EPAM Cloud Infrastructure

Orchestrator ver.2.1.81

What's New

October 2016

CI2WN-S78-81

Version 1.0

CONTENT

1 OVERVIEW

EPAM Orchestration Framework version 2.1.81 was released on October 29, 2016. In this release, we have focused heavily on the development and improvement of our OpenStack-based regions in view of the ongoing migration to OpenStack:

- EPAM-IN1 (OpenStack) region free trial until December 1, 2016.
- EPAM-US2 (OpenStack) region introduced.
- EPAM-MSQ3 region migrates to direct OpenStack.
- OpenStack-based regions functionality expands.

The other focus was on PaaS services, and the following improvements were introduced here:

- Windows Server 2016 is available in EPAM Cloud.
- FTP to AWS S3 service is introduced.
- Docker Service upgraded to version 1.9.
- The Auto Configuration Services Dynamic Discovery Framework implemented.

What is also worth noting is that we have introduced a number of usability improvements:

- AWS optimization statistics is introduced.
- Management screen customization implemented.
- Maestro CLI updated.

The detailed information on these changes are given further in this document.

FREE!

In scope of **EPAM-IN1** region promotion, all the resources in the region are provided **for free** from **October 1** till **November 30**, 2016. Yes, it has been prolonged! For more details, see this section.

The Orchestrator changes and enhancements are reflected in the EPAM Cloud documentation and online resources. Please refer to the EPAM Cloud website for detailed descriptions of the new services and features introduced in Orchestrator version 2.1.81.

Find all our latest news in our Yammer group, and don't forget to check out our Blog, where you can find two new articles – Splunk as a Service and Security in Amazon. Part 1.

2 MASSIVE MIGRATION TO OPENSTACK

As we announced before, EPAM Cloud has launched migration to OpenStack. Therefore, we pay a lot of attention to expanding, improving, and stabilizing our OpenStack-based infrastructure. The efforts in the current release of EPAM Orchestrator were to huge extent spent on the migration, so the new version includes two new regions in direct OpenStack collection, and important improvements to the volume functionality. Also, don't miss EPAM Cloud free trial!

2.1 EPAM-IN1 REGION PROMOTION

Two months ago, we announced the launch of a new EPAM region, EPAM-IN1. In October and November, this region is on a free trial, which means that any project activated in EPAM-IN1 can run virtual resources there free of charge until December 1, 2016.

If you already had virtual machines in EPAM-IN1, they will not be billed for the period between October 6 and December 1, 2016.

The billing for all the existing and new resources will start after the free period ends.

EPAM Cloud team wishes you to enjoy this wonderful moment both for project needs and self-development. If you have any additional questions, please feel free to address EPAM Cloud Consulting Team.

2.2 NEW REGION: EPAM-US2

We have also shared our plans on a new USA region launch. The existing EPAM-US region is running out of the capacity, and now, we are glad to announce that the new region, EPAM-US2 has successfully been activated and you can start hosting your virtual infrastructure there.

The main advantages of the new region are:

- Very low price (billing coefficient is 0.6, which is the lowest around all the private regions)
- Shapes up to 5XL
- Large data center capacity
- Low ping while accessing the virtual infrastructure
- OpenStack-based

EPAM-US2 is a wonderful alternative for those who need to continue hosting their resources in USA and those who are just going to create their infrastructure there. Low ping and low prices make the region a good choice, whenever you are.

To start using the region, submit a project activation request (should be approved by PM/PC).

2.3 EPAM-MSQ3 REGION MIGRATES TO OPENSTACK

With the current release, EPAM-MSQ3 region is migrated to direct OpenStack, so that HP OO and HP CSA are no longer used as mediators in this region. This change will decrease the delays and improve the performance of the region. The other important plus is that using the direct OpenStack will allow to significantly decrease the region prices in the nearest future.

2.4 ADVANCED FACILITIES FOR OPENSTACK REGIONS

Additional volume manipulations are a very useful EPAM Orchestrator feature. Whenever the default volume created at the VM start is not enough, you can create additional volumes of the desired size.

EPAM Orchestrator v.2.1.81 introduces the possibility of detaching and attaching storage volumes in OpenStack regions, which was previously available for AWS regions only.

A storage volume can be detached from a VM and left unattached. Later it can be attached to the same or another VM. An unattached volume is billed according to its size.

Volume manipulations are supported in the Maestro CLI only. To attach an existing volume to a virtual machine, use the following command:

```
or2attvol -i instance_id -v volume_id -p project -r region
```

To dettach a volume, run:

```
or2detvol -p project -r region -v volume_id
```

To find more details on volume manipulation commands, please see the Maestro CLI User Guide – Section 7: Working with Volumes.

3 PLATFORM SERVICES UPDATE

EPAM Cloud supports about two dozens of platform services which, when deployed, form fully usable development environments for projects working on various tasks. Platform services are the focus of interest of many of our users, this is why with each release we are adding a new service or improving an existing one.

3.1 NEW SERVICE: FTP TO AWS S3 (FTP2S3)

With the current update, we are glad to introduce the first stage the new data management service – FTP access to AWS S3.

AWS Simple Storage Service (S3) is a service that allows you to store any amounts of your data in Cloud, and share it with your colleagues. By default, storage management is performed via AWS Management Console and AWS CLI.
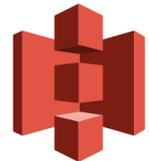
Amazon S3

Establishing FTP access to AWS S3 storage allows to bring data management to a more common format. In addition, people who have access to S3 via FTP, don't need to have AWS credentials to work with the storage, which increases the project security.

FTP to S3, is implemented as a new platform service. So, to set up FTP to S3 connection, all you need is run the standard **or2-manage-services (or2ms)** command called for your project in an AWS region, specify the service name as **-s backup** and the key that will be used to login to the AWS VM:

```
or2ms –p project –r aws_region –k key_name --activate –s backup
```

When the command is called, Orchestrator runs a SMALL Ubuntu 14 instance in the specified AWS region and the FTP to S3 application is set up on it to turn it into an FTP server.

> The service can be run in AWS regions only. It is recommended to run the service in the region where your project's S3 buckets are stored.

When the FTP server is up and running (the backup service is marked as 'available' in **or2dser** command response), you can perform the following manipulations:

- Add an S3 bucket to the service with the **or2-manage-ftp (or2ftp)** command with **-a mount** parameter:

```
or2ftp –p project –r aws_region -a mount -b bucket_name
```

To add several buckets, call the command for several times. To view the list of the buckets available through FTP, use the **or2ftp** command with the **-a list** parameter. Use the **-a unmount** parameter to remove a bucket from the list.

> Please note, the service does not allow creating new buckets or deleting them. All buckets management should be performed by traditional AWS tools. Mounting/unmounting operations only open/close the specific buckets for data management via FTP.

- Allow a user to connect to the FTP server with S3 access with the **or2-ftp-access (or2ftpa)** command with **-a grant** and **-e epam_user@epam.com** parameters:

```
or2ftpa –p project –r aws_region -a grant -e epam_user@epam.com
```

To view the list of the users for whom the access is provided, use the same command with the **-a list** action. To prohibit access to FTP, use the **-a revoke** action.

The users to whom the access to FTP server was granted, can use any FTP client to connect with the following login details:

- **Connection**: FTP to S3 Server DNS or Public IP
- **Username**: <epam_user>@epam.com
- **Password**: a token generated by Orchestrator at **or2access** command run and stored in the **default.cr** file.
- **Port:** 2121 (by default).

One can find the server DNS and port in command response of the **or2-describe-services (or2dser)** command:

```
or2dser –p project –r aws-region
```

The service price depends on AWS prices for the FTP server instance and S3 storage.

3.2 DOCKER UPGRADED TO 1.9 VERSION

As of this release, EPAM Cloud supports Docker version 1.9 and Docker Swarm version 1.0.0. Therefore, Docker service running in any EPAM region will have the same functionality as in the dedicated EPAM-DKR region:

- Docker volume manipulations which were available only in EPAM-DKR will be supported in other regions, as well.
- Each docker host now gets a copy of all docker images available within the service.

Please note, that while in EPAM-DKR Swarm API endpoint can be reached via port 4000, in other regions it can be reached via port 5001.

3.3 DYNAMIC DISCOVERING FRAMEWORK FOR ACS

We have made a step from providing a ready-made platform service to allowing our users to develop their own services and insert them into the Cloud. This is achieved by implementing a new unified interface based on the Dynamic Discovering principle and allowing to discover services and establish connections between different servers.

The new interface evolved from the existing service development framework. It allows using the available service development tools to create a new service and to implement it in Cloud. Moreover, the new service can be then used outside the EPAM Cloud, on any suitable platform. The development process is also easier, as there is no need to create all service components from scratch, but the already existing components developed by experts can be used.

Another advantage of the new development interface is the possibility to create cookbooks supported not only by the Chef Solo client which is widely used by auto configuration developers, but also by Chef Servers. There will be no need to adapt the Chef Solo cookbooks to use them on a Chef Server, they can be used without any modification.

Currently, this approach has already been implemented for Jenkins, Gerrit, and ATG services.

3.4 WINDOWS SERVER 2016 IN EPAM CLOUD

The end of September became the time of the fascinating unprecedented breakthrough for the whole IT community.

Microsoft presented the long-expected Windows Server 2016, which opens the new era of operating systems and Cloud technologies.

The new OS is an operating system, totally refactored for Cloud usage. It allows to run standard applications and take the best of Cloud solutions.

Windows Server 2016 has a big number of fascinating new features, and we would like to highlight the following ones:

- **Containerization**: Support for Hyper-V and Windows Server Containers
- **Native Docker Support**: Windows Server 2016 users get commercially supported Docker
- **Nano Server Deployment**: the lightweight mode especially convenient for Cloud solutions. Takes up to 90% less space, critical updates and reboots.
- **Advanced Security:** new approaches to virtual machines security and vulnerabilities and security issues prevention.
- **Linux Support:** the new OS includes powerful support for Linux, particularly, Linux performance on hypervisors was significantly improved.

With EPAM Orchestrator 2.1.81 Windows Server 2016 becomes available in all EPAM regions, with the following parameters:

- **Image name**: W2016Std

- **Image availability**: EPAM-* regions

- **System disk:** 100GB

- **Monthly LARGE Price:** $92.04 in EPAM-BY1, with 100% load 24/7

For more information on the new Windows Server 2016, please see the Announcement published by Microsoft Windows Server team.

4 CLOUD UI: MANAGEMENT PAGE CUSTOMIZATION

EPAM Cloud Web UI is a great means of managing your virtual infrastructure from any place and any device. It is intuitive, transparent and user-friendly and supports most of the Cloud actions.

We are constantly improving the Web UI to make it as convenient, usable and clear as possible.

EPAM Cloud can be considered one of the luckiest projects in the entire company, as it has the company-sized think tank from which it draws ideas for improvements and enhancements.

In September, 2016, one of our users, Ruslan Nekoz, sent us his considerations as to the improvement of the Cloud Management Console. He suggested adding the option for the user to customize the data displayed on the Management screen. In this release, we have implemented this possibility, so now you can select the columns you want to view and their order.

To customize the page layout according to your needs, make the following steps:

The Organize menu item now has the Customize Columns option opening the window where you can select the columns to be shown or hidden.

So, to customize the Management page layout, login to the page and perform the following steps:

Figure 1 - Management Page Customization

1. In the Organize menu button, select the "Customize Columns" option. The wizard will open.
2. In the Show column, select the columns to be displayed on your screen.

   > The 'id' column cannot be hidden, therefore, its checkbox is always disabled.

3. To move a column to the new place, click the corresponding line, and then click the place to which the column should be moved.
4. Click Apply and Close.

After you apply the changes, refresh the page, and select any of your projects to see the changes in the columns set and order.

This customization is applied on the per-user basis, that is, each user customizes the Management screen for themselves.

5 MAESTRO CLI IMPROVEMENTS

Maestro Command Line interface is an important tool that provides users with the access to the full functionality of EPAM Orchestrator.

With most EPAM Orchestrator releases, we introduce updates to Maestro CLI to make it more convenient and comprehensive. This time, the following changes to the interface were introduced:

- **or2-manage-ftp (or2ftp):** command added to be used for FTP2S3 service buckets management (AWS regions only)
- **or2-ftp-access (or2ftpa)**: command added to set up permissions to FTP2S3 service (AWS regions only)
- **--cluster-name/-cn** parameter is now obligatory for the following Docker-related commands:
  - o **or2-docker-image (or2di)**
  - o **or2-docker-volume (or2dv)**
  - o **or2-docker-container (or2dc)**
  - o **or2-decribe-docker (or2dd)**

In addition, for our users' convenience, a number of changes were introduced to commands descriptions and usage examples.

6 OPTIMIZATION STATISTICS FOR AWS REGIONS

Cost optimization is one of the key points in any project. The more efficiently you use your resources, the more profit you are going to get in the end. One of the key factors here is reasonable VMs states management. Regardless of whether you use private EPAM regions or AWS, the price of a running VM is higher than that of the stopped one.

This difference can be significant. The figure below illustrates the difference between the monthly cost of the same VM in AWS running 24/7 and running 40 hours per week:

Figure 2 - Cost dependence on usage pattern

As you see, stopping your VM for the non-working hours can save more than 50% of its cost (you can either stop and start the VMs manually, or create schedules to make Orchestrator do it automatically for you).

In addition, if a VM is stopped most part of its lifetime, it might be reasonable to terminate it and delegate its functions to another VM, or run a temporary VM of necessary configuration each time you need it.

To make these approaches even more effective, it is important to know, which VMs are in risk zone – are running over 70% or less than 10% of their lifetime.

That's why we implemented the Optimization statistics for AWS regions, that is available on the Monitoring page.

Optimization data provides the information on the time your project VMs spend in running state during the latest closed billing month. Each value gives the number of VMs with a specific runtime rate (the time the VM was in running state, in % of the overall VM lifetime within the month). The report includes currently existing VMs and the VMs that were removed before the month ended

Figure 3 - AWS Optimization Data

When viewing the report, please pay attention to the VMs in the following groups:

- **Normal range: 30%-70%**. We assume that the users regularly work with their VMs and stop them when they are not used. The standard working day is eight hours, and in some cases, a VM

utilization is prolonged for project needs. If a VM usage fits this scheme, its uptime rate is within the 30-70% range.

- **Low utilization: <30%**. The stopped VMs are still billed, and in case a VM is mostly in the stopped state, the bigger part of the VMs price is its down time price. If the VM is in running state for less than 30% of its lifetime, it may be reasonable to remove it and to pass its tasks to another VM. In case there is a need to have separate VMs for some rarely performed tasks, it can be useful to switch from the 'stop/start' utilization pattern to 'run/terminate', when the VM is created to perform a special task and then removed.

- **Very high utilization: >70%**. High utilization can be a signal to check whether the instances are really required 24/7, and if they are not, stop them regularly. It is possible to organize automatic scheduled VMs stopping and starting using the CRON rules.

You can always find the list of VMs that got to this or that group. To do it, unfold the Optimization section, and click the trend graph of the target group. In the opened window, you will see the list of the VMs and their details:
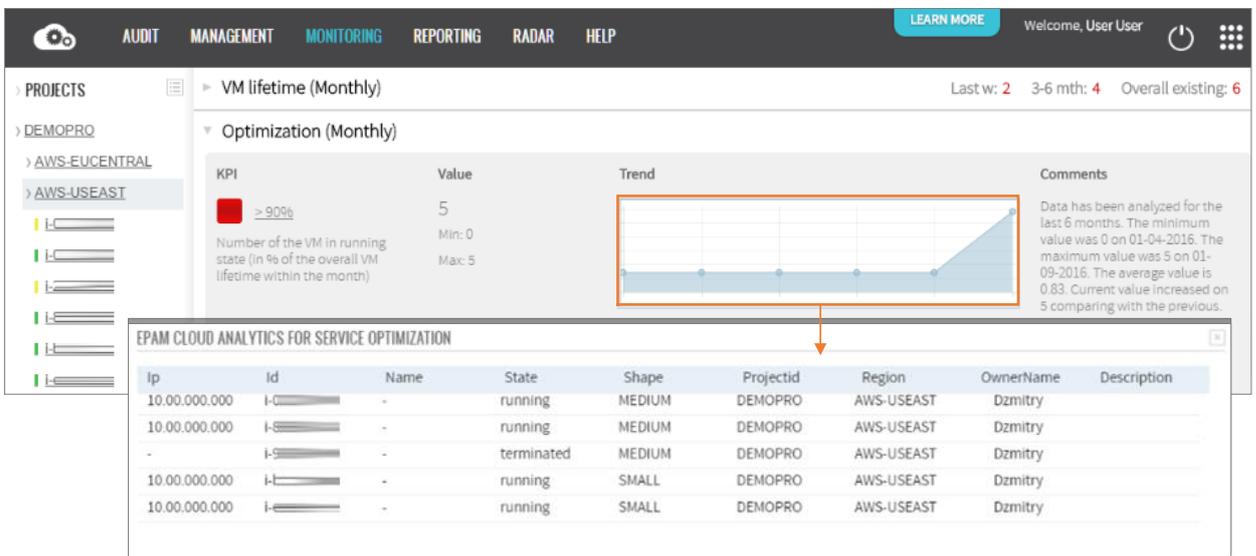

Figure 4 - Optimization Report VMs List

7 SUPPORT AND KNOWLEDGE SHARING

7.1 EFFECTIVE CLOUD COMPUTING TRAININGS

EPAM Cloud Consulting team has started a big educational program, aimed to assist EPAM employees with the basics of Effective Cloud Computing.

The first session of a four-module training was delivered in July, but the number of subscribers was so big, that we organized a second session for those to whom we could not deliver it due to the team's limited capacity.

The other important event that took place since the previous Orchestration update was the Effective Cloud Computing for Managers training, delivered to our colleagues from India in order to support the launch of the new EPAM-IN1 region. The training turned out to be quite popular, was accompanied with an active questions and answers sessions, and got positive feedbacks. The training description and materials are available on its KB page, and its video is available on the Video Portal.

EPAM Cloud Consulting team would like to express special gratitude for the outstanding assistance in training organization to our colleagues from India: Santanu Bhattacharya, Sandeep Joshi, Bhargavi Srigirisetty, Srikanth Simhadri, Venkata Medicharla, and to EPAM CDP Department.

To sum up, we are glad to provide the following statistics on our trainings activities:

- **41 people** attended the second course of Effective Cloud Computing training, **22** of them passed the training successfully and got the respective badge on the Heroes portal.
- **126 people** attended the training for managers.
- **108 people** passed AWS Certification.

Late Summer, we also initiated the creation of badges related to EPAM Cloud trainings and development activities.

Since the previous production update, the following badges were granted:

Badge	Badge Description	Awards
	Granted for completing each of the following courses: - AWS Business Professional - AWS Technical Professional - AWS TCO and Cloud Economics	**76**
	Granted for passing Cloud basic education programs	**47**

Currently, we are planning the trainings schedule for the next year. In case your team needs a specific training – either general or covering a specific topic, feel free to address the Cloud Consulting Team and share your ideas.

7.2 DOCUMENTATION UPDATES

The changes in EPAM Orchestrator are traditionally reflected in our knowledge base. Thus, the following documents were updated:

- EPAM Cloud Services Guide was updated with the new FTP to S3 Service info; Docker service info was updated
- Maestro CLI User Guide was updated with the new commands and existing commands changes
- EPAM Cloud Security Policy – the new IAM user account management details were added.
- EPAM Cloud Terms and Conditions – the Service Categories section was reviewed.
- The information on the new EPAM-US2 region was added throughout the documents.

TABLE OF FIGURES

VERSION HISTORY

Version	Date	Summary
1.0	September 3, 2016	First published