage types are reflected throughout vCommander and the Service Portal as well.

To learn more, see "Manually Reconfiguring VM Resources" in the vCommander User Guide.
Set separate network configurations for multi-VM service requests through REST v3 calls

For multi-VM service requests, you can now include scripts in approval and completion workflow steps that use REST API v3 calls to set distinct network configurations for each VMware VM.

Capacity and resource management

Placement considers storage requirements of concurrent requests

Previously, vCommander chose the placement destination for new vCenter and SCVMM services without accounting for the storage requirements of other in-flight requests. The same was true for service change requests. This meant that vCommander might try to deploy or fulfill multiple concurrent service requests on a datastore where there was room for only one, for example, leading to failed service requests. This problem could also occur for multiple services within a single request.

vCommander now reserves storage as soon as deployment or fulfillment starts — whether it's manual deployment and fulfillment, automated deployment and fulfillment, scheduled fulfillment, vCenter migration, or the manual Reconfigure Resources command. This ensures that new or expanded disks are placed on a datastore with sufficient storage space. Once deployment or fulfillment has succeeded (or failed), the storage reservation is released.

When an administrator is manually deploying or fulfilling a request or reconfiguring VM resources, the wizard shows any existing storage reservation, so that the administrator can make an informed choice of datastore.

When storage is reserved on a particular datastore, you can see it in the datastore's Usage Summary.

![Usage Summary](image)

Four new datastore properties can be added to the Datastores tab and used in searches:

- Available %
- Available (GB)
- Reservation %
- Reservation (GB)

The existing property Provisioning Level now includes the amount of reserved storage.

To learn more, see "Configuring Datastore Placement" and "How Deployment Destinations Work" in the vCommander User Guide.
Lifecycle and policy management

Enhanced Expiry Policy

The Expiry Policy now allows you to set a maximum for the number of allowed expiry extensions, and has also been enhanced with workflow variables so that you can better communicate and automate lifecycle decommissioning. This feature enhances the flexibility of automated decommissioning, while helping to prevent the VM sprawl that can occur from long-running but unused workloads.
Here's part of the email that's sent to the primary owner after the policy configuration:

**Summary**

The service AutomationRT1, with the primary owner Brian Carter, is set to expire soon.

**Extend Expiry Date**

You may extend the expiry date to 2016/10/25 by clicking on the following link. You have 2 extensions remaining.

[https://Keller.embotics.com/portal/expiryextension/ExtendExpiry?expiryId=8e634167-3c5c-4689-ad04-4c7541b4ada8](https://Keller.embotics.com/portal/expiryextension/ExtendExpiry?expiryId=8e634167-3c5c-4689-ad04-4c7541b4ada8)

Both vCommander and Service Portal users can view the number of extensions remaining for a VM in the VM's Details pane.

**Details**

- Annual Cost: $6103
- Date Created: 2017/09/20 15:40:20
- Uptime: 23 hours, 37 minutes
- Powered Off Since:
- All Owner Logins:
- Virtual Disk Size (GB): 1.0
- Expiry Extensions Remaining: 2
Administrators can reset the expiry extension count whenever required by using a new option in the Set Expiry Date dialog.

You can also now use vCommander variables in the subject and body of the Expiry Policy notification email.
In addition to the deployed name and primary owner name shown above, you can use other variables such as DNS name, expiry date, owner email, expiry date, cost information and custom attributes.

To learn more, see “Managing Service Expiry” and “Controlling Expired Services with the Expiry Policy” in the vCommander User Guide.

**Microsoft® SCVMM enhancements**

A number of improvements have been made for integrating Microsoft System Center Virtual Machine Manager (SCVMM) managed systems with vCommander.

**Automatically obtain SCVMM VM IP address changes**

vCommander now uses SCVMM’s refresher mode to automatically obtain IP address changes for SCVMM VMs.

- To use the refresher mode, all Microsoft SCVMM servers must be running SCVMM 2012 R2 Rollup 12 or higher.

By using the refresher mode, vCommander now:
- is automatically updated with the initial IP addresses of newly deployed VMs so that it can run completion workflows
- is automatically updated with any changes to the IP addresses of VMs so that it can run command workflows
- displays the IP addresses of VMs in the VM’s Summary page

![DGD-VM](image)

Note that if there are multiple IP addresses for the VM (for example, if the VM may use multiple NICs), you can click the Details link on the VM’s Summary page to view additional networking details.
Support for host group target destinations for automated deployments

When configuring SCVMM automated deployments, if you group SCVMM hosts in folders, you can now choose those folders as target destinations instead of being forced to choose clusters or hosts. Whatever target destination you choose, vCommander will determine the appropriate host for deployment.

SCVMM VMs with static MAC addresses can be deployed from templates

vCommander now supports the deployment of images with static MAC addresses from SCVMM templates. To support these deployments, SCVMM templates that are configured to use static MAC addresses from a MAC address pool must use a NIC that is set to static, and the vCommander advanced system property `embotics.mediator.vmm.deploy.keeptemplatemacaddress` must be explicitly set to true (the default is false). When these conditions are met, the SCVMM VM that vCommander deploys will be assigned a network adapter with a static MAC address from the MAC address pool.

For information on how to set advanced system properties, please contact support@embotics.com.

New supported platforms

Azure Resource Manager (ARM) support

vCommander now manages Azure Resource Manager. See Azure Resource Manager support above.

vSphere 6.5 support

vSphere 6.5 is now supported as a virtualization platform. For the full list of supported platforms, see System Requirements.
Windows Server 2016 supported for vCommander installation
vCommander can now be installed on Windows Server 2016.

Microsoft SQL Server 2016 database support
vCommander can now be installed against a Microsoft SQL Server 2016 database.

REST API v2 enhancements

Changes in REST API release 6.1.1 (PowerShell Client v2.8.1)
The vCommander REST API PowerShell client version 2.8.1 is compatible with vCommander 6.1.1 and higher.
This new version includes REST APIs for managing AWS Stacks.
   /references/stacks – Retrieve a list of stack references, sorted by their ID.
   /stacks/{id} – Query for a stack by its ID and delete a stack.
   /stacks/{id}/action/applyattribute – Apply a custom attribute value to the specified stack.
   /stacks/{id}/action/applyexpirygroup – Apply an expiry group to the specified stack.
   /stacks/{id}/action/applyownership – Apply ownership to the specified stack.
   /stacks/objecthandle/{object_handle_id} – Retrieve a stack by its object handle ID.

For more information, see the Embotics® REST API v2 documentation. To access the REST API reference information built in to vCommander, enter the following URL in your Web browser: https://<vCommander hostname or IP address>:<port>/apihelp/

For more information on the REST API, see the vCommander REST API Getting Started Guide (included with the REST API package).
You can download the REST API PowerShell client here:
http://support.embotics.com/support/solutions/articles/8000035227-download-vcommander-rest-client

Preview of All-New REST API

Version 3 of REST API available for beta testing
We're excited to introduce a beta version of our completely new REST API. Based on customer feedback, we had several key design goals for version 3:

- Simplicity and ease-of-use
- Pagination on all multiple return calls
- Detailed response messages
- Interactive documentation

Note that the v3 APIs are for preview purposes only and are subject to change in the next release.
REST API v3 capabilities

vCommander REST API v3 provides a limited set of features, detailed in the following sections.

User management

- Get all users (GET - /rest/v3/users)
  - Limit the number of results returned per page and specify which page to return
  - Filtering support exact match filtering on user name only
- Get a user’s details
- Add a user
- Update a user
- Delete a user

Organization management

- Get all organizations
  - Limit the number of results returned per page and specify which page to return
  - Filtering support exact match filtering on org_name only
- Get an organization’s details
- Add an organization with or without a resource or cost quota
- Update a organization and quota
- Delete a organization

Member management

- Get all members
  - Pagination for organization members not supported
  - Filtering for organization members not supported
- Get a member’s detail including is resource or cost quota
- Add a member with or without resource or cost quota depending on the organization
- Update a member and quota
- Delete a member

Service provisioning

- Get all services available for provisioning for the requester
- Get the service request forms (service and component level) for an available service.
- Submit a new service request
- Get all service requests
  - Limit the number of results returned per page and specify which page to return
  - Filtering on service request state only (except FAILED)
- Get a service request’s details including its workflows, costs, and resources
- Get a service request’s comments
- Add a comment to a service request

**Workflows**

- Get all workflows
  - Limit the number of results returned per page and specify which page to return
  - Filtering by type, status, service request ID and duration
- Get a workflow’s details

**Tasks**

Get an asynchronous task’s details. In the event that a method takes too long to complete, an asynchronous task is returned in place of the object (such as a user, organization, member, or service request).

**How does the REST API work?**

The API uses standard HTTP methods (GET, POST, PATCH, DELETE). You can use any REST client to communicate with the vCommander REST service. Embotics® does not provide a PowerShell client for REST API v3.

**Security**

vCommander REST API calls are privileged in the sense that the logged-in user must be authenticated before access is granted. The REST API supports HTTP basic authentication.

**Responses and error handling**

vCommander uses standard HTTP status codes to indicate the status of API calls. For example, 200 for success and 4XX series for bad request format will describe the error. A list of applicable responses is provided with each endpoint request method example.

**Create a user account for the REST API**

We recommend creating a dedicated local user account to access the REST service. This account must have a vCommander administrative role (either Enterprise Admin or Superuser) and appropriate access rights on the target managed systems.

**Service request example**

The following is an example of a service request submission using the available V3 APIs.

1. Browse the available service using the GET /services.
2. Get the service request form for using GET /services/{id}/servicerequestform.
3. Submit the completed form using POST /servicerequests.
4. Query the service request details using GET /servicerequests/{id}.
# System Requirements

This section provides information on software, hardware and port requirements as well as supported third-party integrations.

## Software requirements

| Virtualization and Cloud Platforms Supported | • VMware vSphere 6.5, 6.0, 5.5, 5.1, 5.0  
| Operating Systems Supported for vCommander Installation | • Microsoft® System Center Virtual Machine Manager (SCVMM) 2012 R2 Update Rollup 12  
| • Amazon Web Services  
| • Microsoft Azure Resource Manager (ARM)  
| • Microsoft Azure Service Manager (ASM)  
| • Microsoft Windows Server 2016  
| • Microsoft Windows Server 2012 R2  
| • Microsoft Windows Server 2012  
| • Microsoft Windows Server 2008 R2 or higher  

vCommander does not support Azure subscriptions that contain both Azure Classic and ARM resources. To learn how to migrate resources to ARM, see [Migrate Classic Resources to Azure Resource Manager](#) in the Microsoft documentation.

| Languages Supported | • English  
| Recommended Databases | • Microsoft SQL Server 2016  
| • Microsoft SQL Server 2014  
| • Microsoft SQL Server 2012  
| • Microsoft SQL Server 2008 R2  

The default Cardinality Estimator used for Microsoft SQL Server 2014 and 2016 increases query compile time, which can reduce the vCommander Dashboard display speed. To increase the display speed of the Dashboard, you should change the SQL Server's compatibility level to SQL Server 2012 (110), then restart vCommander service. To learn how to change the SQL Server compatibility level, see [View or Change the Compatibility Level of a Database](#) in the Microsoft documentation.

| Default Database | • PostgreSQL is included with vCommander for evaluation environments  
| Browser Recommended | • Mozilla Firefox 57  

| Browsers Supported | • Mozilla Firefox 57, 56  
| • Microsoft Internet Explorer 11, 10  
| • Google Chrome 63, 62  
| • Microsoft Edge (experimental)  

To use Internet Explorer 10, you must edit the security configuration in new installations of vCommander. To learn how to enable the use of Internet Explorer 10 with vCommander, see the Knowledge Base article [Modifying vCommander’s SSL Ciphers](#).

| Network | • Gigabit Ethernet Minimum  

## Licensing

- For more information about licensing, please refer to the terms in your license agreement or contact your Embotics® representative.

When vCommander is installed, an application called Erlang OTP is also installed, and it will appear in the list of installed programs on the vCommander host. Erlang OTP should not be uninstalled.

### Hardware requirements

The following table provides vCommander deployment tiers based on typical use. See "Scaling Embotics® vCommander® Hardware Requirements" in the vCommander Installation Guide for more details. You can also contact Embotics® Support to discuss requirements further, should you have any questions or unique configurations.

<table>
<thead>
<tr>
<th>Profile</th>
<th>Description</th>
<th>Base Requirements</th>
</tr>
</thead>
</table>
| Evaluation | A single-vCPU deployment used to evaluate vCommander's feature set. It will not grow significantly beyond original occupancy, and it is not expected to be upgraded to production. | • 2 vCPU / 2.0 GHz dual core  
• 8.0 GB Memory  
• 2.0 GB disk space  
• Default Postgres database |
| Small | A single-vCPU production deployment for static environments of fewer than 500 VMs, supporting fewer than 10 concurrent users, with infrequent reporting. | • 2 vCPU / 2.0 GHz quad core  
• 8.0 GB Memory  
• 1.0 GB disk space (installation)  
• 4.0 GB disk space (data partition)  
• Dedicated application server  
• Microsoft SQL Database |
| Medium | A dual-vCPU production deployment for dynamic environments with fewer than 1500 VMs, supporting fewer than 30 concurrent users, with frequent reporting. | • 2 vCPU / 2.0 GHz quad core  
• 8.0 GB Memory  
• 1.0 GB disk space (installation)  
• 10.0 GB disk space (data partition)  
• Dedicated application server  
• Separate Microsoft SQL Database  
• DB data file (mdf) and log file (ldf) stored on separate disks |
| Enterprise | A dual-vCPU production deployment for dynamic environments with more than 1500 VMs, supporting more than 30 concurrent users, with frequent reporting. | • 2 vCPU / 2.0 GHz quad core  
• 8.0 GB Memory  
• 1.0 GB disk space (installation)  
• 10.0 GB disk space (data partition)  
• JVM memory increased to 6 GB  
• Dedicated application server  
• Separate Microsoft SQL Database  
• SAN backing for database files |

### vCommander VM Access Proxy Hardware Requirements

Minimum requirements:

- 2 CPUs
Note that the higher the number of CPUs available, the more concurrent connections the VM Access Proxy can handle.

- 2 GB Memory
- 7 GB disk space

The template archive size is approximately 2.5 GB.

**Network requirements**

The following ports are used by the various vCommander components. You configure some of these ports during installation, and you can also configure ports after installation using the vCommander Control Panel. Certain ports can be configured only through a system property; for more information, contact support@embotics.com.

**IMPORTANT:** To protect the security of the vCommander system, all ports must be firewalled, with the exception of ports that are required to be inbound.

- Where the direction is outbound, this implies a corresponding inbound connection to the target.

<table>
<thead>
<tr>
<th>Connection</th>
<th>Ports</th>
<th>Protocol</th>
<th>Direction</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>vCommander Webserver</td>
<td>443</td>
<td>TCP</td>
<td>Inbound</td>
<td>Access to vCommander admin console, Service Portal and REST API.</td>
</tr>
<tr>
<td>vCommander Microsoft SQL Server</td>
<td>1433</td>
<td>TCP</td>
<td>Outbound</td>
<td>Access to the vCommander database. Additional ports may be required depending on the configuration of your SQL server.</td>
</tr>
<tr>
<td>vCenter</td>
<td>443</td>
<td>TCP</td>
<td>Outbound</td>
<td>Communications with individual vCenters or their external Platform Services Controllers.</td>
</tr>
<tr>
<td>vCenter Hosts</td>
<td>443</td>
<td>TCP</td>
<td>Outbound</td>
<td>Access to the vCenter hosts for VM Guest OS file copy operations.</td>
</tr>
<tr>
<td>Amazon Web Services</td>
<td>443</td>
<td>TCP</td>
<td>Outbound</td>
<td>Communications with Amazon Web Services API.</td>
</tr>
<tr>
<td>Microsoft Azure</td>
<td>443</td>
<td>TCP</td>
<td>Outbound</td>
<td>Communications with Microsoft Azure API.</td>
</tr>
<tr>
<td>Connection</td>
<td>Ports</td>
<td>Protocol</td>
<td>Direction</td>
<td>Description</td>
</tr>
<tr>
<td>---------------------------------</td>
<td>-----------</td>
<td>----------</td>
<td>-----------</td>
<td>--------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Windows Guest OS Features</td>
<td>135 139 445</td>
<td>TCP</td>
<td>Outbound</td>
<td>Access to Windows VMs for issuing WMI commands and file copy operations.</td>
</tr>
<tr>
<td>Linux Guest OS Features</td>
<td>22</td>
<td>TCP</td>
<td>Outbound</td>
<td>Access to Linux VMs for issuing SSH commands.</td>
</tr>
<tr>
<td>Datastore Scanning</td>
<td>443</td>
<td>TCP</td>
<td>Outbound</td>
<td>Access to VMware hosts through HTTPS to collect file layout.</td>
</tr>
<tr>
<td>Legacy Datastore Scanning</td>
<td>22</td>
<td>TCP</td>
<td>Outbound</td>
<td>Access to VMware hosts through SSH to collect file layout. Only used when HTTPS access is not available.</td>
</tr>
</tbody>
</table>

**Table: Network Requirements - Authentication**

<table>
<thead>
<tr>
<th>Connection</th>
<th>Ports</th>
<th>Protocol</th>
<th>Direction</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kerberos Key Distribution Center</td>
<td>88</td>
<td>TCP</td>
<td>Outbound</td>
<td>Access to authenticate against an Active Directory or LDAP server.</td>
</tr>
<tr>
<td>Active Directory Domain Controller for Remote LDAP</td>
<td>389</td>
<td>TCP</td>
<td>Outbound</td>
<td>Access to authenticate against an Active Directory or LDAP server.</td>
</tr>
<tr>
<td>Traffic</td>
<td></td>
<td>UDP</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Active Directory Domain Controller for Remote Global</td>
<td>3268</td>
<td>TCP</td>
<td>Outbound</td>
<td>Access to query the global catalog of an Active Directory or LDAP server.</td>
</tr>
<tr>
<td>Catalog Traffic</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Active Directory Domain Controller for Remote Secure</td>
<td>686</td>
<td>TCP</td>
<td>Outbound</td>
<td>Access to authenticate against a secure Active Directory or a secure LDAP server.</td>
</tr>
<tr>
<td>LDAP Traffic</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Active Directory Domain Controller for Remote Secure</td>
<td>3269</td>
<td>TCP</td>
<td>Outbound</td>
<td>Access to query the global catalog of a secure Active Directory or secure LDAP server.</td>
</tr>
<tr>
<td>Global Catalog Traffic</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### Table: Network Requirements - Optional

<table>
<thead>
<tr>
<th>Connection</th>
<th>Ports</th>
<th>Protocol</th>
<th>Direction</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Splunk Server</td>
<td>8089</td>
<td>TCP</td>
<td>Outbound</td>
<td>Communications with Splunk server for retrieval of guest OS performance metrics.</td>
</tr>
<tr>
<td>BlueCat™ Server</td>
<td>80</td>
<td>TCP</td>
<td>Outbound</td>
<td>Communications with BlueCat™ IP address management server for addressing assignments.</td>
</tr>
</tbody>
</table>

### Table: Network Requirements - Client Connections

All of these connections go from the client browser to the respective servers.

<table>
<thead>
<tr>
<th>Connection</th>
<th>Ports</th>
<th>Protocol</th>
<th>Direction</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>VM Access (Remote Desktop)</td>
<td>3389</td>
<td>TCP</td>
<td>Inbound</td>
<td>Access to remote control VMs using RDP.</td>
</tr>
<tr>
<td>VM Access (Virtual Network Computing)</td>
<td>5900</td>
<td>TCP</td>
<td>Inbound</td>
<td>Access to remote control VMs using VNC.</td>
</tr>
<tr>
<td>VMware Console - WebMKS (HTML5)</td>
<td>9443 (vCenter 6.0) 7343 (vCenter 5.5)</td>
<td>TCP</td>
<td>Inbound</td>
<td>Access to remote control VMs using WebMKS Console.</td>
</tr>
<tr>
<td>VMware Console - Plug-in</td>
<td>443 (vCenter) 902 (ESX)</td>
<td>TCP</td>
<td>Inbound</td>
<td>Access to remote control VMs using VMware Remote Console (VMRC) Plug-in.</td>
</tr>
</tbody>
</table>

### Table: Network Requirements – Advanced Configuration

<table>
<thead>
<tr>
<th>Connection</th>
<th>Ports</th>
<th>Protocol</th>
<th>Direction</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>VM Access Proxy Appliances – Web Server</td>
<td>443</td>
<td>TCP</td>
<td>Inbound</td>
<td>Publishing listener for WebMKS open console sessions.</td>
</tr>
<tr>
<td>VM Access (Hyper-V Console)</td>
<td>2179</td>
<td>TCP</td>
<td>Outbound</td>
<td>Access to remote control VMs using the Hyper-V console.</td>
</tr>
</tbody>
</table>
**Guest OS Scanning Port Requirements**

Guest OS scanning of Windows VMs requires firewall rules to handle a dynamic range of ports that are opened for the response when vCommander queries the VMs on TCP port 135. To avoid opening a large range of high ports, refer to the following Knowledge Base articles for instructions on how to configure the Windows Firewall to enable these ports:

- [Configuring Windows for Guest OS Scans Using Group Policy](#)
- [Configuring Windows for Guest OS Scans](#)

**Third-party integrations**

The following table provides a list of third-party software that can be integrated with vCommander, including supported versions where applicable.

<table>
<thead>
<tr>
<th>Integration Category</th>
<th>Supported Systems and Protocols</th>
<th>Integration Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>Authentication</td>
<td>Active Directory®</td>
<td>Bundled</td>
</tr>
<tr>
<td></td>
<td>LDAP</td>
<td>Bundled</td>
</tr>
<tr>
<td></td>
<td>SAML2 WebSSO</td>
<td>Bundled</td>
</tr>
<tr>
<td></td>
<td>Windows SSO</td>
<td>Bundled</td>
</tr>
<tr>
<td>Configuration Management and Application</td>
<td>Chef™ 12.15.7</td>
<td>Bundled</td>
</tr>
<tr>
<td>Deployment/Automation</td>
<td>Puppet™ Enterprise 2017.1.1</td>
<td>Bundled</td>
</tr>
<tr>
<td></td>
<td>SCCM 2012 R2</td>
<td>Scripted</td>
</tr>
<tr>
<td></td>
<td>Jenkins CI with PowerShell plugin</td>
<td>Scripted</td>
</tr>
<tr>
<td></td>
<td>ServiceNow or ServiceNow Express, with REST API access</td>
<td>Scripted</td>
</tr>
<tr>
<td></td>
<td>Zerto Virtual Manager (ZVM) Replication 4.5u1 (vCenter only)</td>
<td>Scripted</td>
</tr>
<tr>
<td></td>
<td>Docker 1.11.2</td>
<td>Scripted</td>
</tr>
<tr>
<td></td>
<td>vCommander REST API plus Windows Task Scheduler (and similar)</td>
<td>Scripted</td>
</tr>
<tr>
<td></td>
<td>vCenter metadata synchronization, for all vCenter versions supported by vCommander</td>
<td>Scripted</td>
</tr>
<tr>
<td>IPAM</td>
<td>BlueCat™ IPAM 4.1</td>
<td>Bundled</td>
</tr>
<tr>
<td>Application Monitoring</td>
<td>Splunk® 6.2, 6.1 (with HTTPS protocol)</td>
<td>Bundled</td>
</tr>
<tr>
<td>Notification</td>
<td>SNMP 2</td>
<td>Bundled</td>
</tr>
<tr>
<td></td>
<td>SMTP</td>
<td>Bundled</td>
</tr>
<tr>
<td>Backup</td>
<td>Veeam Backup &amp; Replication 8.0</td>
<td>Additional download required</td>
</tr>
</tbody>
</table>

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Integration Category | Supported Systems and Protocols | Integration Type
--- | --- | ---
Workflow Automation | vCommander REST API client for PowerShell 4, 3 with .NET Framework 4.5 or higher | Additional download required

**Upgrade Notes**

**Supported upgrade paths**

Consult the following table to see whether a direct upgrade from your currently installed version is supported:

<table>
<thead>
<tr>
<th>Current installed version</th>
<th>Direct upgrade supported to Release 6.1.6</th>
</tr>
</thead>
<tbody>
<tr>
<td>6.1.x</td>
<td>Yes</td>
</tr>
<tr>
<td>6.0.2</td>
<td>Yes</td>
</tr>
<tr>
<td>6.0.1</td>
<td>No</td>
</tr>
<tr>
<td>6.0.0</td>
<td>No</td>
</tr>
<tr>
<td>5.7.x</td>
<td>Yes</td>
</tr>
<tr>
<td>5.6.x and earlier versions</td>
<td>No</td>
</tr>
</tbody>
</table>

See the Knowledge Base article [What Upgrade Paths are Supported?](#) for instructions on how to upgrade from earlier versions.

**Changes to system requirements**

See also [New supported platforms](#) and [Deprecated and Removed Features and Platforms](#).

**Changes to software requirements**

A warning not to uninstall Erlang OTP has been added.

**Changes to hardware requirements**

The base memory requirement for Enterprise installations of vCommander has changed from 6 GB to 8 GB.
Changes affecting upgrading users

Applying custom branding to the Service Portal

Due to the complete redesign of the Service Portal user interface, the branding points have changed. If your Service Portal already has a custom theme, before upgrading your production vCommander to Release 6.1.6, we recommend that you install a separate instance of vCommander in a staging area where you can reproduce your current theme, using the new method. That way, you can deliver a theme providing seamless branding during the maintenance window for your upgrade. Contact support@embotics.com to obtain a staging license for this purpose.

Users must clear their browser cache for the branding changes to take effect.

To learn more, see "Branding the Service Portal" in the vCommander User Guide.

Bookmarks to Service Portal pages will not work after upgrade

With the new Service Portal user interface, bookmarks created in the previous release will not work after upgrade. The URL for the Service Portal home page, however, remains the same after upgrade, and users can easily create bookmarks in the new vCommander.

Service Portal folders replaced by grouping

In the redesigned Service Portal, it's no longer possible to organize services in folders in the tree. Instead, by editing the VMs and Services widget settings, you can now group by properties such as guest OS, owner, expiry state, power state or custom attributes.

Changes to datastore properties

Now that deployment placement considers the storage requirements of concurrent requests, we’ve made some changes to existing datastore labels and properties.
The "Free" label on the storage pie chart that's displayed on a datastore's Usage Summary, as well as during manual VM deployment, reconfiguring VM storage resources and VM migration, has been changed to "Available". Available storage excludes reserved storage.

The existing property "Provisioning Level (%)" now includes the used, uncommitted and reserved space on the datastore, as a percentage of total space.

Changes to the Storage form element

With the new ability to modify VM storage resources through a change request and when requesting a new service, the Storage and Storage-AWS form elements have changed. There are now three allowed actions, Add, Change and Remove, so the UI has been simplified:

After upgrade, existing settings are preserved; if you want to allow users to remove disks, you must edit the Storage and/or Storage-AWS element on your service catalog blueprints and resource change request forms.

To learn more, see "Adding a vCenter Service to the Catalog", "Adding an AWS Service to the Catalog", "Adding an SCVMM Service to the Catalog" and "Customizing Service Request Forms" in the vCommander User Guide.

Disk Storage Type property for VMs renamed to Disk Type

With the introduction of the VM property Disk Type, the existing VM property Disk Storage Type has been renamed to Disk Provisioning Type for clarity.

To see the full list of VM properties, see "Properties Reference" in the vCommander User Guide.
Changes to SAML 2.0 Web Single Sign-On

Several enhancements have been made to our SAML 2.0 Web Browser SSO implementation.

**Important:** Because of these enhancements, you must reconfigure SAML SSO after upgrade. Your previous configuration is not retained.

- Two SSO options that previously could be configured only by editing a configuration file—setting the hash algorithm and specifying that vCommander metadata was unsigned—are now available in the SAML Single Sign-On dialog.
- The configuration file sso-sp-config.properties is no longer used. If you previously set properties in this configuration file, after upgrade, you must set these properties in the SAML Single Sign-On dialog after upgrade.
- It's no longer necessary to restart the vCommander service after making changes to the SSO configuration.
- Several other options have been added to the configuration dialog to enhance security. For example, you must now upload a PKCS #12 keystore file, which vCommander uses to sign SSO requests.

![SAML Single Sign-On Configuration](image-url)
To learn more, see "Configuring SAML 2.0 Web SSO for the Service Portal" in the vCommander User Guide.

Adobe Flash Player no longer required
Adobe Flash Player is no longer required for either the vCommander admin console or the Service Portal.

Changes to the VM Billing Report
Related to the new ability to retrieve AWS billing data, we've made some changes to the report options for the VM Billing report when you're managing AWS. The Current and Projected selections for the Cost Model drop-down list are no longer supported for AWS VMs. When you select either of these options and the Location is set to Global, and you've added one or more AWS accounts to vCommander, the AWS VMs are excluded from the report, and the report displays the following message: "AWS instances will not be included because the selected Cost Model does not apply to AWS." When you select either Current or Projected and the Location is set to an AWS managed system, the Report Generator displays an error, and the report cannot be generated. Using the Historical option ensures that cost data is taken from historical billing records, which are updated nightly with AWS billing data.

New columns have been added to the report (although these new columns appear only if applicable), and some of the existing column names have changed slightly.
To learn more, see "VM Billing Report" in the vCommander User Guide.

Removal of Pricing Plans from cost model and VM Comparative Economics Report
With the introduction of support for Reserved Instances, it's no longer useful to be able to select a yearly term when configuring the AWS cost model, or when generating the VM Comparative Economics Report. We have removed the Pricing Plan drop-down list from the Resources page of the AWS Cost Model wizard. We have also removed the Pricing Plans from the AWS, Rackspace and IBM SoftLayer options in the Projected Destination tree in the VM Comparative Economics report. The report now supports only on-demand pricing comparisons.

If you had selected a term pricing plan in the cost model, it will continue to work as it did before, but it's no longer possible to change it after upgrade. If you saved a report template using term pricing, the template will continue to work as expected.
To learn more, see "Configuring Cost Models" and "VM Comparative Economics Report" in the vCommander User Guide.

Changes to Power Schedule Groups
vCommander now issues power schedule recommendations, and as a by-product of this new feature, we have made some changes to power schedule groups.

The Default Power Schedule group is no longer displayed in the list of power schedule groups, and is no longer considered to be a power schedule group in practice. VMs that were previously members of the Default Power Schedule Group are now considered to not be members of a power schedule group.
To learn more, see "Configuring and Applying Power Schedule Recommendations" in the vCommander User Guide.
Mark All VMs as Approved setting removed from Add Managed System dialog

Because the Approval Policy is deprecated, the setting enabling you to mark all VMs as approved has been removed from the Add Managed System dialog.

Rightsizing recommendation changes

With the addition of power schedule and Reserved Instance recommendations, we've introduced the following changes:

- One of the Service Portal permissions for viewing rightsizing recommendations now also allows users to view power schedule recommendations. As a result, we have renamed the rightsizing permissions as follows:
  - Show Rightsizing Down is now Show Recommendations: Cost Decrease
  - Show Rightsizing Up is now Show Recommendations: Cost Increase
- The Rightsizing Recommendations page has been renamed the Recommendations page, in both vCommander and the Service Portal.
- For clarity, the command to apply a rightsizing recommendation through a change request has changed from Submit Change Request to Request Service Change, in both vCommander and the Service Portal.
- We've made it easier to distinguish recommendations that will cost you money from those that will save you money. We've renamed the Cost column to Savings, and savings are now expressed as a positive number. Previously, for example, to find all VMs with recommendations that would save more than $200, you had to filter by Recommendation Cost Difference < -200. Now, you can simply filter by Recommendation Annual Cost Savings > 200. If you had saved searches using the Recommendation Annual Cost Savings filter, they are automatically updated during upgrade. This change has been made in the Service Portal as well as the vCommander console.
- The Recommendations property for VMs has been renamed to Has Recommendations for clarity.

Change to minimum update frequency for public cloud managed systems

The minimum update frequency for public cloud managed systems has been changed from 1 minute to 10 minutes. If you had set a value lower than 10 minutes before upgrade, it will be changed to 10 minutes after upgrade. To learn more, see "Adding a Managed System" in the vCommander User Guide.

Microsoft Azure cost model renamed Microsoft Azure (Classic)

With the addition of support for Azure Resource Manager, if you were managing an Azure subscription before upgrade, the associated cost model will be renamed Microsoft Azure (Classic) after upgrade.

vCommander User Guide no longer available as PDF

The vCommander User Guide PDF is no longer included with the product upgrade notification email, or on our Knowledge Base. Online help is available in vCommander and at http://docs.embotics.com.
Deprecated and Removed Features and Platforms

This section lists features and platforms that are deprecated. Support for these features and platforms will be removed in a future release. If you need more information about any of the deprecated or removed features, please contact support@embotics.com.

Removed in version 6.0

Graphical Lineage view for VMs

The Graphical Lineage tab for VMs has been removed.

Removed in version 5.7

vSphere 4.1, 4.0 and 2.5 support

Support for vSphere 4.1, 4.0 and 2.5 as virtualization platforms has been removed.

Deprecation in previous versions

Deprecation variables

As part of the usability improvements to vCommander variables, we have renamed some variables to clarify their purpose, and we have deprecated those that are not needed. The deprecated variables are not guaranteed to work in a future release.

If you are using any of the variables that have been renamed, they will automatically be updated with the new names during upgrade.

If you need to continue using any of the deprecated variables, please contact support@embotics.com, so that we can add them to the list of supported variables.

Version 1 of REST API

Version 1 of the vCommander REST API is deprecated and will be removed in a future release.

Graphical Lineage view for VMs

The Graphical Lineage tab for VMs is deprecated and will be removed in a future release.

User-specific component forms for new service requests

With the introduction of the blueprint service catalog model, user-specific component forms for new service request (that is, component forms created in the Form Designer) are deprecated and will be removed in a future release.

End of Life Policy, Suspect Policy and Approval Policy

The End of Life policy, Suspect policy and Approval policy and the relevant VM states are deprecated and will be removed in a future release.
Connect to the same network as the source service

The option to connect to the same network as the source service when configuring deployment destinations is deprecated and will be removed in a future release. We recommend selecting one or more networks from the list of available networks.

Issues Resolved in This Release

Issues resolved in the 6.1.6 maintenance release

<table>
<thead>
<tr>
<th>Issue</th>
<th>Description and Solution</th>
</tr>
</thead>
</table>
| 23189  | Outdated cacert file causes AWS disconnects.  
*Updated certificate is included in this release, AWS managed systems remain connected.* |
| 23205  | Administrators were unable to update the private key using the key pair credential.  
*Added the ability to add/update the private key in the vCommander.* |
| 23207  | Issues with SAML integration may prevent users from logging into Portal.  
*SAML authentication working correctly now for Portal users.* |

Issues resolved in previous 6.1.x releases

<table>
<thead>
<tr>
<th>Issue</th>
<th>Description and Solution</th>
</tr>
</thead>
</table>
| 23002  | Performance issue affecting vCommander service startup  
*A recommendation-related performance issue affecting vCommander service startup has been addressed.* |
| 22972  | Automated deployment fails when deployment parameter $IP1=$ is used  
*Automated deployment now works as expected when the deployment parameter $IP1=$ is entered during request approval.* |
| 22916  | Unable to deploy Azure template if parameter value contains an integer  
*ARM templates with integer parameter values can now be deployed successfully.* |
| 22787  | vCommander variable #{request.storage.gb} in conditional approval workflow fails if value greater than 250 GB  
*This variable now works properly in conditional workflow steps when the storage value is greater than 250 GB.* |
| 22770  | Value for Destination form element not included with copied service request  
*When a service request is copied, the value for the Destination form element is now included as expected.* |
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</table>
| 22759 | **High Availability: Failover may occur due to number of login errors**  
Because of an issue with the HA heartbeat login using the same session count as the REST API, a high availability failover might occur when not required. The HA heartbeat login no longer counts against the REST API session limit. |
| 22695 | **Unable to update performance data for Azure Resource Manager VM**  
vCommander is now able to gather performance data for ARM VMs with the scheduled task as well as through the Update Performance command. |
| 22664 | **Licensing warning causes Update License button to be hidden**  
When a license warning appears on the Licensing tab under Configuration > System Configuration, the Update License button is no longer hidden. |
| 22609 | **Cross-site scripting vulnerability in Manage Snapshots command**  
The XSS vulnerability in the Manage Snapshots command has been addressed. |
| 22582 | **Windows session authentication may fail with DecryptTokenFailer error**  
This error in Windows session authentication has been resolved. |
| 22452 | **Execute SSH Command workflow step may fail for certain RHEL 7.4 and CentOS distros**  
The Execute SSH Command workflow step now works as expected in completion workflows for RHEL 7.4 and CentOS 7.3 VMs. |
| 22351 | **Service Portal user with Connect Media permission cannot see files in the Media Library**  
A Service Portal user with the Connect/Disconnect Media permission can now see files in the Media Library as expected. |
| 22325 | **Issues with Edit Organization wizard if Use Per Storage Tier Quotas option isn’t enabled**  
When the organization is not configured to use storage tier quotas, using the Edit Organization wizard to add members or configure member quotas now works as expected. |
| 22182 | **Removing and re-adding CloudFormation template to service catalog may cause exception**  
In certain cases, removing a CloudFormation template from the service catalog made it impossible to add another CloudFormation template to the catalog. This issue has been fixed. |
| 22181 | **Unable to deploy public ARM image "Windows Server 2012 R2 Datacenter" to VM**  
Deploying a service that includes the ARM "Windows Server 2012 R2 Datacenter" public image now works as expected. |
| 22056 | **Default superuser account may not be able to access Service Portal**  
Adding the default "superuser" account to an organization and assigning this account a Service Portal role now allows access to the Service Portal as expected. |
| 21980 | **Save User Preferences task may stay in vCommander Tasks tab indefinitely**  
The Save User Preferences task no longer appears in the vCommander Tasks tab. |
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| 22777   | Cannot sync own account if it is given access via AD group  
Accounts can now be synced.                                                                                                                                 |
| 22768   | vCommander becomes disconnected because of Null Pointer Exception in observation system  
This error has been corrected.                                                                                                                                 |
| 22765   | Syncing User directory account removes account's managed system permissions  
Access control functions as expected.                                                                                                                                 |
| 22758   | Copying a completed VM request and requesting again fails when using a custom attribute to modify the VM name  
The VM name is now properly changed in a copied request.                                                                                                                                 |
| 22731   | Inability to thin provision on VMFS6 datastores  
Disk provisioning is now successful when the disk provisioning format is set to Thin.                                                                                                                                 |
| 22694   | Accounts with both vCommander "Auditor" role and Service Portal role displayed as "No individual role" in vCommander  
The user's role is now shown correctly in vCommander.                                                                                                                                 |
| 22658   | Performance charts not accessible from Service Portal if Service Access is restricted and VM Access Proxy is used  
Performance charts are now accessible in the Service Portal in this configuration.                                                                                                                                 |
| 22643   | Pending Completion state of VMs not appearing in Service Portal  
VMs deployed from requests that are pending completion are now marked as "Pending Completion" and actions for these VMs are limited.                                                                                                                                 |
| 22641   | Text may be deleted from text boxes on request form  
Request form text fields now function as expected.                                                                                                                                 |
| 22632   | Assigning users Access Rights does not properly update in certain security group configurations  
Access Rights can now be assigned and viewed as expected.                                                                                                                                 |
| 22593   | The Server version is disclosed in the HTTP Header of the server’s response  
On a fresh installation, the HTTP Header does not show the server version. To address this issue during upgrade, you must add server="Apache" to the connector element in server.xml. See [http://www.techstacks.com/howto/suppress-server-identity-in-tomcat.html](http://www.techstacks.com/howto/suppress-server-identity-in-tomcat.html) for more information.                                                                                                                                 |
| 22592   | XSS vulnerability in VM Access Proxy  
This XSS vulnerability has been resolved.                                                                                                                                 |
| 22588   | Error when viewing VM details and then switching organizations in the Service Portal  
Switching organizations when viewing details for a VM no longer results in an error.                                                                                                                                 |
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<td>22586</td>
<td>Workflows that execute scripts may unexpectedly stop, and system restarts are required. Workflows that execute scripts are now working as expected.</td>
</tr>
<tr>
<td>22500</td>
<td>When using a non-standard port, unable to perform some actions in Service Portal. Service Portal tasks can now be performed as expected when using a non-standard port.</td>
</tr>
<tr>
<td>22455</td>
<td>Removing custom attribute value from custom attribute definition may cause exception. In the case when a VM had a list-type custom attribute value and the VM is then deleted, it's now possible to remove that value from the custom attribute definition.</td>
</tr>
<tr>
<td>22430</td>
<td>Display Domain Field login preference does not take effect in Service Portal. The Display Domain Field login preference now works as expected in the Service Portal.</td>
</tr>
<tr>
<td>22428</td>
<td>When using Chef Run-lists, service requests from the Service Portal might fail. Service requests from the Service Portal are working as expected in this situation.</td>
</tr>
<tr>
<td>22425</td>
<td>In the Manage Service Icons window, some control buttons are not accessible. Control buttons are now accessible in the Manage Service icons window.</td>
</tr>
<tr>
<td>22416</td>
<td>Upgrades from 5.7.10 and 6.0.2 to 6.1.0 fail to delete a file in the tomcat\webapps folder. Upgrade to 6.1.4 functions normally.</td>
</tr>
<tr>
<td>22257</td>
<td>Scheduled VM Billing Reports do not return data. Scheduled VM Billing reports now run and return data as expected.</td>
</tr>
<tr>
<td>22197</td>
<td>Allow Multi-Service Requests option isn't enforced. When the &quot;Allow multi-service requests&quot; configuration option was disabled in vCommander, Service Portal users were still allowed to create multi-service requests, which would eventually fail. The option now works as expected.</td>
</tr>
<tr>
<td>22189</td>
<td>Invoking the Get-PSRequestParams REST API method for an ARM Service returns an error. Using the REST API to get the request parameters for an ARM service that exists in the vCommander service catalog now works as expected.</td>
</tr>
<tr>
<td>22179</td>
<td>Cannot add local user with @ symbol in user name. Local user names may now contain the &quot;@&quot; symbol.</td>
</tr>
<tr>
<td>22155</td>
<td>Decreased performance from Dashboard when using SQL Server 2014. When using Microsoft SQL Server 2014 or greater with the default SQL Server compatibility level, vCommander Dashboard performance is slow. The Cardinality Estimator added in SQL Server 2014 increases query compile time. Therefore, to increase the Dashboard's display speed, change the SQL Server's compatibility level to SQL Server 2012 (110), then restart the vCommander service. To learn how to change the SQL Server compatibility level, see View or Change the Compatibility Level of a Database in the Microsoft documentation.</td>
</tr>
<tr>
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<tr>
<td>22126</td>
<td><strong>vCommander cannot connect to vCenter 6.5 managed system without TLSv1.0 or 1.1 enabled</strong>&lt;br&gt;vCommander can now connect to a vCenter 6.5 managed system that does not have TLSv1.0 or 1.1 enabled, which may occur if the VMWare TLS Reconfiguration Utility is used.</td>
</tr>
<tr>
<td>22099</td>
<td><strong>When deploying CloudFormation templates to VPCs, no values for VPC and subnet ID variables are returned</strong>&lt;br&gt;The vCommander variables #{destination.subnet.remoteId} and #{destination.vpc.remoteId} now return the requested information.</td>
</tr>
<tr>
<td>22092</td>
<td><strong>Incorrect default value for advanced system property embotics.ad.skip.supportedupnsuffix</strong>&lt;br&gt;The default value for both new and upgraded vCommander installations is true. For upgrades, if the value was set to false before upgrade, it will stay false. If the value was set to true before upgrade, it will stay true.</td>
</tr>
<tr>
<td>22059</td>
<td><strong>When requested AWS stacks are deployed, the Outputs may not be immediately available</strong>&lt;br&gt;Outputs now automatically display after requests for AWS stacks are completed; a manual refresh is not required.</td>
</tr>
<tr>
<td>22054</td>
<td><strong>After upgrading, deployed AWS stacks may not be available because their server types are not retained</strong>&lt;br&gt;Server types are now properly retained after an upgrade, so all AWS stacks that were requested and deployed are still available after an upgrade to vCommander 6.1.6.</td>
</tr>
<tr>
<td>22051</td>
<td><strong>Custom attribute descriptions unavailable in service requests</strong>&lt;br&gt;When making service requests in the Service Portal, you can now mouse over the custom attribute label to read the custom attribute's defined description.</td>
</tr>
<tr>
<td>22032</td>
<td><strong>Deletion of AWS stacks in vCommander may not appear to complete</strong>&lt;br&gt;The deletion of an AWS stack will now complete even if the stack contained a resource with a deletion policy of &quot;retain&quot;.</td>
</tr>
<tr>
<td>22005</td>
<td><strong>Unable to copy requests from Service Requests view</strong>&lt;br&gt;In Service Portal 6.0.x, you could not copy an existing a service request. You can now right-click and copy a listed service request.</td>
</tr>
<tr>
<td>20956</td>
<td><strong>Security group member unable to log in to Service Portal if first assigned vCommander role</strong>&lt;br&gt;A Service Portal user added as part of a security group can now log in to the Service Portal if they had previously been assigned a vCommander role.</td>
</tr>
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## Known Issues

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| 23092   | **Direct console connection to VM on vCenter 5.1 will fail if running VMRC 10**  
Due to a VMware change, attempting to open a direct (non-proxied) console connection to a VM on vCenter 5.1 will fail if the standalone VMRC 10 app is in use.  
*Use a different method, such as a previous version of the VMRC app, to connect to a VM on vCenter 5.1. In our testing, version 7.0.1 of the VMRC app was successful.* |
| 23090   | **SSH java applet does not work when using 'Open SSH Session' for Linux VMs.**  
*You can successfully establish an SSH session if you SSH into the VM directly with a tool like PuTTY.*                                                                                                                                 |
| 23056   | **WebMKS not supported for direct console connections to vCenter 6.0 VMs on ESXi 5.5**  
The WebMKS method is not supported for direct (non-proxied) console connections to vCenter 6.0 VMs on ESXi 5.5.  
*Use the VMRC method instead of the WebMKS method to open console connections in this environment. Contact support@embotics.com to learn how to edit an advanced system property that controls the preferred connection method.* |
| 21911   | **Credential selection not preserved when service request is copied**  
When you copy a service request that contains an ARM public image component, and credentials were selected on the Resources tab of the blueprint but the Credentials element was not added to the Form tab, deploying at the service level fails with an error saying that the source URI does not exist, because credentials could not be found.  
*Manually deploy at the component level so that you can specify credentials.* |
| 21900   | **Service Portal’s VMs and Services page maintains loading state**  
In the Service Portal, the VMs and Services page can sometimes display a perpetual loading symbol.  
*Click Refresh to manually reload and display the data.* |
| 21870   | **Deploying the VM Access Proxy disables the "Synchronize guest time with host" option**  
When you deploy the VM Access Proxy, the "Synchronize guest time with host" option is disabled.  
*In vCenter, right-click the VM Access Proxy deployment and select Edit Settings. On the VM Options tab (the Option tab in the Thick Client), enable the Synchronize guest time with host option in the VMware Tools panel.* |
| 21159   | **Google Chrome version 58 does not support Common Name in self-signed certificates**  
Chrome Version 58 now requires a Subject Alternative Names instead of the Common Name used in the self-signed certificate delivered with vCommander.  
*If you are using Chrome version 58, generate a self-signed certificates using the Subject Alternative Name. See the Knowledge Base article Trusting a Self-Signed Certificate for more information.* |
### Known Issues

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| 19502   | **Distributed Service Portal: Time zone for Service Portal nodes different from vCommander**  
  When you set up a distributed Service Portal, tasks appear in the Service Portal in UTC time, and it's not currently possible to configure the time zone. As a result, expiry dates may not match, expiry policy actions may be triggered at the incorrect time, and scheduled tasks may be executed at the incorrect time. |
| 19275   | **Open SSH Session not supported in Chrome and Firefox**  
The commands **Open SSH Session** and **Open SSH Session with Key Pair** are no longer supported in Chrome and Firefox due to the discontinuation of support for the Java plug-in (applets) by these browsers.  
*Use Internet Explorer to open an SSH session.* |
| 17455   | **Performance metrics may not be available immediately after upgrade to vSphere 6**  
Attempting to run the **Update Performance and Capacity** command for a cluster immediately after upgrading to vSphere 6 may fail, because performance metrics are not yet available to vCommander.  
*Wait about an hour for vSphere to make performance metrics available, and run the command again.* |
| 16002   | **Mouse pointer may not be visible when opening VM console using IE 11 or 10**  
When the WebMKS console connection method is configured, Internet Explorer 11 or 10 users may be unable to see the mouse pointer in the console session.  
To open a console to a Windows VM from Internet Explorer 11 or 10 when using WebMKS, try enabling mouse trails with the shortest option. Or, use the VMRC plug-in method instead of the WebMKS method.  
For Linux VMs, use the VMRC plug-in connection method.  
*Note that if your users install the VMRC plug-in from a version 5.5 update 2 vCenter, they will be able to open a console for a VM in any version 5.x vCenter.*  
See "Prerequisites for Opening a Console Session on vCenter" in the vCommander User Guide to learn how to change the console connection method for HTML5 browsers. |
| 15602   | **Multiple connections in same browser not supported**  
vCommander and the Service Portal do not support multiple connections in the same browser. For example, you can connect to vCommander in both Firefox and Chrome at the same time, but you cannot connect to vCommander in two instances of Firefox at the same time.  
*Use a different browser to open another session.* |
| 14837   | **Caps Lock key may cause duplicate characters in a secure RDP session**  
In a secure RDP session, if Caps Lock is enabled, duplicate characters may be printed for the characters c, x, and v.  
*Use the Shift key instead of enabling Caps Lock.* |
| 14353   | **VM console connection does not time out if connection cannot be established**  
If a console connection to a VM cannot be established, a "Connecting" message is displayed indefinitely. |
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| 14165   | **Evaluation Exception when running a Compare Drift command on a VM after upgrading vCommander**  
> When running the **Compare Drift** command, an Evaluation Exception error occurs.  
> *This issue disappears once the scheduled Database Maintenance task runs. This task is scheduled for Saturday night at 2 a.m. following the upgrade. If you want to run this scheduled task earlier, go to Tools > Scheduled Tasks, select the Database Maintenance task, and click Run Now.*  

| 13566   | **Failed status may not be displayed for service request with failed completion workflow steps**  
> If a completion workflow step fails, the list of service requests may not display the proper Failed status for that service request.  
> *Open the service request details to view the workflow status, or go to **Tools > Workflow Status**.*  

| 11671   | **Automated deployment may fail for VM with no storage tier specified**  
> For a Service Catalog request of a VM template with no explicit storage tier set, automated deployment uses the default storage tier specified by the cost model applied to the deployment destination. If the deployment destination for the service request does not contain a datastore for this storage tier, the automated deployment will fail. For example, if a highly available datastore is not assigned to the default storage tier for a VM configured to be highly available, automated deployment will fail.  
> *Always configure the default storage tier to include datastores for vCenter, SCVMM highly available storage, and SCVMM non-HA storage. If this configuration is not possible due to the way your organization uses storage, contact support@embotics.com for other configuration options.*  

| 10874   | **Exporting CSV files from a table may result in incomplete data**  
> If you right-click a table and click **Export** to export results, the exported .csv file may not contain complete data.  
> *Export reports while viewing them, using the Export button. Exporting a .csv file through a scheduled search or report also generates complete data.*  

| 10515   | **Comments may not be displayed on approval landing page for command workflow**  
> For a command workflow that includes an approval email step, request comments may not appear on the approval landing page.  
> *View the request comments from the Workflow Management dialog.*  

| 10330   | **Guest OS scans for non-English Windows guests may report disk metrics as Unknown**  
> WMI scans may fail to retrieve disk usage metrics for a non-English guest OS.  
> vCommander also pulls disk space properties directly from VMware Tools. Obtain disk usage data from VMware Tools instead of a guest OS scan.  

| 9154    | **Acknowledgment email for a completion workflow may contain inaccurate or incomplete information**  
> Information such as CPU count, MAC address and cost may be inaccurate or incomplete in acknowledgment emails for completion workflows.  

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<tr>
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<td>To ensure that the information in the acknowledgement email is correct, add a &quot;Wait for event&quot; step to the beginning of the completion workflow. In the Wait For drop-down menu, select an option as follows:</td>
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<td></td>
<td>- If VMware Tools is installed, <strong>Service to obtain IP address</strong> is the recommended option. You can also select <strong>Service to obtain DNS name or Service to obtain IP address and DNS name</strong>.</td>
</tr>
<tr>
<td></td>
<td>- If VMware Tools is not installed, select <strong>Time to Elapse</strong>. Specify sufficient time for VMware to update all properties changed by vCommander.</td>
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**Help and Support**

If you require additional help and support, send an email to support@embotics.com or telephone 877-599-0494 (toll-free in Canada and the US) or +1 613-599-0494.