Hystax Acura Integration for Virtuozzo Hybrid Infrastructure

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Hystax Acura Overview

Hystax is a cloud migration and Disaster Recovery company focusing on consistent replication of IT workloads and providing real-time migration and Best-In-Class Disaster Recovery.

To deploy the Hystax Acura solution, a customer needs to request Hystax (migrations@virtuozzo.com) for the golden image of the solution and follow the steps described in this document.
CHAPTER 2

Installation Requirements

- Virtuozzo Hybrid Infrastructure version 4.7.1 (50).

- Golden image with Hystax Acura. Provided on request - contact your account manager or email migrations@virtuozzo.com

- A Hystax Acura Solution License. Provided on request - contact your account manager or email migrations@virtuozzo.com

- Resources to launch a virtual machine with 8 vCPUs, 16 GB RAM, 100 GB disk created from the Hystax Acura Golden image.

- Resources to launch a VM with 2 vCPUs, 4 GB RAM, 20 GB disk for the Hystax Cloud Agent. Created in each target / failover Virtuozzo Hybrid Infrastructure project.

- SMTP server with TLS/SSL encryption.

- **Security groups allowing the following traffic:**

  1. **Hystax Acura host:**

    - Ingress - tcp/443
    - Ingress - tcp/4443
    - Ingress - udp/12201

  2. **Hystax Cloud Agent (spawned automatically in the Target Project):**

    - Ingress - tcp/80
• Ingress - tcp/3260
CHAPTER 3

Installation Steps

The installation process will be divided into three sections:

1. Virtuozzo Hybrid Infrastructure Platform resources planning and configuration.
2. Deploying the Hystax Acura Solution on Virtuozzo Hybrid Infrastructure Platform.

3.1 Resource Planning and Configuration for Virtuozzo Hybrid Infrastructure

Before starting with the deployment of the Hystax Acura migration solution, we need to review the solution architecture, gather information, and verify that we have the necessary resources available on our Virtuozzo Hybrid Infrastructure Platform. The information gathered, will be used to deploy the Hystax Acura solution.

Hystax Acura Migration Solution Architectural Overview
We need to verify that the following resources exist on our Virtuozzo Hybrid Infrastructure Platform. If the resources do not exist, we will need to create them:

- A customer domain, we will name it Ringo-Cloud for the purpose of this example. This domain will be where our customer’s projects will be created. We will refer to this domain as the **target project domain**. If you already have a domain configured that you wish to use to create your customer’s projects on, please use it. A domain is a container for projects and users that have roles assigned to them.

- A project to host the migrated infrastructure, we will name the project migrationinfra for the purpose
of this example. This project will live inside the domain created on the previous step. We will refer to this project as the **target project or target cloud**. This project will be where replicated workloads will be spun, also the Acura Cloud Agent (an instance automatically deployed by the Hystax Acura Solution, which job is to forward replication data and write it to a storage volume on the target project) instance will be created here. A project is a container of virtual objects with set virtual resource constraints, such as virtual CPU, RAM, storage, and floating IP addresses, as well as assigned users. Each project is also known as a tenant. We will also be creating a network, a virtual network and a router for this project.

- A user who will execute the migration, we will name this user “migration-user”. The user will have the necessary access rights defined by the role assigned, to perform the migration tasks. We will use this to fill the **username** field when configuring the Hystax Acura Migration Solution appliance. A role defines all of the actions that a user may execute, at the level of the entire infrastructure, a specific domain, or a single project. The user will be assigned the “project member” role, and will have single project scope.

- A domain and project which will host the Hystax Acura Migration Solution (Hystax Acura Controller), we will refer to this project as the **Hystax service project**. The domain that has been used in previous steps can be used to create this service project. The Hystax Acura Migration instance will be deployed on this project. This way the instance will be isolated. This isolation is relevant, as when configuring the Hystax Acura Solution instance in the next section, we will need to define which network is used by the instance in order to communicate with the Acura Cloud Agent instance, which is spun on every customer project. We have two choices; we can define the network attached to the Hystax Acura instance, in order to do this, we need to create a RBAC rule using the OpenStack command line to share the network with every project we wish to communicate. The other option is to use an external physical network, which can be made shareable with any project via the Web UI interface. We will use a physical external network type to establish this communication in this example.

1. Create a Domain, log in to your Virtuozzo Hybrid Infrastructure Platform Admin Panel, go to **Projects and Users** and click on **Create Domain**. This is only necessary if your customer does not have an organization domain already.
2. Now create a new Project inside the domain that you have just created (or existing customer domain). Click on the name of the Domain, then on Projects and click on Create project, in this example we have created a project with unlimited resources.
Remember you need to account for the following resources when creating the projects:

- **Service project**: Resources to launch a virtual machine with 8 vCPUs, 16 GB RAM, 100 GB disk created from the Hystax Acura Golden image.

- **Target project**: Resources to launch a VM with 2 vCPUs, 4 GB RAM, 20 GB disk for the Hystax Cloud Agent. Created in each target / failover Virtuozo Hybrid Infrastructure project. Also, any replicated workloads will be deployed here.

3. Create a project user and assign it to the migration project. Click on **Domain Users** then on **Create user**. Allow the user to upload images.
4. Create a Domain and a Project where the Hystax Acura Solution instance will be deployed. Remember this project will be the **Acura Service Project**. When the Hystax Acura Solution is deployed you will be able to manage multiple tenants from this single instance. This is the reason why having dedicated domain a project helps to organise resources. From your Virtuozzo Hybrid Infrastructure Appliance, go to “**Projects and users**” tab on the left-hand side navigation menu, then click on **Create Domain**.
Now click on the **Acura Service Domain > Projects > Create Project**. This project will be the service project. We will use it to deploy the Hystax Acura Solution Instance.
5. Now create a user. This user will be used to login later into the Acura Service Project in order to deploy the Hystax Acura Solution instance. Don't forget to assign the user to the Acura Service Project.

Go to Projects and Users, click Acura Service Domain > Create User. Assign the user to the Acura Service Project with the Project Member role.
6. At this point, our Acura Service and the Target Projects are ready but there is a missing configuration related to the network, the **Hystax service network**. Later in this guide, we will deploy the Hystax Acura Instance. This instance will communicate with the Acura Cloud Agent instance through an external physical network which will be made available on both projects. We will use the same physical network to simplify the configuration. The only requisite when choosing the network to use for the **Hystax service network** is that the network should be routable from the Acura Cloud Agent instance network to the network in which the Hystax Acura Instance is located.

7. Login to your Virtuozzo Hybrid Infrastructure Admin Panel and click on network on the left-hand navigation panel. Identify the external network you wish to use (for this example we will use a network
named **public** and click on top of it, you’ll see a new panel on the left, find the network access section and click **Edit**.

8. Now enable the network on the **Service Domain** and the **Ringo Cloud Domain** as we only have one project on each, the access will be inherited by the project.
9. Download the Hystax Acura image to your admin panel server and upload the image to the Acura Service Project.

9.1. SSH in to your Virtuozzo Hybrid Infrastructure Admin panel compute node.

9.2. Source your admin credentials:

```
su - vstoradmin
kolla-ansible post-deploy ; exit
source /etc/kolla/admin-openrc.sh
```

9.3. Download the Hystax Acura image:

```
wget https://xx-hystax-imagexx-acura.tar.gz
```

9.4. Extract the archive:

```
tar -xvf xx-hystax-imagexx-acura.tar.gz
```

9.5. Upload the Hystax Acura image to your project:

```
openstack --insecure image create "Hystax Acura" \
--disk-format raw \
--container-format bare \
--file Hystax_Acura_VA_MGR_Virtuozzo_3_7_1701-release_3_7_ \
--project name_of_the_hystax_service_project
```

3.2 Deploying Hystax Acura Solution on Virtuozzo Hybrid Infrastructure

At this stage we will log in to our Acura Service Project, create an overlay network and a router which will be configured to enable SNAT for the Acura Instance. We will then have the necessary resources to deploy the Hystax Acura migration Solution and assign a Floating IP to the instance.

1. Login to the Acura Service Project from the self-service portal using the URL https://fqdn:8800.
2. Create a Network. This will be a virtual network, which later will be attached to the Hystax Acura Solution instance. **Networks > Create Virtual Network**. We will name this network **vm-network** in this example.
3. Create a Router. This router will allow us to provide SNAT (Outbound access) to the Hystax Acura Solution instance. Please note how we connect the physical external network named “public” with the newly created virtual network named **vm-network**.
4. Deploy an instance using the Hystax Acura golden image downloaded. Remember to attach a keypair, this will grant you access to the Acura instance. Create the instance with the following info:

- 8 vCPUs, 16 GB RAM, 100 GB disk (Xlarge flavour).
- Image Hystax_Acura_VA_MGR_Virtuozzo_X_XXX
• Use the Default Security Group.

• Image Hystax_Acura_VA_MGR_Virtuozzo_X_XX

• Add a network interface, in this case we will add the vm-network to this instance.

• Add your SSH key pair to the instance.

Note: Adding a key pair is highly recommended to provide you with SSH access to the machine. Although Hystax Engineering team will be able to perform maintenance checks and troubleshooting (as long as the network is reachable and your security groups allow the corresponding traffic), it is better to have your own means of accessing the Acura instance.

It takes from 10 to 20 minutes for the services to start and the Web UI to become available.

5. Assign a floating IP to the newly created Hystax Acura instance. Logged to the self-service portal https://your-fqdn-vhi.com:8800. And login to the Acura Service domain using the user defined for this domain. Go to **Floating IPs**, click on add. Note that we are using Private IPs, but in a real scenario this should be a Public IP.
6. **Troubleshooting tip:** The web UI for the Hystax Acura Solution instance, will take from 10 to 20 minutes to bring all the services up. Hystax Acura uses Kubernetes to manage the services inside the instance. If after 20 minutes you still have no access to the web UI, SSH in to the Acura instance and check the status of the services. SSH with the user “user” and execute the command `kubectl get pods` (This command will gather information about pod(services) status). When you see all the pods in Running status (except for four that will be in completed status) the web UI will be available.
Chapter 3. Installation Steps

If after 20 minutes, instead of getting the pod status you get a connection refused message, please contact us.

7. Open a web browser and go to https://<ip_address of the machine>/. You will be redirected to the Hystax Setup Wizard. After you perform all the steps, the installation will be complete, and you will be able to start using Hystax Acura.

7.1. **Step 1:** Enter the organization name, you can enter here your company name, this step creates the login user and password and associates it to whatever organization name you wish to provide. Add the **Admin user login** and **Password**. This will be the user account for logging in to Hystax Acura Control Panel and managing the system. If there are any errors, the system will notify you.
7.2. **Step 2**: Fill in your Hystax **License key** that was supposed to be shared with you in advance as well as the settings for accessing your mail server, which will be used to send notifications from Acura and generate periodic reports.

---

**Note**: SMTP server with TLS/SSL encryption is required to proceed with deployment.

If you prefer a public SMTP server associated with your email address (gmail, yahoo etc.), please find its settings online. In the case of a private SMTP server, contact your network administrator for further details.

A sample notification will be sent to the specified “**Test email**” to verify the functionality when you click “**Next**”. 
7.3. **Step 3**: Fill in all the fields by providing cloud configuration details. Use question mark icons to get hints on the fields. After you click “Next”, the Setup Wizard will validate the entered data and notify you in case of an error.
Step 3 of the configuration wizard goal, is to configure what we refer to as target cloud. We are configuring our customer target project, where the replicated workloads will be migrated to.

- **Keystone API endpoint**, is the fqdn of your Virtuozzo Hybrid infrastructure Admin panel listening on port 5000 (make sure the compute API traffic type is on the public network) will be used to authenticate for authentication.

- **User Domain**, this field refers to the domain name the user is part of. Remember in our example, the domain for our customer is **Ringo-Cloud** then we created the project named **migration-infra** and a user **migration-user** which was assigned to the project and belongs to the Ringo-Cloud domain.

- **Username**, the user we created an associated to the target project migration-infra as Project Member. In this case the user is **migration-user**.

- **Target Project Domain**, this is the customer domain, the same as the **User Domain** and is the domain where we created the project. In our example the name is **Ringo-Cloud**.
Ringo-Cloud.

- **Target Project ID**, the UID for the project migration-project. The **Target project ID**, can be found by logging in to your Virtuozzo Hybrid Infrastructure Admin Panel > Projects and Users > Click on the Domain > Click on the Target Project and the ID will be visible on the left-hand side sliding panel that will appear.

- **Hystax Service Network**, Network that will be used for Hystax Cloud Agent machines. Should be the same or routable to the network in which a Hystax Acura instance is located. In our case we have already prepared a physical external network type named **public** for this purpose in previous steps.

- **Floating IP network**, this is the name of the network you wish to use to provide floating IPs to your migrated instances. In our case is the same physical external network named **public**.

- **Hystax Acura Control Panel Public IP**, Public IP that will be used to access the Hystax Control Panel via web browser and by replication agents.

- **Additional Parameters**, add additional parameters to customize integration.

Example information gathering form:

<table>
<thead>
<tr>
<th>Field</th>
<th>Description</th>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td>User Domain</td>
<td>User domain name to access VHI</td>
<td>Ringo-Cloud</td>
</tr>
<tr>
<td>Username</td>
<td>Username to access VHI Project</td>
<td>migration-user</td>
</tr>
<tr>
<td>Password</td>
<td>Password to access VHI</td>
<td>password</td>
</tr>
</tbody>
</table>

Continued on next page
Table 3.2.1 -- continued from previous page

<table>
<thead>
<tr>
<th>Field</th>
<th>Description</th>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td>Target Project Domain</td>
<td>Target VHI project domain name</td>
<td>Ringo-Cloud</td>
</tr>
<tr>
<td>Target Project ID*</td>
<td>Target VHI project ID where replicated workloads will be spun up</td>
<td>c57dd14c08bc4d6780ab17 87774fd6e8</td>
</tr>
<tr>
<td>Hystax Service Network</td>
<td>Network that will be used for Hystax Cloud Agent machines.</td>
<td>public</td>
</tr>
<tr>
<td>Floating IP Network</td>
<td>External network that will be used to attach Floating IPs to migrated ma-</td>
<td>public</td>
</tr>
<tr>
<td></td>
<td>chines</td>
<td></td>
</tr>
<tr>
<td>Hystax Acura Control Panel</td>
<td>Public IP that will be used to access the Hystax Control Panel via web</td>
<td>Public IP</td>
</tr>
<tr>
<td>Public IP</td>
<td>browser and by replication agents</td>
<td></td>
</tr>
<tr>
<td>Additional Parameters</td>
<td>p2v - Sets type of Physical to Virtual to integration (Virtuozzo)</td>
<td>{“p2v_type”: “virtuozzo”, “cloud_site_timeout_min”: 2880}</td>
</tr>
<tr>
<td></td>
<td>Extends cloud site timeout (adds support for virtuozzo cinder (vstorage))</td>
<td></td>
</tr>
</tbody>
</table>

The specified Virtuozzo Hybrid Infrastructure Platform user should have the following rights for Hystax Acura to operate correctly.

- Import image
- Launch instance
- Create volume
- Attach volume to instance
- Detach volume from instance
- Create volume snapshot
- Create volume from snapshot
- Remove snapshot
• Remove volume
• Manage networks

The user we created had the assigned role “Project Member” which include all of the above.

7.4. **Step 4**: Installation is complete, and you can now log in to the system using credentials entered in the previous step.

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### 3.3 Performing Test Migration

In this section we will perform a test migration. Let’s first define specific Hystax Acura concepts before we start with the test migration.

- **Cloud/Target Clouds** on the Hystax Acura portal are objects that contain information about things like, where should workloads be migrated? What user and password Hystax Acura must be used authenticate via Keystone API? What is the URL for the Keystone API? Which is the service network? Basically, all the information provided on step 3 of the installation wizard is used to populate this Hystax Acura entity. Once you login for the first time you will see this resource by clicking on the “Manage Clouds” button. You can add more “Cloud/Target Clouds” to manage more migration projects on Virtuozzo Hybrid Infrastructure Platform.
Customers are entities that we create which logically associate a customer with migrated instances, migration plans, cloud sites, cloud/target cloud and target project ID*. We will select this “Customer” entity in order to start a migration. You can create multiple customers that belong to different projects (target project) as long as the user defined on the “Cloud/Target cloud” is a project member. This is the first configuration resource you will need to create in order to start planning the migration. Note that in this case the Target Project ID* is the same as the one defined in the original Cloud/Target Cloud.
Chapter 3. Installation Steps

Machine Groups are ways to group instances, you could create a machine group for Windows instances, another machine group for Linux instances, etc. There is a default group and will be the one we will use in this example.

Migration Plans are a way to define what the migrated instance will look like when migrated e.g., what network should be the new replicated instance part of? What flavor should be used to create the new instance (flavors define how much RAM and CPU should be assigned to the new instance)? If we migrate more than one instance, we could even define how to orchestrate the migration, by defining for example what instance should start first and what instance should wait until the other instance is up.

To perform a test migration, do the following:

1. Login to the Hystax Acura portal by going to https://floating-ip-acura-instance.
2. Add a customer. Click on the Hystax logo on the top left and you'll see the Add button to add a customer click that button. Fill in the information relevant to your customer. Click Save.

3. The new customer will be available after creation. Click on the customer and review the smart migration wizard. We will follow these steps to run a test migration.
4. Click on **install agents**, choose the install agent you wish to deploy on the source remote instance, that you wish to replicate. In our example I will be migrating an Ubuntu 16 web server instance, hosted currently on Amazon EC2. To do it, select the Linux agent and then click **Next**. If the migration was from VMware, it would be possible to install a HRVAgent image on each ESXi Hypervisor to perform the migration. For more details on the migration from VMware to Virtuozzo Hybrid Infrastructure, refer to the Hystax Acura Migration Guide for VMware.

5. Select the machine group, in our example this will be the **Default** group, then the target Linux distribution (**Debian/Ubuntu**). Check the supported kernel list, if the kernel of your instance is not supported, then you need to build the drivers and use the DKMS as the snapshot driver deployment type, in this example we will follow this path. Otherwise, you could choose **Snapshot driver deployment type (pre-built)**. If you have any issues building the drivers, please contact us.
Chapter 3. Installation Steps

6. Follow the steps provided by the Hystax Acura wizard, and copy and paste the instructions in order to install the agent on the instance that will be replicated.

7. Click on the Hystax logo on the top left. You will see now the customer and the machine count will be 1.
Chapter 3. Installation Steps

8. Click on the name of the customer and you’ll see the new instance.

9. Click on **Start Replication**. If everything is correctly configured, replication of the remote instance will start on your target cloud. Replication will take some time, depending on how much data will be replicated and the connection between your source and target clouds.
10. Wait until the instance is synced.

11. While the image is being synced, let's create a target network (the network that will be used by our instance on the replicated target cloud). Go to your VHI self-service portal on “vhi-admin-panel-fqdn:8800” and login to the target project.
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12. Once you've logged in, check the **Virtual machines** tab and you will see that the Acura cloud agent has been deployed automatically.

```
<table>
<thead>
<tr>
<th>Name</th>
<th>Status</th>
<th>IP address</th>
<th>vCPUs</th>
<th>RAM</th>
<th>Storage</th>
<th>Volumes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Target Projekt cloud agent</td>
<td>Active</td>
<td>192.168.3.94</td>
<td>2</td>
<td>4 GB</td>
<td>8 GB</td>
<td>1</td>
</tr>
</tbody>
</table>
```

13. Now go to **Networks**, create virtual network and follow the steps. I will create the network using exactly the same CIDR (172.31.32.0/20) as the instance being replicated. You could use any other network CIDR, this is just to show an example of a migration with exactly the same IP address source and remote.

14. Add a migration plan, step 1. Add a machine. Click on the ellipsis icon “...”, select **Add machine > Default** > the machine discovered.
15. Add a migration plan, step 2. Configure the subnets for your new instance. Expand the view for your instance. You will see information regarding Machine ID, Flavor, and Port (network). Also, on the left you’ll see information regarding the network to be used.

We will replace the Flavor name with one that is available on our cloud. You can check available flavors by going to Virtual machines and Flavors. Also, we will find the subnet ID for our newly created network and paste it there.

16. Source the information regarding the subnet ID:

16.1. Login to your Virtuozzo Hybrid Infrastructure Admin panel via SSH.
16.2. Source the `admin-openrc.sh` file.

```sh
# source /etc/kolla/admin-openrc.sh
```

16.3. Run the command `openstack network list --insecure` and identify the subnet ID.

![OpenStack Network List](image)

17. Add a secondary Port. Add a subnet by clicking the “+” button on the **Subnets** section.

![OpenStack Subnets Section](image)

18. Click on the **Subnet ID** drop down menu for your new subnet and select the Public IP you wish to use. By leaving the **Port IP** field blank you are specifying DHCP. Provide a name for the plan and click **Save**.
19. Click on **Run test migration** and select the migration plan.

20. Create a cloud site by giving a name, a cloud site is a way to logically group a migration plan with a snapshot to be used for the migration. Give the Cloud Site a name, select a snapshot and click on **Run migration**.
If all went well, you will see your replicated instance available on your target cloud. When you are done reviewing the migration test, you can delete the resources by deleting the cloud site.
Chapter 3. Installation Steps
CHAPTER 4

Providing Access to Hystax Acura Portal

In order to allow users to manage their migration workloads, we can create a user with project scope from the Hystax Acura web interface.

1. Login to the Hystax Acura Solution web interface and click on the Settings tab on the left-hand side. Then click on Roles and click Add.

   ![Add Role Form]

   ![Add Role Form]

   Share role with customers

   Name
   TriangleCakes Inc.

   Description
   Role project scope for TriangleCakes

   Role owner
   Customer: TriangleCakes

   Settings template
   Customer
2. Assign the necessary permissions to the role. We will provide full access to the **TriangleCakes** target cloud.

![Role Configuration](image)

3. Now we will add a new user. Click **Users** and then click **Add**. Fill in all the information and select the **Customer:Customer** name as **Organization**.
4. Click on the newly create user in order to assign a role to the user.

5. Click **Add** in the **Role** section and add the role.
The user, at this point, will be able to login to the Hystax Acura web interface and perform the Migration as a Service (self-service migration).
CHAPTER 5

Troubleshooting

Hystax Acura automatically checks cloud access and the necessary permissions for assuring successful operation. It provides detailed error messages that describe their potential causes.

In case of an error, please check the correctness of the data entered and availability of the necessary permissions.
The Hystax Acura limitations are listed in the official documentation.