EPAM Cloud Infrastructure

Orchestrator ver.2.1.130

What's New

September 2018

Version 1.0

CONTENT

1 OVERVIEW

EPAM Cloud Orchestration v.2.1.130 was released on September 8, 2018.

One of the most significant updates of the current release and of the year, in generally, is the **introduction of the new billing policy**, aimed to unify the prices across private regions and bring Cloud costs close to those in public providers.

A set of updates is also introduced on the **infrastructure level**. This includes legacy infrastructure deprecation, performance improvements, OpenStack updates, and others.

The **Account Management** updates include a new financial report for project sponsors and the ability to set up project-specific configurations for instances in AWS

Traditionally, the new release is accompanied by a set of **hybrid cloud improvements**, mainly related to integration with Google Cloud Platform access, auto configuration, and monitoring. For AWS, Launch templates were enabled through EPAM Orchestrator for infrastructure setup simplification.

We are also glad to announce **Terraform as a Service** as a new member of EPAM Cloud Platform Services, which will be greeted with fervor by many EPAM Cloud Users.

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 2.1.130.

We are also glad to announce that Cloud Education: Learn as You Go article, aimed to cover the cloud expertise growth facilities within EPAM and provided by the largest public providers.

2 PRICING UPDATES

EPAM Cloud has been facing major infrastructure updates during the latest months. These included creating new OpenStack regions and migrating virtual resources to them, updating the OpenStack versions to more recent ones, updating compute hosts and operating systems, and others.

All these changes resulted into a more effective and cost-efficient utilization of cloud infrastructure in private regions. This allowed us to review the existing billing approaches and to optimize them.

Thus, we are glad to announce that a new billing model for all private regions in EPAM Cloud was applied starting from August 1, 2018. Taken into account the virtual resource usage statistics, we expect that the total Cloud chargebacks for most projects in private regions will decrease significantly.

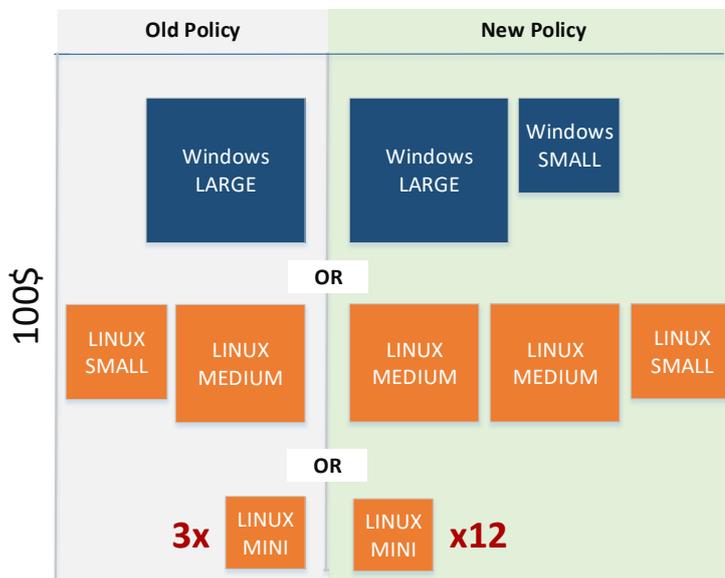Thus, having the same budget, you can now get more resources:

Figure 1 - The $100 - priced infrastructure with the old and new pricing policy

The prices in all regions are unified, so that similar VMs in different regions are provided by the same price.

It is also important that the new policy brings EPAM Cloud prices close to those in public regions, which allows better planning and expenses control.

Please note, that the new billing model includes not only new prices for provided services and components, but the new approach to cost objects allocation. This is why the changes in prices for different types of resources are not alike.

The table below illustrates the price changes by shape and operating system:

LINUX			
Shape	Old Price	New Price	Price Change, %
MICRO	$35.17	$4.09	-88.37
MINI	$37.36	$8.17	-78.13
SMALL	$41.02	$13.88	-66.16
MEDIUM	$58.54	$41.53	-29.06
LARGE	$77.54	$61.28	-20.97
XL	$91.42	$113.56	+24.22
2XL	$128.67	$122.55	-4.76
3XL	$156.43	$227.12	+45.19
4XL	$182.73	$187.91	+2.83
5XL	$231.67	$245.10	+5.80

WINDOWS			
Shape	Old Price	New Price	Price Change, %
MICRO	$49.57	$10.59	-78.64
MINI	$51.76	$15.17	-70.69
SMALL	$55.42	$21.58	-61.06
MEDIUM	$72.94	$51.28	-29.7
LARGE	$91.94	$74.78	-18.66
XL	$105.82	$127.06	+20.07
2XL	$143.07	$143.55	+0.34
3XL	$170.83	$248.12	+45.24
4XL	$197.13	$216.91	+10.03
5XL	$246.07	$281.10	+14.24

It is important to highlight that **the main benefit from the change goes to the projects whose virtual infrastructures in private regions are mainly based on smaller shaped instances**. Fortunately, this applies to the majority of projects.

The costs for large infrastructures, based XL+ instances, are most likely to increase. The recommended workaround is reviewing the infrastructure architecture, or migrate the large resources to AWS where possible.

The new pricing model is described in details in EPAM Cloud Documentation, the Billing and Quotas page and in the FAQ.

Starting from August 1, 2018, the pricing policy for hardware resources was also changed. The new details are available in billing-related documentation mentioned above.

3 INFRASTRUCTURE UPDATES

Infrastructure on which the whole EPAM Cloud is based, is an important part of the service, which ensures stable and high performance, high availability and makes EPAM Cloud meet all the challenges it faces together with the project teams.

This is why, we constantly introduce updates on the infrastructure level, carefully collect the performance statistics and your feedbacks, and react in shortest terms to any unexpected situations.

EPAM Orchestrator v.2.1.130 is released with the following set of updates related to performance improvements and OpenStack integration. In addition, EPAM-SAP region was completely decommissioned.

3.1 EPAM-UA2 AND EPAM-US2 REGIONS PERFORMANCE IMPOVEMENT

In August, EPAM-UA2 and EPAM-US2 regions faced performance degradation caused by an issue in OpenStack virtualization platform. This could be evidenced by users even during standard cloud infrastructure management operations.

To bring the regions performance to normal and eliminate the issue consequences, maintenance was scheduled to August 25.

EPAM Cloud Support has already got positive responses on the maintenance effect. However, we still collect your feedbacks in order to analyze the effect of the measures that were taken. Please feel free to share your ideas by sending a letter to us.

3.2 EPAM-BY2 REGION MIGRATION TO PIKE

It is important to keep in line with the latest innovations. While the migration of EPAM Cloud infrastructure is in progress, we also keep improving the existing platforms.

This time, we are glad to announce that OpenStack in EPAM-BY2 region is scheduled to migrate to OpenStack Pike.

The new OpenStack version is foremost aimed to improve the security of the region.

The migration will be additionally announced, so that to minimize the effect on the projects that host their virtual infrastructures in the region.

4 ACCOUNT MANAGEMENT UPDATES

EPAM Orchestrator v.2.1.130 is accompanied by two updates that allow to make cloud costs tracking more transparent and easy, and improve the control over the resources that can be managed by the project team.

4.1 PROJECT SPONSOR SUMMARY REPORT

The new Project Sponsor Summary report is sent at the end of each billing month.

It provides the billing statistics for billable and non-billable projects at which the recipients is assigned as Project Sponsor.

Figure 2 - Sponsor Report

The statistics provided in the report allows to analyze the trends, and react properly when needed. The standard recommendations include the following:

- Pass the costs to clients where possible.
- Initiate project capacities utilization review, setting project quotas and schedules.

4.2 CUSTOM IMAGE CONFIGURATIONS FOR PROJECTS

With EPAM Orchestrator v.2.1.130, we introduce the ability for the projects to have their custom predefined VMs configurations for AWS due to integration of AWS Launch Templates.

This allows responsible project experts create a detailed description of a VM that perfectly meets the project needs or specific customer requirements. After that, the template is uploaded to the project's AWS account and can be used by project team to run new instances.

> *By default, creating launch templates via EPAM Orchestrator is restricted. The operation can be performed only by specific users, to whom the project manager, project coordinator, or account manager grants the admin cloud access.*
> *This ensures that only authorized and approved configurations are automated.*

The **key benefits** of the new feature in terms of the project management are:

- The possibility to specify the **exact type and configuration of resources** the project team should use in AWS. This can go beyond the standard shape/AMI mapping and default configurations applied by Orchestrator, thus the AWS resources usage becomes more flexible.
- **Better costs planning and control** due to usage of resources of predictable configuration which exactly meets the project needs.
- The possibility to **minimize project team's effort** in setting up the repetitive environment elements.

The templates can be used by any project member who have the permissions to run new resources.

The details on launch templates creation and management are described in this section.

5 PERSONAL PROJECTS UPDATE

Overall EPAM Cloud infrastructure usage optimization could not avoid affecting personal projects usage specifics.

Average VM prices were cut with the new billing policy, which means that now more resources are available within the same personal quotas.

However, to balance the load, an additional resource limitation is introduced. The latest resource quotas settings for personal projects is described in the table below.

Item	Description	Limit	
Volumes	Number of storage volumes created	5	(Daily)
Volume size	Size of each storage volume	10 GB	(Daily)
Total volume size	Total size of volume	50 GB	(Daily)
Instances	Number of instances created	2	(Daily)
Instances	**Number of existing instances**	**3**	**(Total existing)**

Please note, that only the number of simultaneously existing instances was changed. Other resource quotas were not affected.

We would also like to remind, that the personal projects activation flow was recently changed. Now, the personal project is activated with the Activate Project wizard available on the Dashboard:
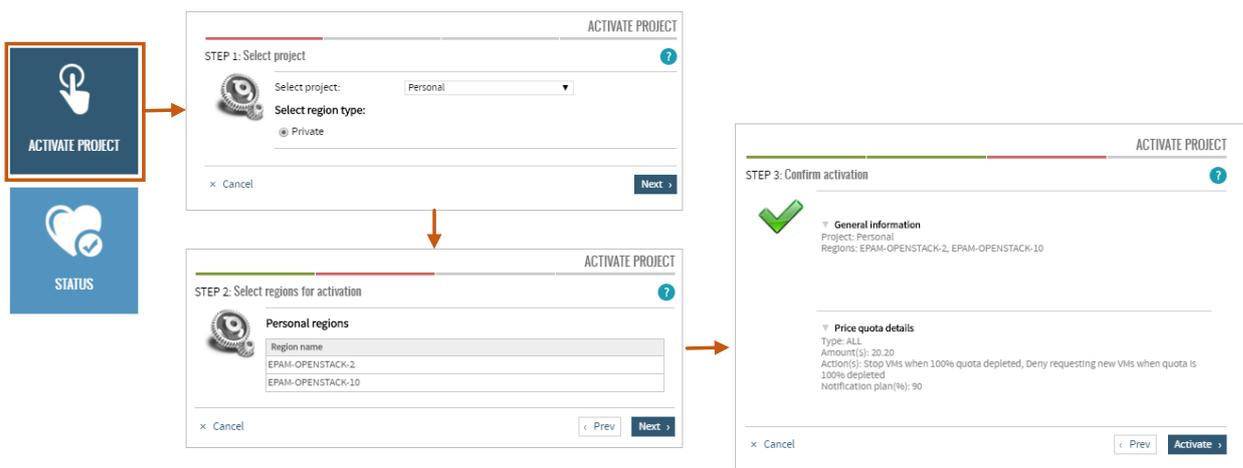

Figure 3 - Personal Project Activation

Once the personal project is activated, you can start managing the resources via Maestro CLI.

If "There are no available projects for activation" message is shown, your personal project has already been activated before.

For more details on personal projects management and limitations, please see the respective section of the Quick Start Guide.

6 HYBRID CLOUD UPDATES

6.1 GOOGLE CLOUD CHANGES

EPAM Orchestrator offers you the best hybridization practices to enable fully-featured work with the external cloud providers. With the 2.1.130 release, we paid much efforts and attention to improve the flow of working with Google Cloud Provider. The updates include access improvements, autoconfiguration upgrades and low utilization monitoring for the resources in Google regions.

6.1.1 GCP Access Improvements

One of the important hybridization factors is a convenient access to the external cloud providers. With this release, we are happy to announce the changes in the GCP access mechanism. Now you can access the resources in Google Cloud on the base of your Project role as it is indicated in UPSA. Additionally, you can login into the Google Cloud Console via SSO.

Within the mechanism improvement, no requests for temporary users are needed, as the constant users are created in G Suite. To reach the Google region resources, take the following flow:
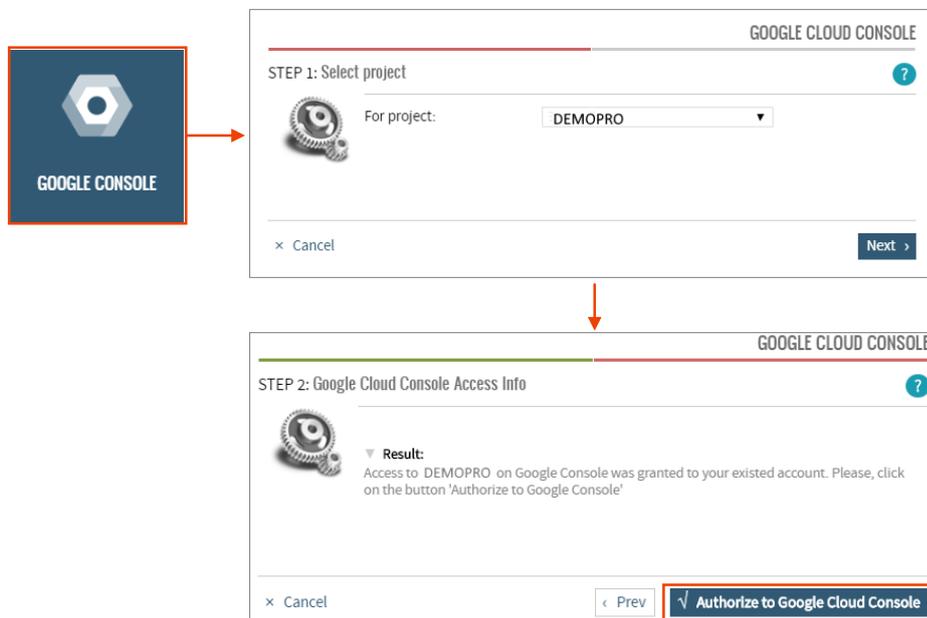

Figure 4 - Google Console Wizard

1. Use either the Google Console button on the Cloud Dashboard, or the **or2-google-management-console (or2goomc)** command, which has the similar effect.

```
or2goomc -p project_ID
```

When the Authorize to Google Cloud Console button is pressed, or the command is executed, you will receive an email containing the URL to access the Google Management Console, and your credentials. Please note that you should change your first password.

2. After you authorize to the Google Console and an account is created, you can login into the console via SSO without the need to save the aggregated credentials. Enter your work email as the login.

Please note that if EPAM SSO is turned off, you should use these credentials for login.

6.1.2 GCP Autoconfiguration updates

Another significant hybridization concern is the ability to access the services regardless of the cloud provider. EPAM Orchestrator supports the Cloud Agnostic Services Initiative, and we are delighted to announce the availability of two more services for Google regions.

Previously, EPAM Cloud Team ensured access to GreyLog and Zabbix services in Google regions in 2017. With the 2.1.130 release, two autoconfiguration services became available:

- Jenkins
- Artifactory

The table below lists the main commands related to the services:

Full Name	Short name	Role in Service
or2-manage-service	or2ms	Starts services. The corresponding --**service-name** flag identifies which service is to be started.
or2-describe-services	or2dser	Describes the services activated for the given project in the given region. Needs the --**project** and --**region** parameters to be specified.
or2-describe-[service]	or2d[service]	Provides the necessary details on the instances involved into the service. Needs the --**project** and --**region** parameters to be specified.
or2-describe-instances	or2din	Provides the list of all the instances involved into a specific service, or into all services. Needs the **-S/--service** parameter followed by a service name or 'any' keyword (to get instances engaged in all services), the --**project** and --**region** parameters.
or2-audit	or2audit	Provides the information about the state and the performance of each service. Needs the **--group PROJECT** flag), the --**project** and --**region** parameters.

Please find more details on Jenkins and Artifactory services in our Services Guide.

You can also find the details on CI/CD ecosystem implemented in EPAM Cloud in our [CI/CD Integration article](#).

6.1.3 GCP Monitoring Updates

The last, but not the least meaningful change for the resources in Google regions is an improved monitoring process. With 2.1.130 release, the following metrics are monitored for Google regions:

- CPU utilization
- Network traffic

To simplify the resources management, EPAM Orchestrator sends a Low Utilization report to the resources owner, if several conditions are met:

- Instance was created more than 14 days ago
- CPU utilization is less than 10%
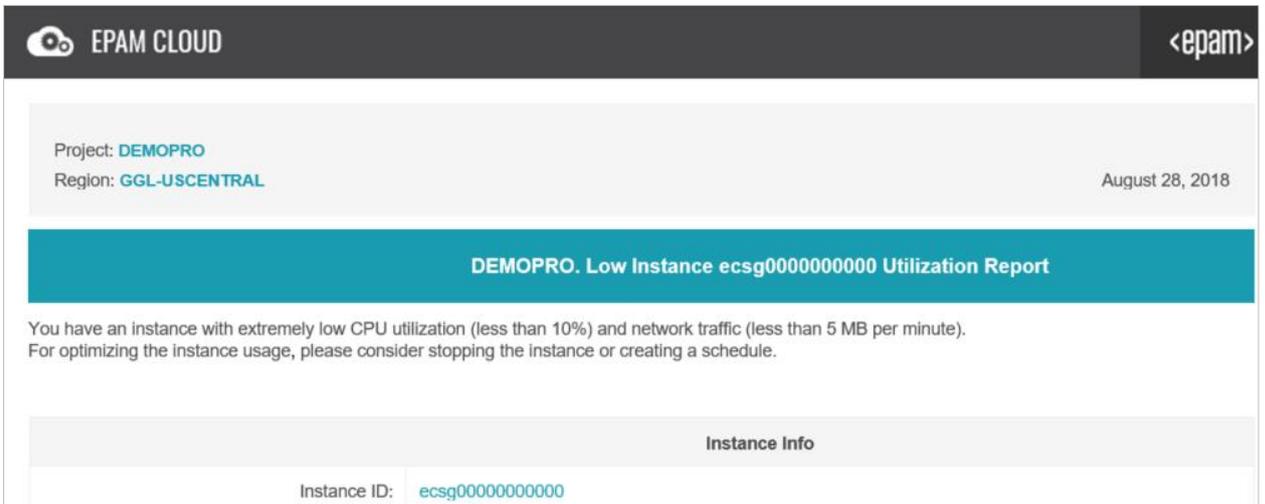- Network traffic is less than 5 MB per minute

Figure 5 - Low Utilization report

The report contributes to the hybrid cloud usage assuring the necessary control on the resources and their well-timed management via EPAM Orchestrator.

6.2 AWS LAUNCH TEMPLATE

There are situations when you have to launch VMs with specified parameters and settings, but there is no need to create descriptions of complex configurations, as in CloudFormation. Exactly for such cases the AWS Launch Template can be useful. This instrument allows you to describe the parameters in a **json-file** and then launch instances, taking the information about the settings out of this file. Now you can use and manage this AWS tool with EPAM Cloud Orchestrator.

Unlike CloudFormation, which describes the whole infrastructure (including mapping, conditions and VPC) and is designed for advanced users, the AWS Launch Template runs a certain configuration of VMs in the existing infrastructure and simplifies the launch process.

Useful Tips:

- *With the help of a template you can launch several VMs with the same start configuration: this can save more time!*
- *A new launch template version can be created on the basis of an existing one, just with adding new information to it, or you can create a completely new version.*
- *Only users that belong to the Advanced Management group can create templates. All users from the New Resources group can launch them: this can improve your project security and minimize risk of deployment errors.*
- *You can specify all instance types and AMIs available on AWS in launch templates. This relieves the Orchestrator constrains on new resources configuration.*

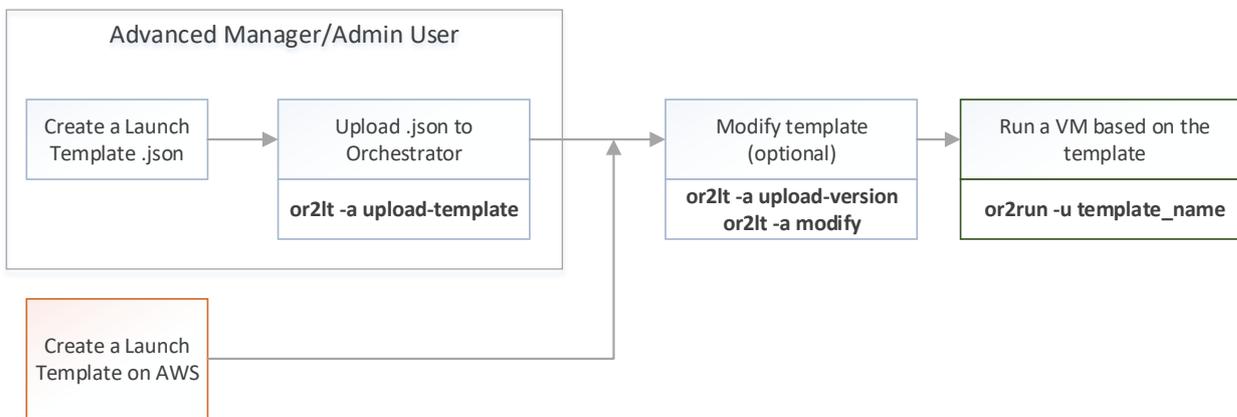Below you see the flow of general AWS Launch Template usage in EPAM Cloud Orchestrator:

Figure 6 - Launch templates usage flow

6.2.1 Syntax and Template Creation

All templates you upload are stored on the AWS side.

Below you can find an example of a json-file with the set of parameters needed to run a VM from a template.

Please note: although the AWS Launch Template works both with json and yaml files, the Orchestrator can use only json files.

```
{
    "NetworkInterfaces": [{
        "AssociatePublicIpAddress": true,
        "DeviceIndex": 0,
        "Ipv6AddressCount": 1,
        "SubnetId": "subnet-ID"
    }],
    "ImageId": "Image-ID",
    "InstanceType": "r4.3xlarge",
    "TagSpecifications": [{
        "ResourceType": "instance",
        "Tags": [{
            "Key":"Name",
            "Value":"webserver"
        }]
    }],
    "CpuOptions": {
        "CoreCount":4,
        "ThreadsPerCore":2
    }
}
```

The detailed syntax and parameters to create a json file and code examples are given here.

Besides, you can create an AWS launch template via AWS Managing Console. It will be described in Orchestrator and can be used. You can find the detailed instruction here.

6.2.2 Managing AWS Launch Templates

To manage the AWS Launch Templates, use a Maestro CLI command **or2-aws-launch-template (or2lt)**. The examples below show possible actions with the templates.

1. To describe the AWS launch template general info:

```
or2lt -a describe -p project -r region -n template_name
```

All project templates can be described if you don't specify the **-n template_name** parameter.

2. To upload a new AWS launch template:

```
or2lt -a upload_template -p project -r region -n template_name
-f path_to_file -d version_description
```

The **-d version_description** parameter describes the AWS Launch Template version.

3. To upload a new version for an existing AWS launch template:

```
or2lt -a upload_version -p project -r region -n template_name
-f path_to_file -d version_description -s source_version
```

If you don't specify the **-s source version** parameter, the default template version will be used.

4. To change the default version of an AWS launch template:

```
or2lt -a modify -p project -r region -n template_name -v version
```

The **-v version** specifies here the new default version of the template.

5. To describe the current AWS launch template version:

```
or2lt -a describe -p project -r region -n template_name -v version
```

6. To delete an AWS launch template version use the command below:

```
or2lt -a delete -p project -r region -n template_name -v version
```

7. To delete an AWS launch template with the help of the following command:

```
or2lt -a delete -p project -r region -n template_name
```

You can manage the created AWS Launch Templates via the **native AWS Console**.

> *Please note: this service is provided at no charge, but its usage can result in additional costs according to the resources you launch.*

6.2.3 Launching a VM with a Template

To run an instance based on the AWS Launch Template, you can use the **or2run** command, specifying the **--project (-p)**, **--region (-r)**, and **--launch-template (-u)** parameters, where the latter specifies the template name. You can also specify a template version with the **--launch-template-version (-v)** parameter. If not specified, the default version will be used.

Command Example:

```
or2run -p project -r region -u template_name
```

Response example:

```
D:\maestro-cli\maestro-cli\bin>or2run -p DEMOPRO -r aws-eucentral -u template_test
Response:
=================================================================================================
instanceId        | dnsName | privateIp   | state   | guestOS | owner        | image          | shape   |
=================================================================================================
i-000dbdb123c345e42 |         | 000.000.0.0 | pending | linux   | User User    | ami-000a00b   || CUSTOM  |
-------------------------------------------------------------------------------------------------
```

7 INTRODUCING TERRAFORM AS A SERVICE

EPAM Cloud Team is constantly proceeding in its goal to provide you with the integral set of tools and services. With the release 2.1.130, we are gladly announcing the Terraform as a Service integration to the EPAM Orchestrator.

Terraform allows to build, version and manage your infrastructure within the Infrastructure as a Code approach. Its key features are:

- Infrastructure as a Code
- Execution Plans
- Resource Graph
- Change Automation

You can find more details on Terraform facilities and usage on the [Terraform official page](#).

The table below provides the list of service-related commands and their description.

Command	Description
or2-terraform (or2ter) -a activate	Starts and manages* the service in the specified project and cloud.
or2-upload-file (or2uf) ...-t tf-template	Uploads the terraform template.
or2-describe-file (or2df) ...-t tf-template	Describes the uploaded file.
or2-delete-file (or2delf) ...-t tf-template	Deletes the terraform template.

*Actions imply changes of various levels to the resources. Thus, each action needs a specific permission level, mapped to the following user groups:

- **META**:
    - o or2uf -t tf-template
- **NEW**:
    - o or2ter -a activate
    - o or2ter -a apply
    - o or2ter -a plan
- **KILL**:
    - o or2ter -a deactivate
    - o or2ter -a destroy
    - o or2delf -t tf-template
- **READ**:
    - o or2df -t tf-template

7.1 WORKFLOW

Below you can see the typical flow of the Terraform activation, template uploading and management:

1. Run the **or2-terraform (or2ter)** Maestro CLI command with the **--action activate**, indicating the **-p project_ID** and the **-c cloud** where you want to activate Terraform:

```
or2ter -a activate -c cloud -p project_ID
```

Once the command is invoked, Orchestrator configures your projects' account in the selected cloud so that the Terraform could be used properly.

2. After the service is activated, you upload a terraform template with the **or2-upload-file (or2uf)** Maestro CLI command:

```
or2uf -t tf-template -d file_description –file-path file_path -p
project_id -c cloud -n template_name
```

The template is stored in EPAM Orchestrator's S3 bucket in AWS.

3. To describe the template, run the **or2-terraform** command with the **--action describe** parameter

```
or2ter -a describe -p project_ID
```

In the command response, you will find the information about the template.
Command output example:

```
or2ter -p demopro
Date: 2018-09-05T13:19:36+00:00
Response:


====================================
 name                | status    |
====================================
 00_tf_aws-eucentral.json | VALID    |
------------------------------------
 testtemplate        | CREATED   |
------------------------------------
 cvcvcvcvcvcvcv       | INVALID   |
------------------------------------
 testtemplate2       | CREATED   |
------------------------------------
 test_template_aws_user | DESTROYED |
------------------------------------
 testmaptype         | VALID     |
------------------------------------
```

4. To plan the template running, run the **or2-terraform** command with the **--action plan** parameter

```
or2ter -a plan -c cloud -p project_ID
```

5. To apply the template, run the **or2ter** command with the **--action apply** parameter

```
or2ter -a apply -c cloud -p project_ID
```

6. To destroy the created structure, run the **or2-terraform** command with the **--action destroy** parameter

```
or2ter -a destroy -c cloud -p project_ID
```

7. To deactivate the service, run the **or2-terraform** command with the --action deactivate parameter

```
or2terr -a deactivate -c cloud -p project_ID
```

On the service deactivation, a project's account in the selected cloud is deleted.

7.2 SERVICE PRICING

The service is provided for free. Project costs are only affected by the changes in resources managed with the help of Terraform.

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.2.1.130:

- the **or2run** command – the **--shape (-s)** and **-- image (-i)** parameters became optional
- the **or2run** command – the **--launch-template (-u)** parameter was added for launching template
- the **or2ssm** command – the **--action (-a**) parameter became optional; [describe] as an allowed value is added and set as default
- the **or2lt** command is added for managing AWS Launch Templates
- the **or2ter** command is added for managing Terraform templates

Naturally, all changes are reflected in Maestro CLI User Guide and Maestro CLI Quick Reference Card.

9 CLOUD EDUCATION

Cloud education is an important part of a modern expert's everyday life and passing online trainings and certifications allows EPAMers to keep track of the latest technical news, tools, and approaches. To expand your knowledge horizon, you can take one or several trainings, offered by external cloud providers, starting from the free short-term ones, and up to paid long-term courses that can take several weeks to pass.

We inform you, that from now on we change our strategy in assigning Google badges. Besides, the existing Google Cloud badges have been transformed and re-designed as follows:

The previous Google Cloud Certifies badge has changed into the **Google Cloud Trainee** badge. It is granted to those, who make their first steps into the long journey of Google Cloud Platform education process and pass the basic courses on free platforms (for example, Coursera).

The Google Cloud Advanced badge has been re-colored and transformed. Now it is called **Google Cloud Graduate**, and can be obtained by those, who completed a full Google Cloud Platform Specialization on Coursera or other similar training classes for the designated track.

If you have successfully passed a Google online specialization and haven't received your badge yet, please send a copy of your certificate to the Cloud Consulting Team and the badge will be assigned to you.

The Google Cloud Professional badge has been renamed and painted gold. From now on, those who successfully completed all requirements to be recognized as Google Cloud Certified Professional will receive the **Google Cloud Certified** badge.

All previous badge assignments before will remain, but they will be updated with the new badges.

Please remember, that the rules for **AWS Certified badge** applicants were also reviewed and now the badge is granted for completing any of the free certifications provided within Amazon Partner Network program, in case one of the following requirements is met:

- You provide a certificate that was granted for a single training that takes 6 hours or more to pass.
- You provide several certificates granted for passing shorter trainings, with at least 8 hours in total spent to pass them.

We also would like to remind you, that recently we introduced a new **Microsoft Azure Advanced badge** which is assigned for participating (both as attendee or lector) in advanced Azure-oriented courses, including those delivered within EPAM.

Any Cloud Expertise badges can be 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.

We are also glad to tell, that in the summer months the number of EPAMers who successfully passed the official certifications has increased. In the table below, you can see the updated statistics.

Badge	Specialization	Granted
	Architecting with Google Cloud Platform	40
	Data Engineering on Google Cloud Platform	5
	Microsoft Azure Cloud Platform and Infrastructure Certification	1
	AWS Solutions Architect	12
	AWS SysOps Administrator	3

On the Dashboard you can keep track on the up-to-date status and stay informed about the total amount of badges received.

As there is a huge demand on Cloud Certification, we gathered, structured and sorted the whole information about opportunities inside of EPAM and at public cloud providers. You can find the detailed information about the road map for your Cloud Expertise Growth in our new article at info.epam.com.

10 DOCUMENTATION UPDATES

All changes and updates to the EPAM Orchestrator functionality are reflected in the documentation and other EPAM Cloud resources. With the release of EPAM Orchestrator 2.1.130, the following documentation updates were made:

- The Maestro CLI User Guide was updated according to functionality changes; default permissions mapping was changed.
- The EPAM Cloud Orchestrator Services User Guide was updated with the information about Terraform and pricing details.
- In the Account Management Guide default permissions mapping was changed and the new billing policy was described.
- To the Hybrid Cloud User Guide the information on Launch Templates, improvements in the GCP integration and GCP details was added.
- The personal project details were revised and added to the Quick Start User Guide.

We revised the whole documentation and the site and made changes according to the new billing policy.

We are also glad to announce that EPAM Cloud Consulting team published a new article on the Info portal: Cloud Education: Learn as You Go.

You can always find the full set of EPAM Cloud documentation on the respective page on our web-site.

TABLE OF FIGURES

VERSION HISTORY

Version	Date	Summary
1.0	September 8, 2018	First published