Oracle Cloud Infrastructure
Scripting with OCI CLI

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Frankfurt, DE – Denver, CO

Distance as the Crow flies: 8115 km / 5140 mi
Flight Time of Crane (Lufthansa): 10:25 h
Time Shift: -8 Hours
Weather: Frankfurt: partly cloudy, max 12°C / 53°F
Robert Marz – Independent Consultant

Primary Role

• Senior Technical Architect
• with database centric view of the world

DOAG (German Oracle User Group)

• Active Member of Database Community
• Responsible for Cloud Topics

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500+ Technical Experts Helping Peers Globally

Nominate yourself or someone you know: acenomination.oracle.com

bit.ly/OracleACEProgram
Session Presentation & Evaluations

Complete evaluations online in less than a minute.

- Open the Bizzabo app.
- Select Agenda.
- Select current session.
- Scroll to Polls & Surveys; tap Session Evaluation.

Select Attachments to view presentation (if applicable).

Thanks for your valuable feedback!
Motivation
CLIs are mighty Tools

CLIs aren’t dead
- even not in 2019

CLIs purposes
- ad hoc Changes
- Batch Scripts

AWS Shell
- aws

Azure CLI
- az

Go

Oracle Cloud Infrastructure CLI
- oci

Virtual Every Cloud Provider provides a CLI
Scripting the Cloud
Scripting means Automation: Infrastructure as Code

Building up and tearing down of virtual environments happens frequently in the Cloud.

Some changes can only be made by recreating the resource.

Provisioning Cloud Resources by Clicking the UI is tedious and error prone.

Use the Web-UI for Orientation only.

Scripting is automation and documentation at the same time: **Software Defined Infrastructure**
Choosing the Right Tool for the Job

“A good tool improves the way you work.

A great tool improves the way you think.”

Jeff Duntemann
Building complex Infrastructures: Hashicorp Terraform

- Used to plan, define and provision a datacenter infrastructure
- Scripting across all Major IaaS Providers
- OCI Provider developed by Oracle
- De facto Standard for Scripting Cloud Resources
Configuration Management Tools

- Used to change multiple Machines to a desired state at once
- e.g. Ansible
  - Agentless Orchestration and Automation
- OCI Module provided by Oracle
  - provided by Oracle
- Other CM Tools
  - Chef
  - Puppet
  - SaltStack
  - …
REST API

“The Master”
All SDKs, CLI & The WebUI use it

Provides Access
to ALL Resources and Options

More Programming
than Scripting

Used to
Develop your own automation

Encapsulate
the complexity of REST API

Multiple Languages
Java, Python, Ruby, Go
OCI Command line Interface

Use to
- make small changes
- utility batch scripts
- set up small environments (demos, etc)

OCI CLI
- Python Based CLI

Platforms
- MacOS, Unix, Linux
- Windows

OpenSource
- Hosted on GitHub
- Developed & Maintained by Oracle
Tenants

Identity Domains, Tenants & Cloud Account

Mean the same thing: Your Cloud Space

Enter your Identity Domain; Login with user & password

Your User & Tenant have both an OCID
Availability Domains

Oracle Region

Every Region has at least 3 ADs

Your Tenant gets exactly 3 ADs assigned

gets exactly 3 ADs assigned

The AD# to Datacenter assignment

is randomly generated

Your AD Names get a prefix

The prefix determines your assignment

eg: yFpi:EU-FRANKFURT-1-AD-3
## Compartments

<table>
<thead>
<tr>
<th>Logical Dividers</th>
<th>Namespaces</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Subdomains</td>
</tr>
</tbody>
</table>

### Separation

<table>
<thead>
<tr>
<th>Departments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Applications</td>
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</table>

### Cloud Resources

- Stay in their Compartment
- See each other
Using the OCI CLI
**Usage:**

oci <service> <type> <action> <options>

Example:
- `compute` is the <service>
- `instance` is the resource <type>
- `launch` is the <action>

the rest of the command string consists of <options>.

**Results**

The Output is in JSON Format

**Pagination**

Attention:

Results often come paginated
Use `--all` or `--limit n (n > 0)`
Basics – Getting Help

Tab completion

Press <Tab> at any position for valid options

Getting Help:

oci --help
oci bv volume --h
oci os bucket create -?

Want to know more?

Check out the docs - they are awesome (no kidding!)
- OCI CLI Concepts
- OCI CLI Reference
Global Parameters

work with virtual every command

--cli-rc-file

Defaults, aliases, predefined queries

--generate-full-command-json-input

prints a json document with all possible parameters

--generate-param-json-input

prints example json for complex input like arrays

--output json|table

prints output in json or text

--query

queries filter & format response before output

JMESPath query language
OCI CLI Service Commands Overview

Announcements Service (announce)
Audit (audit)
Autoscaling (autoscaling)
Block Volume Service (bv)
Budgets (budgets)
Compute Management Service (compute-management)
Compute Service (compute)
Container Engine for Kubernetes (ce)
Data Transfer Service (dts)
Database Service (db)
DNS (dns)
Email Delivery (email)
Events (events)
File Storage Service (fs)
Functions Service (fn)
Health Checks (health-checks)
Identity and Access Management Service (iam)

Key Management Service (kms)
Load Balancing (lb)
Monitoring (monitoring)
Networking Service (network)
Notifications (ons)
Object Storage Service (os)
Resource Manager (resource-manager)
Search Service (search)
Service limits (limits)
Session commands for CLI (session)
Streaming Service (streaming)
Web Application Acceleration and Security Services (waas)
Work Requests (work-requests)

As of 01-Sep-2019
Administration
Installation Prerequisites

**Supported Operating Systems**
- MacOS
- Linux / Unix
- Windows

**Python**
- Version 2.7.5 and up
- Version 3.5 and later
- The Installer offers to install missing Python

**Oracle Cloud Infrastructure Access**
- OCI Account
- OCI User with desired permission
- A keypair – the public key uploaded to OCI
- token-based Authentication is possible instead of keys
Automatic Installation MacOS, Linux, Unix

Execute


Installation

Follow Prompts

Autocompletion

Install adds autocompletion for oci commands at the end of your shell ressource file
If using zsh instead of bash, add
autoload bashcompinit
bashcompinit
In your .zshrc before the call to autocomplete
Automatic Installation Windows

Open

Open Powershell as Administrator

Execute

Set-ExecutionPolicy RemoteSigned
powershell -NoProfile -ExecutionPolicy Bypass

Installation

Follow Prompts
Manual Installation

Follow Instruction

https://docs.cloud.oracle.com/iaas/Content/API/SDKDocs/climanualinst.htm
Upgrading OCI CLI

Upgrading Automatic Install

- Run the install script and specify the same install directory.
- When prompted, reply **Y** to overwrite the existing installation.

Upgrading Manual Install

```
pip install oci-cli --upgrade
```
Deinstall OCI CLI

Deinstalling Automatic install

• Delete Directories from installation location (showing defaults):
• MacOS / Linux / Unix:
  • ~/lib
  • ~/bin
• Windows:
  • %USERPROFILE%\lib
  • %USERPROFILE%\bin

Deinstalling Manual Install

pip uninstall oci-cli
Basic Troubleshooting (from the docs)

Service Errors
Any operation resulting in a service error causes an error of type "ServiceError" to be returned by the CLI. For information about common service errors that Oracle Cloud Infrastructure returns, see API Errors.

oci Command Not Found
If the oci command isn't found, this can be caused by one of the following reasons:
• pip installed the package to a different virtual environment than your active one.
• You switched to a different active virtual environment after you installed the CLI.
To determine where the CLI is installed, run the which pip and which oci commands.

Wheel File Won't Install
If the wheel file won't install, verify that pip is up to date. To update pip, run the pip install -U pip command. Try to install the wheel again.

Oracle Linux Permissions Issues
On Oracle Linux 7.3, if you encounter permission issues when running pip install, you might need to use sudo.

Windows Issues
If the oci command isn't found, make sure that the oci.exe location is in your path (for example, the Scripts directory in your Python installation).
Contribute

Contributions

Got a fix for a bug, or a new feature you'd like to contribute? The CLI is open source and accepting pull requests on GitHub. https://github.com/oracle/oci-cli

Notifications

To be notified when a new version of the CLI is released, subscribe to the Atom feed.

Questions or Feedback

• GitHub: To file bugs and feature requests only.
• Stack Overflow: Use the oracle-cloud-infrastructure and oci-cli tags in your post.
• Developer Tools section of the Oracle Cloud forums
• My Oracle Support
Setting up OCI CLI
Setting up OCI CLI

Generate Keys
oci setup keys

Upload Public Key

Gather Information
- Tenancy OCID
- User OCID
- Regions & Availability Domains

Create config
oci setup config
Demo Backup: Generate Keys

robbie@NightSpark:~$ oci setup keys
Enter a passphrase for your private key (empty for no passphrase):
Public key written to: /home/robbie/.oci/oci_api_key_public.pem
Private key written to: /home/robbie/.oci/oci_api_key.pem

If you haven't already uploaded your public key through the console, follow the instructions on the page linked below in the section 'How to upload the public key':

https://docs.cloud.oracle.com/Content/API/Concepts/apisigningkey.htm#How2

robbie@NightSpark:~$
Demo Backup: Upload Public Key

ORACLE Cloud

Identity > Users > User Details

Add Public Key

Note: Public Keys must be in the PEM format.

PUBLIC KEY

-----BEGIN PUBLIC KEY-----
MIICIjAgIBAgEDCgEgLjBIBwYQMA8GCSqGSIb3DQEBFAAOCAIQCAQkCaAQEBBAoGCSqGSIb3DQEBFAAOCAIQCAQkD
MA8GCSqGSIb3DQEBFAAOCAIQCAQkD
-----END PUBLIC KEY-----
Demo Backup: Setup Config

robbie@NightSpark:~$ oci setup config
This command provides a walkthrough of creating a valid CLI config file.

The following links explain where to find the information required by this script:

User OCID and Tenancy OCID:
https://docs.cloud.oracle.com/Content/API/Concepts/apisigningkey.htm#Other

Region:
https://docs.cloud.oracle.com/Content/General/Concepts/regions.htm

General config documentation:
https://docs.cloud.oracle.com/Content/API/Concepts/sdkconfig.htm

Enter a location for your config [/home/robbie/.oci/config]: 
Enter a user OCID: ocid1.user.oc1..aaaaaaaaabpmwz8x3yphl2en3tjha
Enter a tenancy OCID: ocid1.tenancy.oc1..aaaaaaaaabpmwz8x3yphl2en3tjha
Enter a region (e.g. ap-mumbai-1, ap-seoul-1, ap-tokyo-1, ca-toronto-1, eu-frankfurt-1, eu-zurich-1, sa-saopaulo-1, uk-london-1, us-ashburn-1, us-gov-chicago-1, us-gov-phoenix-1, us-langley-1, us-luke-1, us-phoenix-1): eu-frankfurt-1

Do you want to generate a new RSA key pair? (If you decline you will be asked to supply the path to an existing key.) [Y/n]: n
Enter the location of your private key file: /home/robbie/.oci/oci_api_key.pem
Config written to /home/robbie/.oci/config

If you haven't already uploaded your public key through the console, follow the instructions on the page linked below in the section 'How to upload the public key':
https://docs.cloud.oracle.com/Content/API/Concepts/apisigningkey.htm#How2

robbie@NightSpark:~$
The Keys to the Cloud
Key Pairs

Cloud Authentication
is done via x509 key pairs

The Private Key
never leaves your machine

Multiple file formats
• .pem – (Privacy-enhanced Electronic Mail)
• .cer, .crt, .der
• .p12
• .pfx

OCI CLI
needs pem

Generation and Conversion
with tools
puttygen
ssh-keygen
openssl
Best Practices
Best Practices

OCI CLI is the key to your datacenter

• do not put it on a laptop
• do not deploy it in the OCI Cloud
• Limit access

Script everything

• Scripts are automation and documentation
• Learn how to deal with json
  • JMESPath
  • Tools like jq
• Use Variables for common parameters and OCIDs

Store your scripts without credentials

• Especially, when you version control them
• Use a key vault
Conclusion
Automate your Cloud

- Scripting: with OCI CLI convenient & easy
- Cloud Account: is like a Datacenter: Limit Access
- The Web UI: is only second-best: script everything

The Sky Cloud is the Limit