

A decorative graphic on the left side of the page, featuring a complex network of thin, light blue lines connecting various points, resembling a mesh or a web structure. It is partially obscured by a light blue diagonal band that runs from the top left towards the bottom right.

EPAM Cloud Infrastructure Orchestrator ver.2.1.125

What's New

July 2018

[CI2WN-S1019-125](#)

Version 1.0

Legal Notice: This document contains privileged and/or confidential information and may not be disclosed, distributed or reproduced without the prior written permission of EPAM®.

CONTENT

1	Overview	3
2	Infrastructure Updates	4
	2.1 Complex Maintenance and Update of Infrastrucure	4
	2.2 OpenStack Speed Up	4
3	Amazon Linux AMI in OpenStack Regions.....	5
4	Analytics Updates	6
	4.1 Visualization: Mind The Project Milestones	6
	4.2 CloudWatch Agent Integration	7
5	Project Management Updates	10
	5.1 Upcoming Pricing Policy Changes	10
	5.2 Project and Region Activation Improvements.....	10
6	Services Updates: OpenShift as a Service Improvements.....	12
7	EPAM Orchestrator Environment and Security Updates.....	12
	7.1 EPAM Orchestrator Migrates to Ubuntu 18.04	12
	7.2 EPAM Orchestrator Database Update.....	12
	7.3 Orchestrator Deployment Automation	13
8	Maestro CLI Changes.....	13
9	Cloud Education	14
10	Documentation Updates	14
	Table of Figures.....	15
	Version history.....	16

1 OVERVIEW

EPAM Cloud Orchestration v.2.1.125 was released on July 8, 2018. The new release is mainly focused on infrastructure and environment updates, but also brings improvements in reporting, project management, services, and other aspects.

The main points of the **infrastructure updates** are:

- The improvements in OpenStack regions performance.
- EPAM-US2 region migration to the new OpenStack release, Pike.
- Migration of EPAM Orchestrator resources to the new operating system.

The other important update is the introduction of **Amazon Linux 2 image in OpenStack regions**, which is another step in tools and resources unification across the hybrid infrastructure.

We also reviewed the existing **pricing approaches** and prepared a new pricing policy which will significantly cut the overall prices in private regions.

The new Orchestrator includes a set of **reporting and analytics** upgrades:

- The monitoring and analytics email reports now include infographics for better visibility and clarity of the provided information.
- The CloudWatch service now provides the monitoring of resources in private OpenStack regions.

From the **project management** perspective, we improved the flows for project activation in Google, and for adding an activated project to a new cloud provider.

Traditionally, the release includes updates for platform, services. The **Openshift as a Service** operation was enhanced this time.

We are also glad to announce that two new badges were introduced to improve the cloud expertise appreciation approaches: for passing the Google specializations and Microsoft Azure advanced trainings.

 The functionality changes, of course, are reflected in Maestro CLI, where necessary, and in EPAM Cloud documentation. Refer to the [EPAM Cloud](#) website for detailed information on the improvements and features introduced in Orchestrator version 2.1.125.

We are also glad to announce that [EPAM Cloud: Containerization Ecosystem In Few Steps](#) article was published on the Info portal by EPAM Cloud Consulting team.

2 INFRASTRUCTURE UPDATES

EPAM Cloud Orchestrator is constantly improving its infrastructure capacity to provide the developers with the best possible solutions. In this release, the changes mainly concern OpenStack regions, which will ensure more stable and quick performance.

Besides, within the scope of the global process of EPAM Cloud migration to OpenStack, EPAM-SAP region will be decommissioned. All resources from EPAM-SAP region will be moved to EPAM-BY1 region for further CSA-based resource consolidation. Please check for updates.

2.1 COMPLEX MAINTENANCE AND UPDATE OF INFRASTRUCTURE

Following the OpenStack upgrades and the most recent technology trends and possibilities, we monitor the best possible options for improving EPAM Cloud private infrastructure.

With EPAM Orchestrator 2.1.125 we are glad to announce that the complex update and improvements of OpenStack regions started, and EPAM-US2 became the “first shot” here. The general aim is to update the whole infrastructure and to unify the settings and configuration in all regions as much as possible.

The updates are aimed to bring the security and performance to the new level, and include the following steps:

1. Compute hosts update, which include:
 - firmware version update
 - security tools update
 - audit tools update, etc.
2. Compute hosts operating system update.
3. Update of OpenStack version to OpenStack Pike.

OpenStack Pike was released on August 30, 2017, and is currently the most preferable one for EPAM Cloud in terms of stability, performance and security. The detailed information on the version is available on the [official OpenStack website](#).

Other regions are also scheduled for the changes, and the next region to be updated is EPAM-IN1. Please watch for the notifications.

2.2 OPENSTACK SPEED UP

With the 2.1.125 release, we are pleased to announce the performance improvements in OpenStack regions. The upgrade of the synchronization between the OpenStack and EPAM Cloud Orchestrator allowed to decrease instance creation time and accelerate operation time.

Extending the changes of the previous release, we've been working on the improvement of the server auto discovering which is a synchronization mechanism aimed at detecting resources changes in OpenStack regions. As a result, the instance creation time decreased by over 50%.



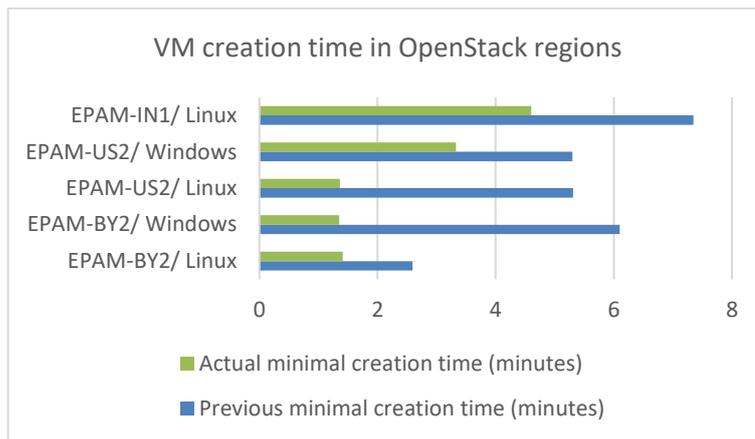


Figure 1 - VM Creation Time in OpenStack Regions

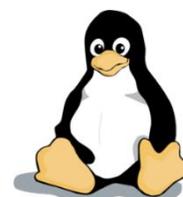
In the OpenStack regions, several aspects determine the instance creation time:

- Image size
- Image cloning speed
- Disk subsystem operation speed
- Operation system type
- Region where the instance is started

Primarily, instance start takes about 1 minute. After that, up to 5 minutes is taken for the basic instance configuration.

3 AMAZON LINUX AMI IN OPENSTACK REGIONS

[Amazon Linux 2](#) image is now available in OpenStack regions. This is the Linux image, prepared and supported by AWS. It provides high performance and stable execution environment. The image security is enhanced due to the focus on limiting access and reducing software vulnerabilities.



Amazon Linux 2 includes several important benefits, such as preinstalled SSM agent and **extras library**. The library allows to install latest versions of application software, by selecting the from the list of software bundles, verified by AWS.

The new image can be referenced as *Amazon_Linux*:

```
or2run -p DEMOPRO -r EPAM-BY2 -s MEDIUM -i Amazon_Linux -k mykey
```

Adding the *Amazon_Linux* image to the private cloud library is another step in unification of images across supported clouds. It allows you to use the same image for development in private cloud and for production after migrating to AWS.

The instances based on this image are billed and treated the same as any other Linux instance in EPAM private regions.

4 ANALYTICS UPDATES

One of the important parts of the project management is effective analytics. The more you aware about the resources utilization, the more successful is your management strategy. EPAM Orchestrator offers a range of analytics and monitoring solutions for the project management in terms of self-service.

In this release, we upgraded the resources utilization reports. The reports contain infographics, which make them more illustrative.

Besides, EPAM Cloud Team strives for providing as detailed and precise monitoring as possible. In this release, we implemented CloudWatch as a service for monitoring resources in non-AWS regions.

4.1 VISUALIZATION: MIND THE PROJECT MILESTONES

Awareness about the resources is a must, when managing a project. The more visible is the assets usage, the easier it is to control its distribution within the established quota. In the 2.1.125 release, periodic resource utilization reports and quota alert notifications are upgraded with the visualization component. It simplifies the resources control and improves the project analytics process.

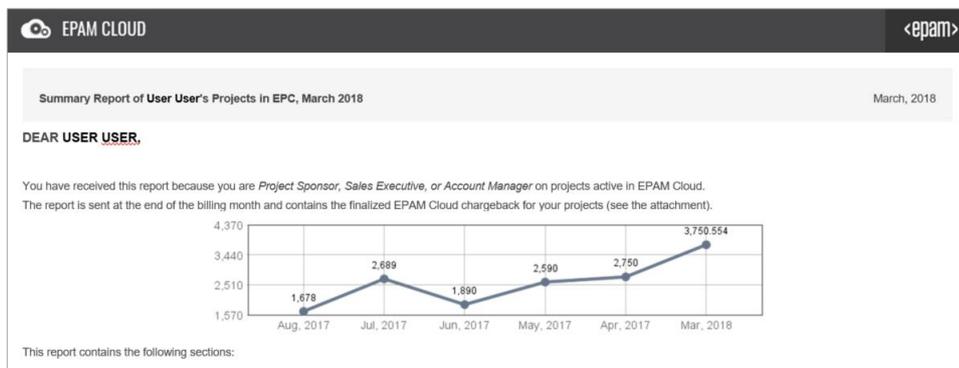


Figure 2 - Summary Report for Sales Executives

The project utilization infographics replace the tables with the resources utilization data. Consequently, the resource monitoring more explanatory, and the management can be performed more effectively, based on the provided info.

Below you can find an example Chargeback and Quota Utilization diagram added to the Weekly Status Report:

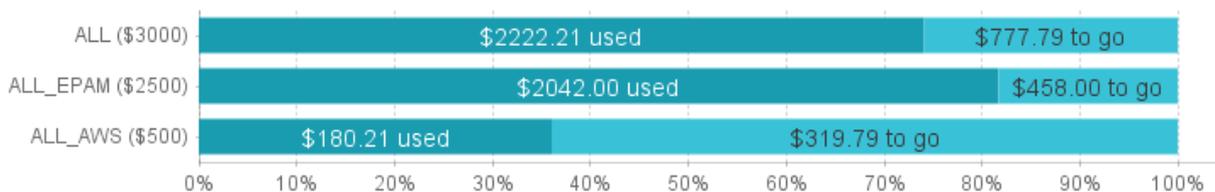


Figure 3 - Chargeback and Quota Utilization Diagram

The diagram provides information on the quotas that are currently activated for the project (Y axis), their utilization status (X axis).

The following resources utilization reports were updated:

Report type	Infographics
Weekly Status Report	Chargeback Report
Summary Report for Sales Executive	Chargeback History
	Monthly Billing Report by Customers
	Monthly Billing Report by Projects
	Account Optimization Ratio Report
	Price Quotas Report
	VM Lifetime Report
	Checkpoint Lifetime Report
Weekly Instance Usage Report	Number of Instances with Low Utilization by Project
Cloud Radar Report	Total Report:
	<ul style="list-style-type: none"> • VM Count
	<ul style="list-style-type: none"> • Personal VM count
	<ul style="list-style-type: none"> • Active Projects
	<ul style="list-style-type: none"> • Daily Chargeback
Quota Alert	Quota Actions

Besides, as the VM launch time significantly decreased in the private regions, the Daily and Monthly Instance Run Reports obtained more granularity with the VM launch time analysis.

All the reports are available for the primary and secondary project contacts and are sent automatically in a set period.

4.2 CLOUDWATCH AGENT INTEGRATION

EPAM Orchestrator offers a set of monitoring tools to get information on the cloud resources. Starting from this release, CloudWatch Agent as a service will help to monitor the resources in EPAM Cloud.



CloudWatch Agent is integrated with EPAM Orchestrator to enable data collecting, analysis and presentation to the user for virtual instances in private OpenStack regions.

The service collects the following data:

- CPU utilization
- Operation disk bites READ/WRITE
- Memory used
- Network bites

The service uses AWS Systems Management (SSM) Agent which is installed to target VMs on service activation.

Below, you can see a flow chart of the data collection process performed by the service:

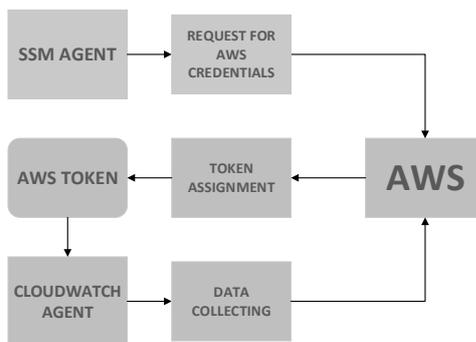


Figure 4 – Data Collecting Flow in Private OpenStack Regions

To manage AWS SSM and CloudWatch for a project in private OpenStack regions, take the following steps:

1. Activate SSM service with the **or2-manage-ssm (or2ssm)** command:

```
or2-manage-ssm -a activate -p <project> -r <region>
```

On command call a record is created in EPAM Orchestrator database containing the necessary configs and AWS credentials.

Command example:

```
D:\Maestro\maestro-cli\maestro-cli\bin>or2ssm -p demopro -r epam-openstack-10 -a activate
Response: Service was successfully activated.
```

2. Install CloudWatch Agent to the existing instance with the **or2-cloud-watch-agent (or2cwag)** command:

```
or2-cloud-watch-agent -p <project> -r <region> -i <instance_name>
-a install
```

On command call CloudWatch Agent and SSM Agent are installed to the VM via Chef role.

Command example:

```
D:\Maestro\maestro-cli\bin>or2cwag -p demopro -r epam-openstack-10 -a install -i ecs000000000
Response:
=====
instanceId | activationId | awsRegion | agentState |
=====
ecs000000000 | 05c05c-05c-05c-05c-05c05c05c05c | eu-central-1 | INSTALLING |
=====
```

3. To describe the instances covered by the CloudWatch monitoring, run the **or2-cloud-watch-agent (or2cwag)** command with the **-a describe** parameter (you can also add **-i <instance_id>** to see the info on a specified instance):

```
or2-cloud-watch-agent -p <project> -r <region> -a describe
```

Command example:

```
D:\Maestro\maestro-cli\bin>or2cwag -p demopro -r epam-openstack-10 -a describe
Response:
=====
instanceId | activationId | awsRegion | agentState |
=====
ecs000f000f000f | d807d807-d807-d807-d807-d807d807d807 | eu-central-1 | ACTIVE |
=====
```

The data collected by CloudWatch can be reviewed as graphs on the [Monitoring](#) page:

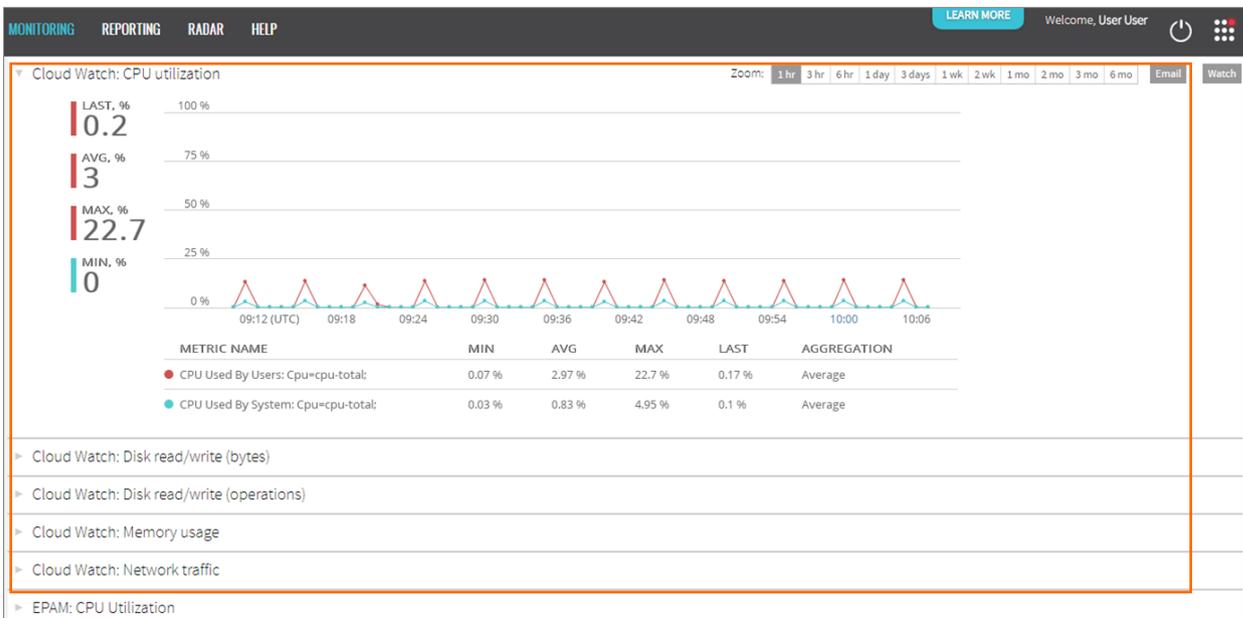


Figure 5 - CloudWatch Metrics

To deactivate the service, run the **or2-manage-ssm (or2ssm)** command with the **-a deactivate** parameter:

```
or2-manage-ssm -a deactivate -p <project> -r <region>
```

On command call, the record with AWS-related information is deleted from the EPAM Orchestrator database and the CloudWatch Agent monitoring becomes unavailable for all project members and instances.

Command example:

```
D:\Maestro\maestro-cli\bin>or2ssm -p demopro -r epam-openstack-10 -a deactivate
Response: Service was successfully deactivated.
```

5 PROJECT MANAGEMENT UPDATES

EPAM Cloud allows project responsible persons to get the necessary virtual infrastructure in terms of self-service. With this release, we improved management logic and upgraded the mechanism of the new region activation.

Besides, the Cloud pricing policy is changing soon, making the resources in private regions cheaper.

5.1 UPCOMING PRICING POLICY CHANGES

The infrastructure of EPAM private cloud regions is constantly reviewed and optimized. Regular improvements not only provide better usability, performance, and reliability of the virtual resources. We are glad to announce that the time has come to review the billing mechanisms, and to implement the general prices decrease for the resources in private regions.



So, the new billing model for private regions is coming soon!

The change is not just in numbers. This is a new approach to virtual resources billing calculation.

The new billing model will be applied within the nearest months, and will be pre-announced accordingly.

Stay tuned and keep track of the updates!

5.2 PROJECT AND REGION ACTIVATION IMPROVEMENTS

EPAM Cloud Team is constantly working on the enhancement of the EPAM Orchestrator tools and processes. The new EPAM Orchestrator includes a set of improvements in project management in terms of self-service.

First, the process of **activating projects in Google Cloud regions was reviewed**. Although the change does not affect the user side (no additional actions are needed), the overall approach “behind the scene” was optimized.

The other update relates to **activating projects for new cloud providers**. The logic of the process was improved. Now, if a project is already activated in Cloud, one can activate it in new clouds with the Activate Region option in the Manage Cloud wizard (you should belong to the Advanced Management group to have the necessary permissions):

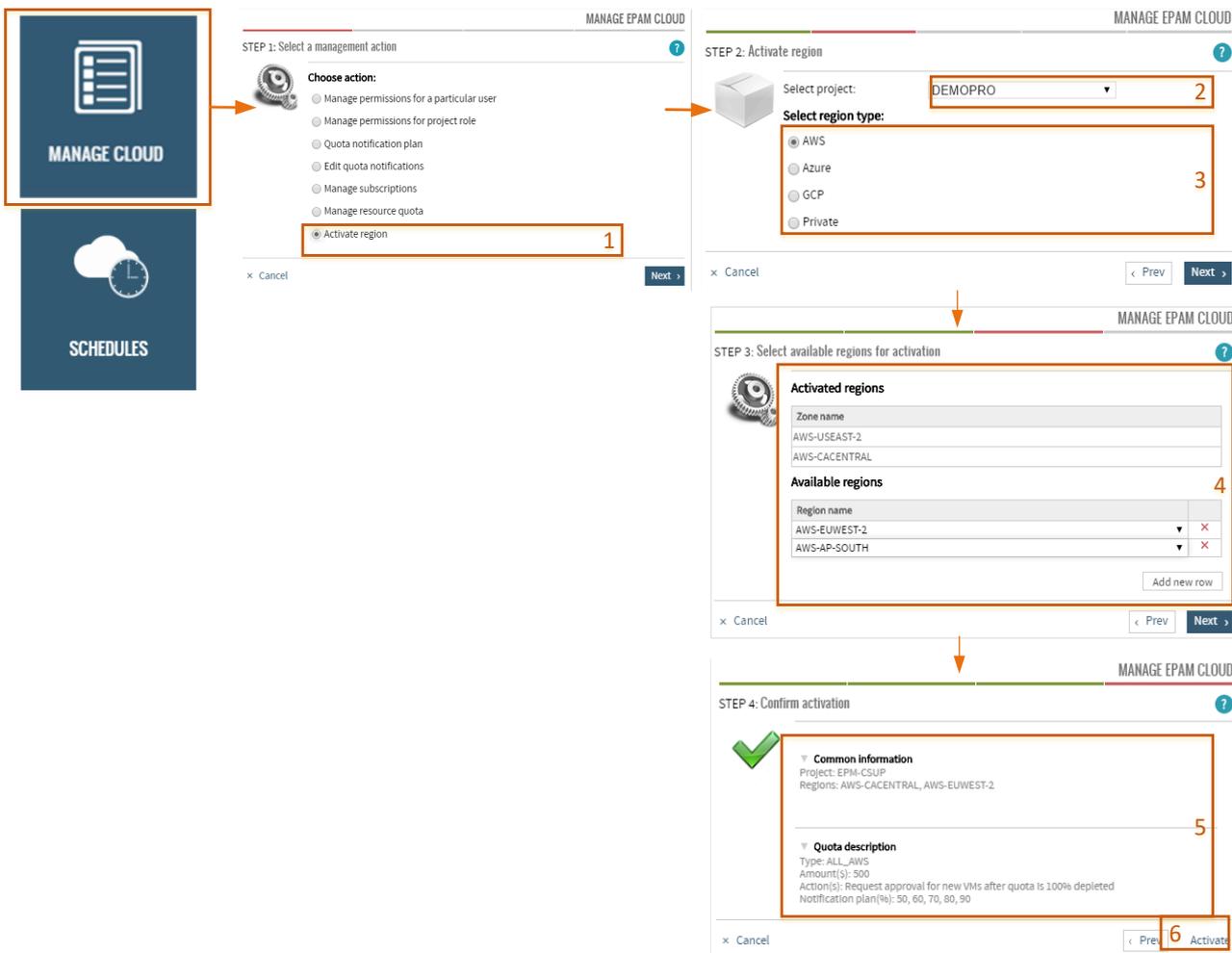


Figure 6 - Manage Cloud wizard

All you need to do is select the new region type and quota, and then select the regions to be added. The steps are very similar to those with project activation:

1. Select the Activate Region option in the Manage Cloud wizard.
2. Specify the project for which the new regions should be added. The list of projects includes only the UPSA projects to which you belong as a Project manager, Project Coordinator, or Account Manager, and which are already activated in Cloud.
3. Specify the type of the regions you want to add.
4. Using the **Add new row** button, select the new regions to be added.
5. Review the request details.
6. Click **Activate**.



Please note: in case the project is not activated in Cloud yet, the activation can be performed by the Account Manager with the [Activate Project wizard](#), or requested by any project member in a [standard support request](#).

6 SERVICES UPDATES: OPENSIFT AS A SERVICE IMPROVEMENTS

EPAM Orchestrator pursues the stable deployment of the provided services. And we are happy to present the improvement of the OpenShift as a Service deployment in Cloud. EPAM Cloud Team developed a tool for PTR record creation during the instances launching.



OPENSIFT

PTR record allows to achieve DNS name for IP address, which is necessary while establishing a service cluster. When deploying OpenShift as a Service, the peers are created in the service cluster. Their configuration comprises the connection between the IP address and the server domain name. With the PTR record creation tool, the risk of wrong configuration is diminished. In its turn, it ensures steady work of the cluster.

7 EPAM ORCHESTRATOR ENVIRONMENT AND SECURITY UPDATES

Security and high performance are among the points of top importance in any system, especially enterprise ones.

The important changes that have been under implementation recently are mainly related to migration of EPAM Orchestrator and its ecosystem to Ubuntu 18.04. This process allows to bring the security of the whole solution to the new level, as it includes getting access to security features of higher level, additional tools and capabilities, and other.

With this release, the main focus was made on EPAM Orchestrator database and environment updates. The next steps are planned to improve Chef servers and storage.

7.1 EPAM ORCHESTRATOR MIGRATES TO UBUNTU 18.04

As it has been mentioned above, EPAM Orchestrator was migrated to the new operating system. While the end of life of the previous version, Ubuntu 14.04, will take place within the nearest year, the brand-new [Ubuntu 18.04 will be supported till 2023](#).

Among improvements, such as Linux kernel 4.15 and OpenJDK 10 introduction, Ubuntu 18.04 includes a set of important security updates. They not only improve the overall resistance to security threats, but also strengthen the protection against Spectre and Meltdown.

You can find the detailed information on Ubuntu 18.04 in the official [Release Notes](#).

7.2 EPAM ORCHESTRATOR DATABASE UPDATE

EPAM Orchestrator uses MongoDB as the main database.

With this release, we the database version was updated to [MongoDB 3.4](#).

The version was chosen to meet two main requirements:



- Improve the database security and performance.
- Allow backward compatibility with other elements.

The main features of the new version are views, collation, and linearizable read concerns. It is also important that the new MongoDB supports the new Replica Set protocol.

You can find the details on the version and included updates, in the [official Release Notes document](#).

It is planned to proceed with the database version updates to the more recent ones, as soon as the respective prerequisites are met.

7.3 ORCHESTRATOR DEPLOYMENT AUTOMATION

EPAM Orchestrator is quickly developing, and its product component grows constantly and quickly. Here, automation is one of the key points, as, when established properly, it can allow deploying Orchestrator on different platforms quickly and with minimum manual input.

With this release, the process of EPAM Orchestrator deployment became faster and easier, as it is completely automated by scripts. This not only makes Orchestrator more convenient in support and maintenance, but also puts it as a product to a completely new level.

8 MAESTRO CLI CHANGES

The functional changes and optimization in EPAM Orchestrator are also reflected in changes in Maestro CLI. The following commands were updated with EPAM Orchestration v.2.1.125:

- **or2-cloud-watch-agent** command was added to manage instance monitoring CloudWatch agents.
- **or2-manage-ssm** command was added to manage AWS SSM configuration for projects in private regions.

Naturally, all changes are reflected in [Maestro CLI User Guide](#) and [Maestro CLI Quick Reference Card](#).

9 CLOUD EDUCATION

Cloud education remains highly important from the long-run perspective. More and more EPAMers pass online trainings and certifications, striving for knowledge. External cloud providers offer a range of trainings, starting from the free short-term ones, and up to paid long-term courses that can take several weeks to pass.

Google Cloud provides a set of [Coursera trainings](#), aimed to help attendees get acquainted with the most useful tools, principles and approaches in Google Cloud management. The **Google Certified** badge is already widely known among EPAMers, as it is given for each passed course. Now, we are glad to announce the new **Google Advance badge** that can be obtained by those who pass the full Google Cloud specialization on Coursera - a set of courses aimed to improve the attendee's expertise in a specific field.



We are also glad to introduce the **Microsoft Azure Advanced badge** which is assigned for participating (both as attendee or lector) in advanced Azure-oriented courses, including those delivered within EPAM.

You can find the complete information on the [Cloud Expertise Appreciation program](#) and all the currently available badges on this page.

Please send a copy of your certificate to the [Cloud Consulting Team](#) and receive your badge. The badges are granted for the newly received certificates, as well as for those that were received in past, if the respective training is not outdated and still available for passing.

10 DOCUMENTATION UPDATES

As usual, EPAM Orchestrator updates and changes are reflected in the documentation. With the current version, the following documents were reviewed:

- The [EPAM Cloud Services Guide](#) was updated with the information on the new service and options.
- The [Maestro CLI User Guide](#) was updated according to functionality changes.
- [Maestro CLI Quick Reference Card](#) was updated according to the changes in Maestro CLI.

We are also glad to announce the two new articles that were published on the Info portal by EPAM Cloud Consulting team:

- [EPAM Cloud: Containerization Ecosystem In Few Steps](#)
- Cloud Education: Learn as You Go.

TABLE OF FIGURES

Figure 1 - VM Creation Time in OpenStack Regions	5
Figure 2 - Summary Report for Sales Executives	6
Figure 3 - Chargeback and Quota Utilization Diagram	6
Figure 4 – Data Collecting Flow in Private OpenStack Regions	8
Figure 5 - CloudWatch Metrics.....	9
Figure 6 - Manage Cloud wizard	11

VERSION HISTORY

Version	Date	Summary
1.0	July 8, 2018	First published