



# Automate Oracle VM Server Leverage the OVM-REST Interface

21<sup>st</sup> November 2017

Robert Marz



# Robert Marz

Client

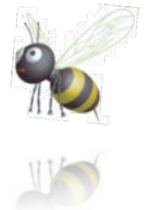
Senior Technical Architect  
with database centric view of the world

its-people

Portfolio Manager Database Technologies  
Blog Editor

DOAG

Active Member Database Community  
in charge of Cloud topics



@RobbieDatabee



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## Oracle VM Server

Open Source

Underlying technology of Oracle Cloud

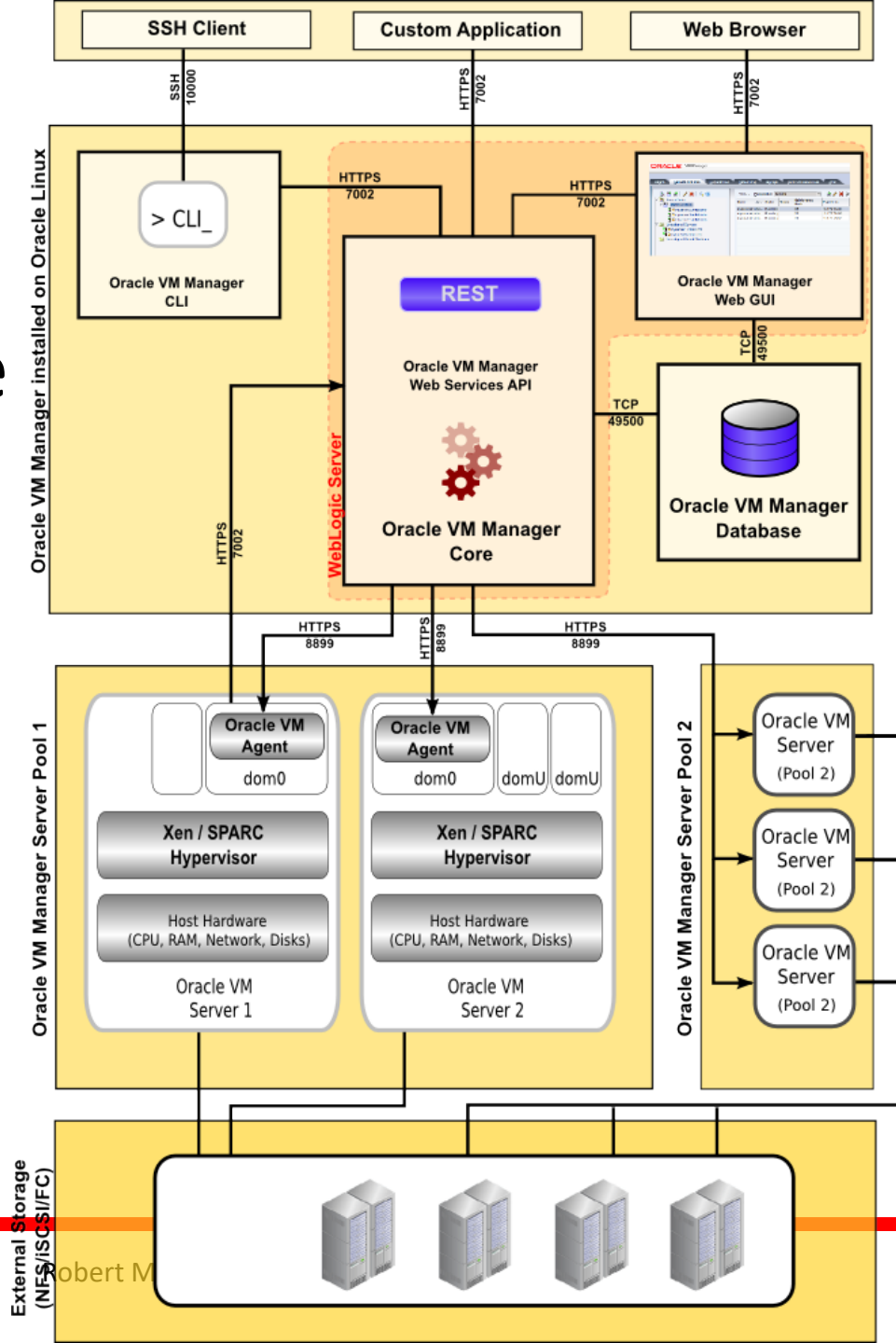
## Automatization

Key in larger Environments

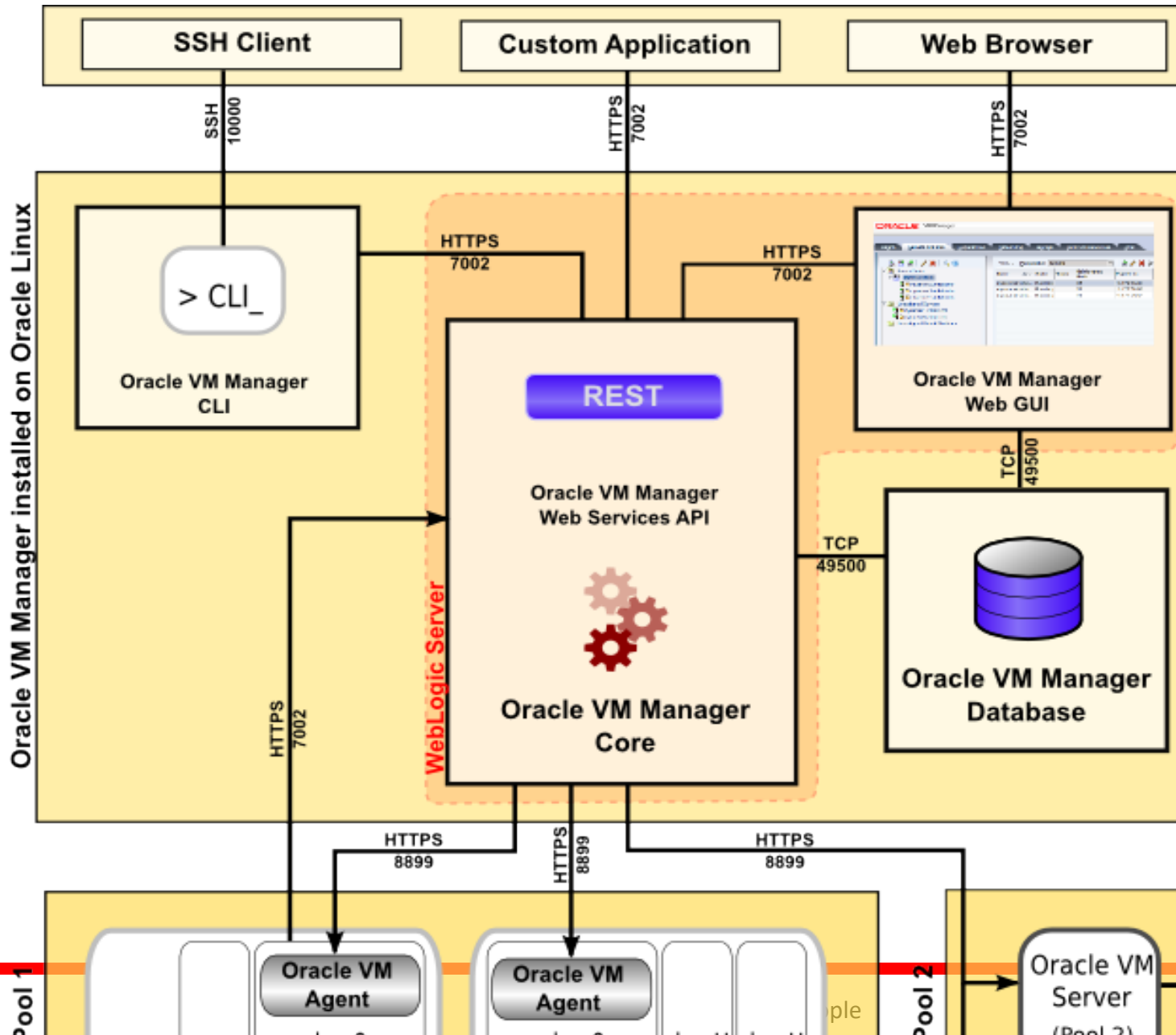
Information is hard to find

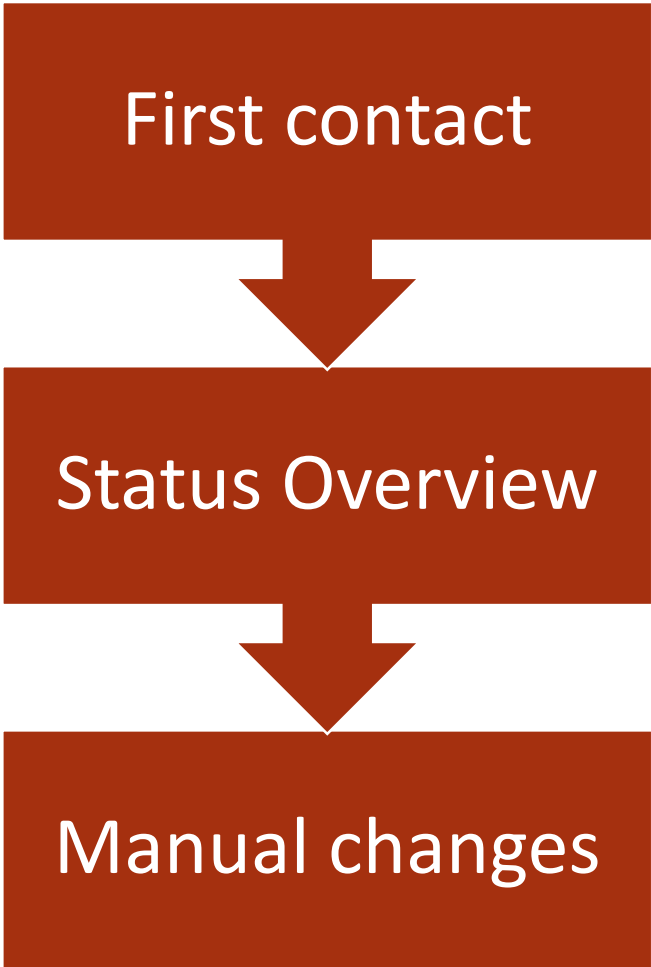
## Oracle VM Architecture

[Oracle VM Concepts Guide for Release 3.4](#)  
[Chapter 2.1](#)



# Oracle VM Server - Overview





Oracle VM Home

https://172.24.19.254:7002/ovm/console/faces/resource/resourceView.jspx

ORACLE VM Manager

Logged in as: admin Logout Settings Help

Health Servers and VMs Repositories Networking Storage Reports and Resources Jobs

View Perspective: Virtual Machines

Name	Status	Tag(s)	Event Severity	Server	Max. Memory (MB)	Memory (MB)	Max. Processors	Processors	Keymap	Operating System
▷ FCSV195 Mapni...	Running		Informational	sv096	2048	2048	1	1	de	Other Linux
▷ FCSV196 PostGis	Running		Informational	sv096	4096	4096	4	4	de	Other Linux
▷ sv103	Running	stredax.e	Informational	sv095	8192	4096	2	2	en-us	Oracle Linux 6
▷ sv104	Running	stredax.e	Informational	sv094	8192	8192	2	2	de	Oracle Linux 6
▷ sv107 - OSS Ap...	Running		Informational	sv096	4096	4096	4	2	en-us	Oracle Linux 7
▷ sv108	Running	stredax.e	Informational	sv095	4096	4096	2	2	en-us	Oracle Linux 6
▷ sv110	Running		Informational	sv094	8192	4096	2	2	en-us	Oracle Linux 6
▷ sv112	Running	stredax.e	Informational	sv094	16384	8192	2	2	en-us	Oracle Linux 6
▷ sv113	Running	stredax.e	Informational	sv094	8192	4096	2	2	en-us	Oracle Linux 6
▷ sv122	Running	stredax.e	Informational	sv095	16348	16348	6	4	de	Oracle Linux 6
▷ sv127	Running	streda...	Informational	sv095	2048	2048	2	2	en-us	Oracle Linux 6
▷ sv143 - e7 - oss	Running		Informational	sv096	2048	2048	2	2	de	Oracle Linux 6
▷ sv144 - OSS Lin...	Running		Informational	sv096	8096	8096	4	2	en-us	Oracle Linux 7
▷ sv146	Running	stredax.e	Informational	sv094	4096	4096	2	2	en-us	Oracle Linux 6
▷ sv149 -OSS Pro...	Running		Informational	sv096	2048	2048	2	2	de	Oracle Linux 6
▷ sv150 - OSS Te...	Running		Informational	sv096	2048	2048	2	2	de	Oracle Linux 6
▷ sv151 - OSS Lin...	Running		Informational	sv096	6144	6144	4	2	en-us	Oracle Linux 7
▷ sv152	Stopped	OSS.g...	Informational	sv095	16384	16384	2	2	de	Oracle Linux 6
▷ sv154 - QGIS S...	Running		Informational	sv096	2048	2048	1	1	de	Other Linux
▷ sv155 - 3i Plans...	Running		Informational	sv095	6144	6144	4	4	de	Oracle Linux 6
▷ sv156 - OSS un...	Running		Informational	sv096	3072	3072	4	4	de	Other Linux
▷ sv157 - OSS DB...	Running		Informational	sv096	4096	4096	4	4	de	Oracle Linux 6
▷ sv165	Running	OSS.g...	Informational	sv095	16348	16348	2	2	de	Oracle Linux 6
▷ sv170 - OSS alt ...	Stopped		Informational	sv096	3072	3072	4	4	de	Microsoft Windows Se...
▷ sv171 - OSS alt ...	Stopped		Informational	sv096	3072	3072	4	4	de	Microsoft Windows Se...
▷ sv172 - ora 11g ...	Running		Informational	sv095	8192	4096	2	2	en-us	Oracle Linux 6
▷ sv174 - BigData...	Running		Informational	sv096	18432	18432	8	8	de	Oracle Linux 6
▷ sv175	Running		Informational	sv095	16348	16348	2	2	de	Oracle Linux 6
▷ sv176	Running	OSS.g...	Informational	sv095	16348	16348	2	2	de	Oracle Linux 6
▷ sv231 - DAEBALA	Running		Informational	sv094	8192	4096	4	4	en-us	Oracle Linux 6

Job Summary: 0 Total Jobs 0 Pending 0 In Progress 0 Failed 0 Aborted 0 Complete

Description	Status	Progress	Message	Timestamp	Duration	Abort	Details
No data to display							

First contact

Status Overview

Manual changes

The screenshot displays the Oracle VM Manager web console interface. The top navigation bar includes tabs for Health, Servers and VMs, Repositories, Networking, Storage, Reports and Resources, and Jobs. The main content area is divided into several sections:

- Servers and VMs:** A table listing virtual machines with columns for Name, Status, Tag(s), Event Severity, Server, Max. Memory (MB), Memory (MB), Max. Processors, Processors, Keymap, and Operating System.
 

Name	Status	Tag(s)	Event Severity	Server	Max. Memory (MB)	Memory (MB)	Max. Processors	Processors	Keymap	Operating System
FCSV195 Mapni...	Running		Informational	sv096	2048	2048	1	1	de	Other Linux
FCSV196 PostGis	Running		Informational	sv096	4096	4096	4	4	de	Other Linux
sv103	Running	stredax.e	Informational	sv095	8192	4096	2	2	en-us	Oracle Linux 6
sv104	Running	stredax.e	Informational	sv094	8192	8192	2	2	de	Oracle Linux 6
- Repositories:** A tree view on the left shows a hierarchy of repositories including sv094-repository, sv095-repository, and sv096-repository. The main table lists repository files with columns for Name, Used (GiB), Max (GiB), Shareable, Absolute Path, Mounted Path, File, and Description.
 

Name	Used (GiB)	Max (GiB)	Shareable	Absolute Path	Mounted Path	File	Description
stredax-db-template.img	12.78	1024.0	No	/dev/mapper/3600508b10...	/OVS/Repositories/0004f...	0004fb000120000866b5...	Template für die ...
sv095-stredax-db-201...	966.74	1024.0	No	/dev/mapper/3600508b10...	/OVS/Repositories/0004f...	0004fb000120000dc54...	
sv095-stredax-db-201...	4.18	1024.0	No	/dev/mapper/3600508b10...	/OVS/Repositories/0004f...	0004fb0001200000eea3...	
sv095-template-oracle...	5.32	10.0	No	/dev/mapper/3600508b10...	/OVS/Repositories/0004f...	0004fb000120000037fa...	
sv095-template-oracle...	6.34	10.0	No	/dev/mapper/3600508b10...	/OVS/Repositories/0004f...	sv095-template-oracle-12...	
sv095-template-oracle...	2.12	5.0	No	/dev/mapper/3600508b10...	/OVS/Repositories/0004f...	0004fb0001200002e452...	
sv095-template-var-a...	0.05	50.0	No	/dev/mapper/3600508b10...	/OVS/Repositories/0004f...	0004fb00012000089518...	
sv103-oracle-12cR1.img	8.62	10.0	No	/dev/mapper/3600508b10...	/OVS/Repositories/0004f...	0004fb00012000083725...	
sv103-oracle-apex.img	2.12	5.0	No	/dev/mapper/3600508b10...	/OVS/Repositories/0004f...	0004fb000120000c33cd...	
sv103-stredax-db-201...	966.74	1024.0	No	/dev/mapper/3600508b10...	/OVS/Repositories/0004f...	0004fb0001200004926d...	
sv103-system-01.img	11.07	12.0	No	/dev/mapper/3600508b10...	/OVS/Repositories/0004f...	0004fb000120000890f1...	
sv103-var-app-streda...	0.69	50.0	No	/dev/mapper/3600508b10...	/OVS/Repositories/0004f...	0004fb00012000061ec9...	
sv108-oracle-12cR1.img	8.58	10.0	No	/dev/mapper/3600508b10...	/OVS/Repositories/0004f...	0004fb00012000076897...	
sv108-oracle-apex.img	2.12	5.0	No	/dev/mapper/3600508b10...	/OVS/Repositories/0004f...	0004fb00012000077239...	
sv108-stredax-db-201...	854.62	1024.0	No	/dev/mapper/3600508b10...	/OVS/Repositories/0004f...	0004fb000120000e6e6a...	
sv108-system-01.img	6.5	12.0	No	/dev/mapper/3600508b10...	/OVS/Repositories/0004f...	0004fb000120000e9c7cf...	
sv108-var-app-streda...	18.44	50.0	No	/dev/mapper/3600508b10...	/OVS/Repositories/0004f...	0004fb00012000043589...	
sv122-oracle-12cR1.img	9.75	10.0	No	/dev/mapper/3600508b10...	/OVS/Repositories/0004f...	0004fb000120000d8d81...	
sv122-oracle-apex.img	2.12	5.0	No	/dev/mapper/3600508b10...	/OVS/Repositories/0004f...	0004fb00012000040a60...	
sv122-stredax-db-201...	966.74	1024.0	No	/dev/mapper/3600508b10...	/OVS/Repositories/0004f...	0004fb00012000012cd4...	
sv122-system-01.img	9.55	12.0	No	/dev/mapper/3600508b10...	/OVS/Repositories/0004f...	0004fb0001200005f234...	
sv122-var-app-streda...	11.51	50.0	No	/dev/mapper/3600508b10...	/OVS/Repositories/0004f...	0004fb000120000ea7c8...	
sv127-oracle-12cR1.img	6.53	10.0	No	/dev/mapper/3600508b10...	/OVS/Repositories/0004f...	0004fb0001200002bc8e...	
sv127-oracle-apex.img	2.12	5.0	No	/dev/mapper/3600508b10...	/OVS/Repositories/0004f...	0004fb0001200004f539...	
sv127-system-01.img	9.89	12.0	No	/dev/mapper/3600508b10...	/OVS/Repositories/0004f...	0004fb000120000f3e88...	
sv127-var-app-streda...	0.05	50.0	No	/dev/mapper/3600508b10...	/OVS/Repositories/0004f...	0004fb0001200009728c...	
sv152-oracle-12cR1.img	9.15	10.0	No	/dev/mapper/3600508b10...	/OVS/Repositories/0004f...	0004fb0001200004378b...	
sv152-oracle-apex.img	2.12	5.0	No	/dev/mapper/3600508b10...	/OVS/Repositories/0004f...	0004fb00012000064b37...	
sv152-system-01.img	9.93	12.0	No	/dev/mapper/3600508b10...	/OVS/Repositories/0004f...	0004fb0001200003e8cc...	
sv152-var-app-streda...	32.0	50.0	No	/dev/mapper/3600508b10...	/OVS/Repositories/0004f...	0004fb000120000bb2b4...	
- Job Summary:** A section at the bottom showing job status. The top summary indicates 0 Total Jobs, 0 Pending, 0 In Progress, 0 Failed, 0 Aborted, and 0 Complete. Below is a table with columns for Description, Status, Progress, Message, Timestamp, Duration, Abort, and Details.

# Oracle VM Command Line Interface (CLI)

## Introduced

- OVM 3.1

## Accessible

- via ssh

## Own

- parser
- syntax

## Architecture

- REST calls to core

```
[root@isdkoosv127 scripts]# ssh ovmcli show virtualdisk id=0004fb00001200000889983661c45bf4.img
OVM> show virtualdisk id=0004fb00001200000889983661c45bf4.img
Command: show virtualdisk id=0004fb00001200000889983661c45bf4.img
Status: Success
Time: 2017-03-04 22:25:48,310 CET
Data:
  Absolute Path = /dev/mapper/3600508b1001c65c2be139edeee929665/VirtualDisks/0004fb00001200000889983661c45bf4.img
  Mounted Path = /OVS/Repositories/0004fb0000030000649ac50e020f50fe/VirtualDisks/0004fb00001200000889983661c45bf4.img
  VmDiskMapping 1 = 0004fb00001300008d03bb04d3121e02 [sv113-oradata]
  Max (GiB) = 1024.0
  Used (GiB) = 839.83
  Shareable = No
  Repository Id = 0004fb0000030000649ac50e020f50fe [sv094-repository]
  Id = 0004fb00001200000889983661c45bf4.img [sv113-stredax-db-2017KW04.img]
  Name = sv113-stredax-db-2017KW04.img
  Locked = false
  DeprecatedAttrs = [Assembly Virtual Disk]
OVM> delete vmdiskmapping name=sv127-oradata
Command: delete vmdiskmapping name=sv127-oradata
Status: Success
Time: 2017-03-04 22:35:43,416 CET
JobId: 1488663311335
OVM> create vmdiskmapping slot=4 name=sv127-oradata virtualdisk='sv095-stredax-db-2017KW09.img' on vm name="sv127"
Command: create vmdiskmapping slot=4 name=sv127-oradata virtualdisk='sv095-stredax-db-2017KW09.img' on vm name="sv127"
Status: Success
Time: 2017-03-04 22:48:02,838 CET
JobId: 1488664081698
Data:
  id:0004fb0000130000aacb39aab2440b9f name:sv127-oradata
```

# OVM CLI

## Pros

Accessible via ssh

Well documented:

- Oracle® VM Manager Command Line Interface User's Guide for Release 3.4

Mode:

- Synchronous
- Asynchronous

## Cons

Own parser

- weird behavior

ssh key authentication

- First use after VM Manager restart requires password

Access

REST Client  
Scripts

Lightweight

Complete functionality



[Oracle® VM Web Services API Developer's Guide for Release 3.4](#)

Using the API

Connecting  
 Authenticating  
 URI Mappings  
 Internet Media Types

Code Examples

Java  
 Python

**NO Reference**

The Oracle VM Web Services SDK

Oracle VM Manager installation ISO

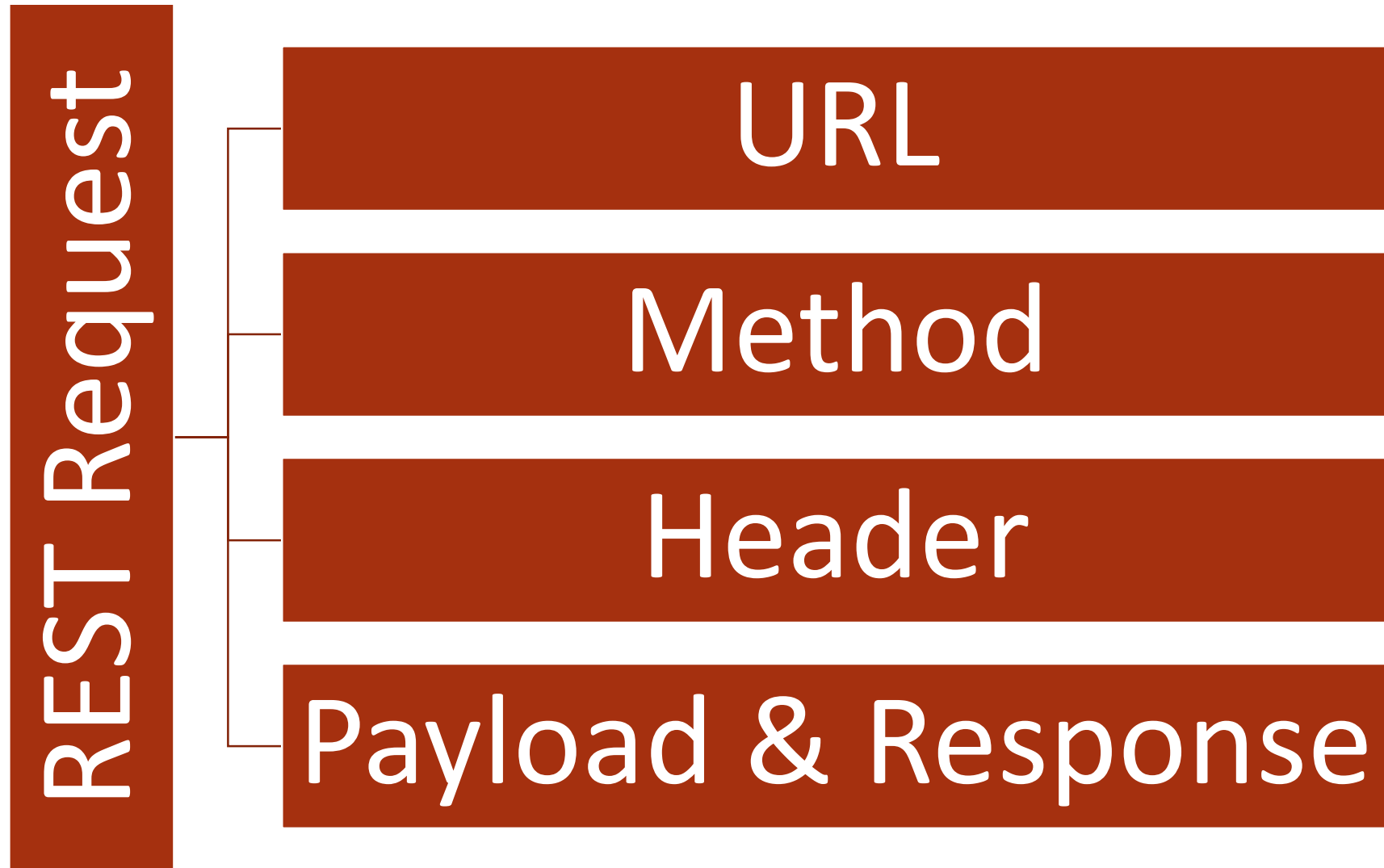
Mount ISO  
 Copy OvmSDK\_3.4.2.1384.zip to local machine  
 Unzip

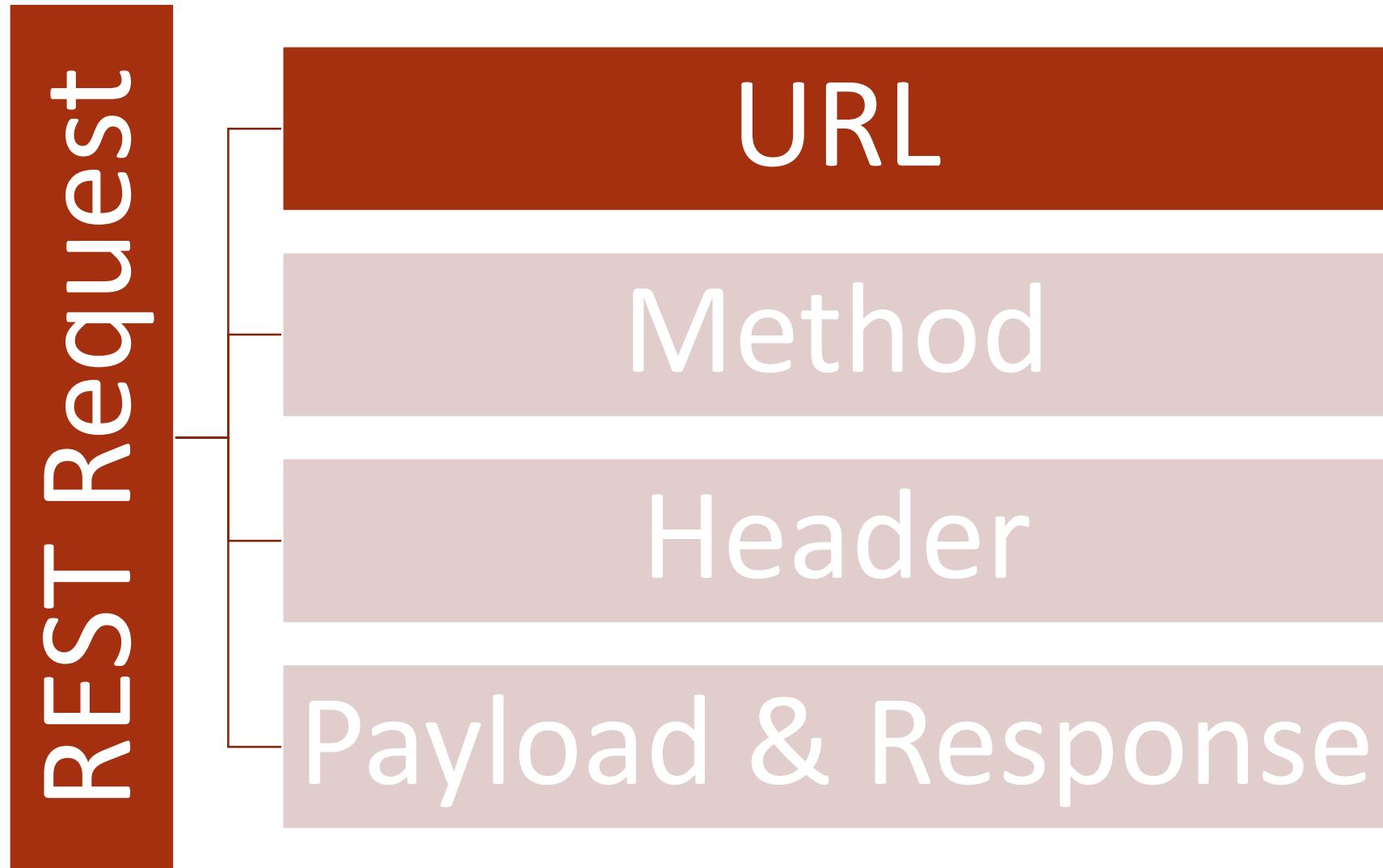
Contents

OVM web services client lib (JAR-File)  
 Sample Code (Java) using client lib  
 Full API Documentation (HTML)

# What is REST?

REST	<b>RE</b> presentational <b>S</b> tate <b>T</b> ransfer	
	programming paradigm	Distributed Systems Web Services
RESTful Applications	implements 6 constraints most important:	Uniform Interface (API via URIs) Stateless Cacheable
Implementation	Transport protocol	http(s)
	content	JSON Documents XML Documents





Host:Port

https://192.168.56.101:7002/ovm/core/wsapi/rest/...

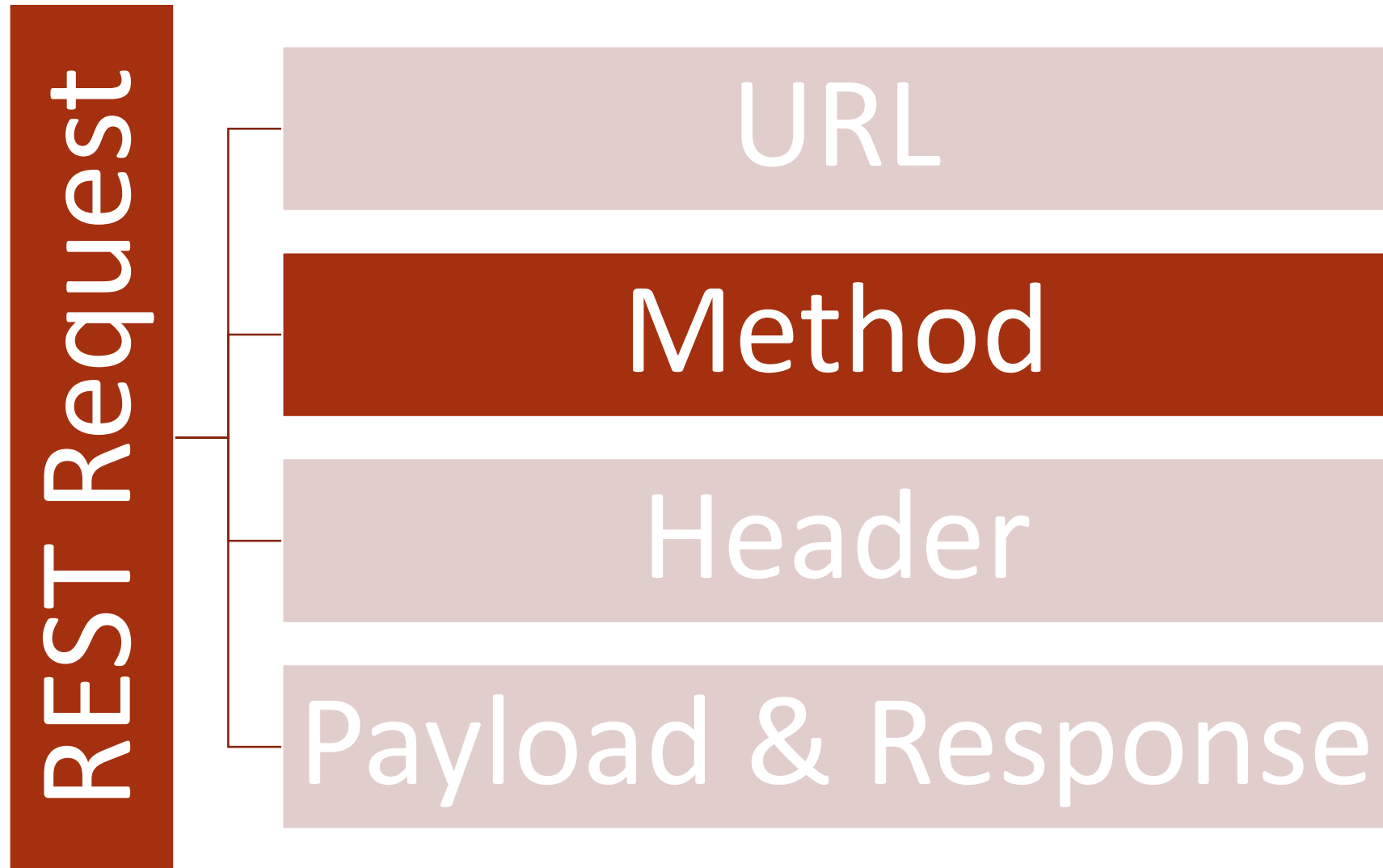
Protocol

REST Base URI

Object Id

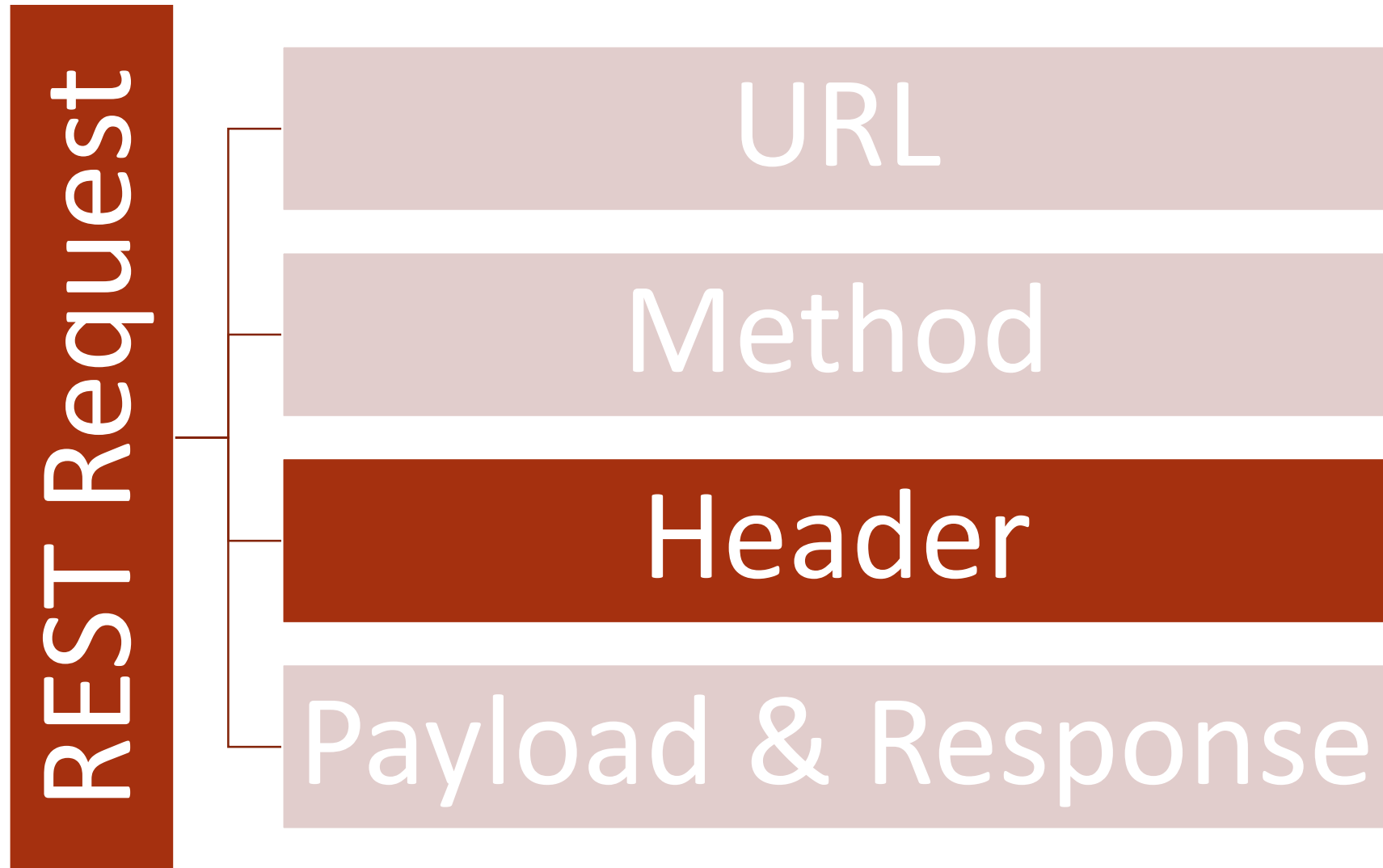
.../VMDiskMapping/0004fb0000130000aacb39aab2440b9f

Object Type

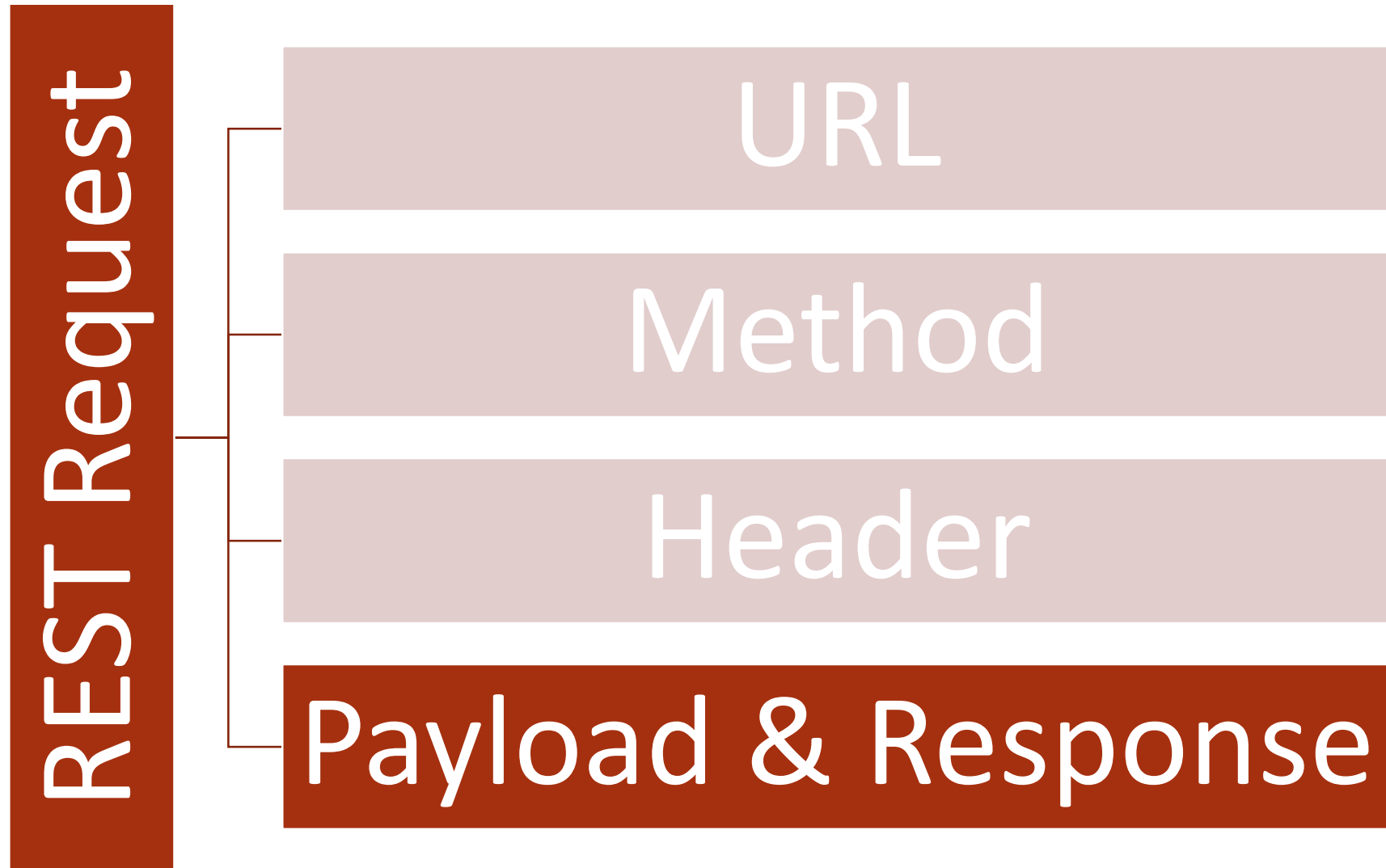


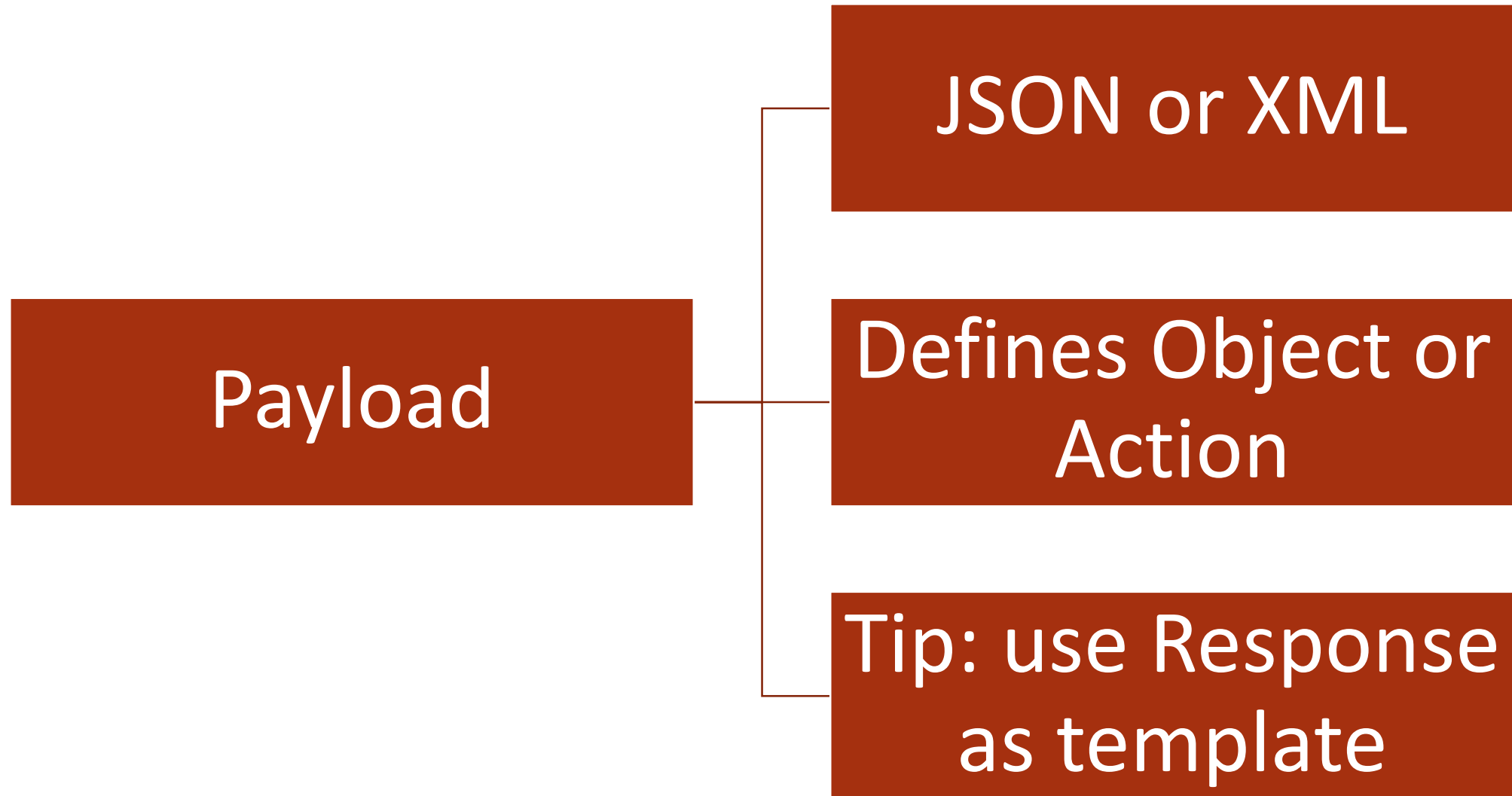
# OVM REST Methods

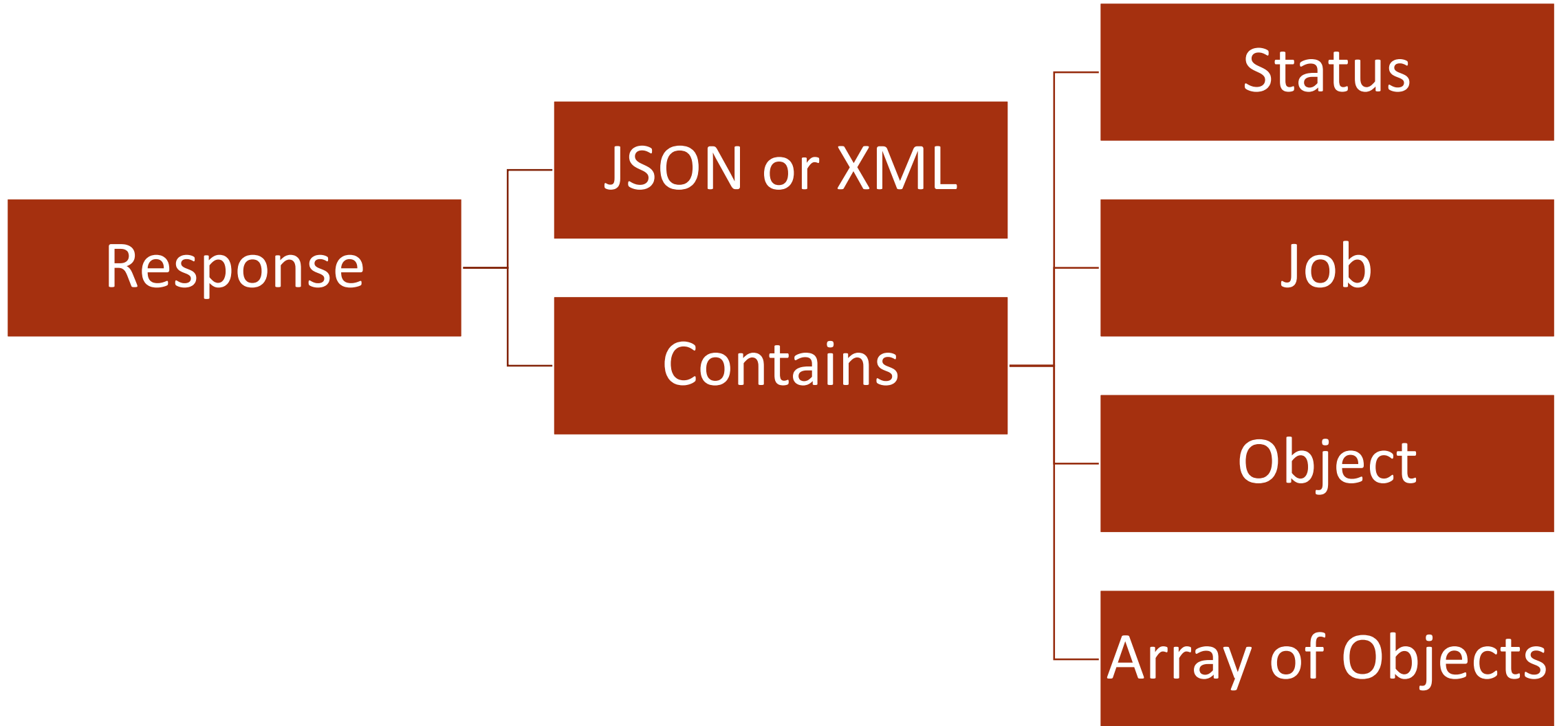
HTTP Method	Operation	URI Path
GET	Get all	/ObjectType
	Get all IDs	/ObjectType/id
	Get by ID	/ObjectType/{id}
	Get child associations	/ObjectType/{id}/ChildType
	Get child association IDs	/ObjectType/{id}/ChildType/Id
PUT	Modify	/ObjectType/{id}
	Action	/ObjectType/{id}/action
	Add child association	/ObjectType/{id}/addChildType
	Remove child association	/ObjectType/{id}/removeChildType
POST	Create	/ObjectType
	Create child Object	/ParentType/{id}/ChildType
DELETE	Delete	/ObjectType/{id}
	Delete child Object	/ParentType/{parentId}/ChildType/{childId}



HTTP Header Field	Content	Effect
Accept	application/xml	Server responds in XML
	application/json	Server responds in JSON
Content-Type	application/xml	Server expects XML payload
	application/json	Server expects JSON payload
Cookie	_WL_AUTHCOOKIE_JSESSIONID=6CT2CZ5eZ...	Session Cookie – no further auth required
Authorization	Basic QWxhZG....	Encoded Credentials – no cookie necessary







# JSON

Java Script  
Object Notation

```
{
  "name": "STOCKTICKER",
  "primaryKey": [
    "symbol",
    "tstamp"
  ],
  "members": [
    {
      "name": "symbol",
      "type": "VARCHAR2"
    },
    {
      "name": "tstamp",
      "type": "DATE"
    },
    {
      "name": "price",
      "type": "NUMBER"
    }
  ],
  "links": [
    {
      "rel": "collection",
      "href": "http://192.168.56.101:8080/o",
      "mediaType": "application/json"
    },
    {
      "rel": "canonical",
      "href": "http://192.168.56.101:8080/ords/rmougprov/metadata-catalog/tab-StockTicker/"
    },
    {
      "rel": "describes",
      "href": "http://192.168.56.101:8080/ords/rmougprov/tab-StockTicker/"
    }
  ]
}
```

Think of XML with  
<Tags> replaced by  
brackets

Schemaless

“Key”：“Value” Pairs

{ } – Groupings

[ ] - Arrays

no constraints for your implementation

Developers hell when dealing with  
documents not produced by your code

# Basic Auth

Provide “Basic Auth” with every REST request

---

## Pro

Easy to implement

---

No Overhead / Checks needed

---

## Con

Every Request gets own session

---

Resource intensive on OVM Manager

---

# REST Login

POST Request with Basic Auth to  
ovm/core/wsapi/rest/login

Extract Cookie  
„\_WL\_AUTHCOOKIE\_JSESSIONID “

Use as Session-Cookie for all subsequent Calls

Pro

Session Lasts in OVMM

Faster Response time

Con

Overhead implementing login and  
alive checks

# SSL Cert

Login using SSL certificates with every call

---

Pro

Convenient: No Credentials needed

---

Con

Setup overhead on Client & OVM Manager

---

Works only from Client with certs installed

---



# Demo with REST Client

Application Edit View Window Help

**OVM Manager** POST {{ base\_url }}/login Send **200 OK** TIME 42 ms SIZE 0 B

VirtualBox Cookies No Body Auth Query Headers (2) Source Cookies (2) Headers (5)

Filter +

Demo 01 - Virtual Disks

- POST REST login
- GET Virtual Machine List
- GET Virtual Disk List
- GET Virtual Disk
- PUT Clone Virtual Disk
- GET Query Job
- GET Virtual Disk (Clone)
- PUT Rename Virtual Disk
- DEL Delete Virtual Disk

URL PREVIEW

```
https://192.168.56.99:7002/ovm/core/wsapi/rest/login
```

name	value
JSESSIONID	DLO0QcMk8pdsI9kD TsgJUNlznQgoO8TO 8AvW_vMwnYKDOM hxAM_Q!172043544 8
_WL_AUTHCOOKIE_JSESSIONID	bINcCFW5djNpPqec wE7g

Manage Cookies

Import from Url

# Demo with REST Client

Application Edit View Window Help

**OVM Manager** PUT {{ base\_url }}/VirtualDisk/0004fb0000120000: Send **201 CREATED** TIME 104 ms SIZE 648 B

VirtualBox Cookies JSON Auth Query (1) Headers (3) Source Cookies Headers (5)

Filter

**Demo 01 - Virtual Disks**

- POST REST login
- GET Virtual Machine List
- GET Virtual Disk List
- GET Virtual Disk
- PUT Clone Virtual Disk**
- GET Query Job
- GET Virtual Disk (Clone)
- PUT Rename Virtual Disk
- DEL Delete Virtual Disk

URL PREVIEW

```
https://192.168.56.99:7002/ovm/core/wsapi/rest/VirtualDisk/0004fb000012000054ab7ca8a741c983.img/clone?cloneType=NON_SPARSE_COPY
```

cloneType	NON_SPARSE_COPY
name	value

```

1 {
2   "id": {
3     "type":
4     "com.oracle.ovm.mgr.ws.model.Job",
5     "value": "1489083277338",
6     "uri":
7     "https://192.168.56.99:7002/ovm/core/wsapi/rest/Job/1489083277338",
8     "name": "Clone Virtual Disk: vm200-system01.img to Repository: ovm01 Repository"
9   },
10  "name": null,
11  "description": null,
12  "locked": false,
13  "readOnly": false,
14  "generation": 0,
15  "userData": null,
16  "resourceGroupIds": null,
17  "resultId": null,
18  "jobRunState": "NONE",
19  "jobSummaryState": "NONE",
20  "done": false,
21  "summaryDone": false,
22  "jobGroup": false,
23  "error": null,
24  "progressMessage": null,
25  "latestSummaryProgressMessage": null,
26  "extraInfo": null,
27  "parentJobId": null,
28  "childJobIds": null,
29  "user": null,
30  "abortedByUser": null,
31  "startTime": null,
32  "endTime": null
33 }

```

\$.store.books[\*].author

## The API is normalized

Actions are implemented only once

Not always intuitive

## Example VirtualDisk:

Query: GET /VirtualDisk/{virtualDiskId}

Modify: PUT /VirtualDisk/{virtualDiskId}

Create: POST /Repository/{repositoryId}/VirtualDisk

Delete: DELETE /Repository/{repositoryId}/VirtualDisk/{virtualDiskId}

# Automatization & Reporting

Actions are asynchronous

Always return Job-Object  
Query Job-Id for Status

Messing with OVM Manger can be dangeous

Easy to destroy Disks, VMs or Repositorys

Good Practice:

Implement your own API, e.g. clone Disk

Setup simple Reportings

e.g. Orphaned Disks

## Download Slides

Conference Site

GitHub: <https://www.github.com/its-people>

## Blog Posts

In Preparation:

Setting up OVM Demo Environment with VirtualBox

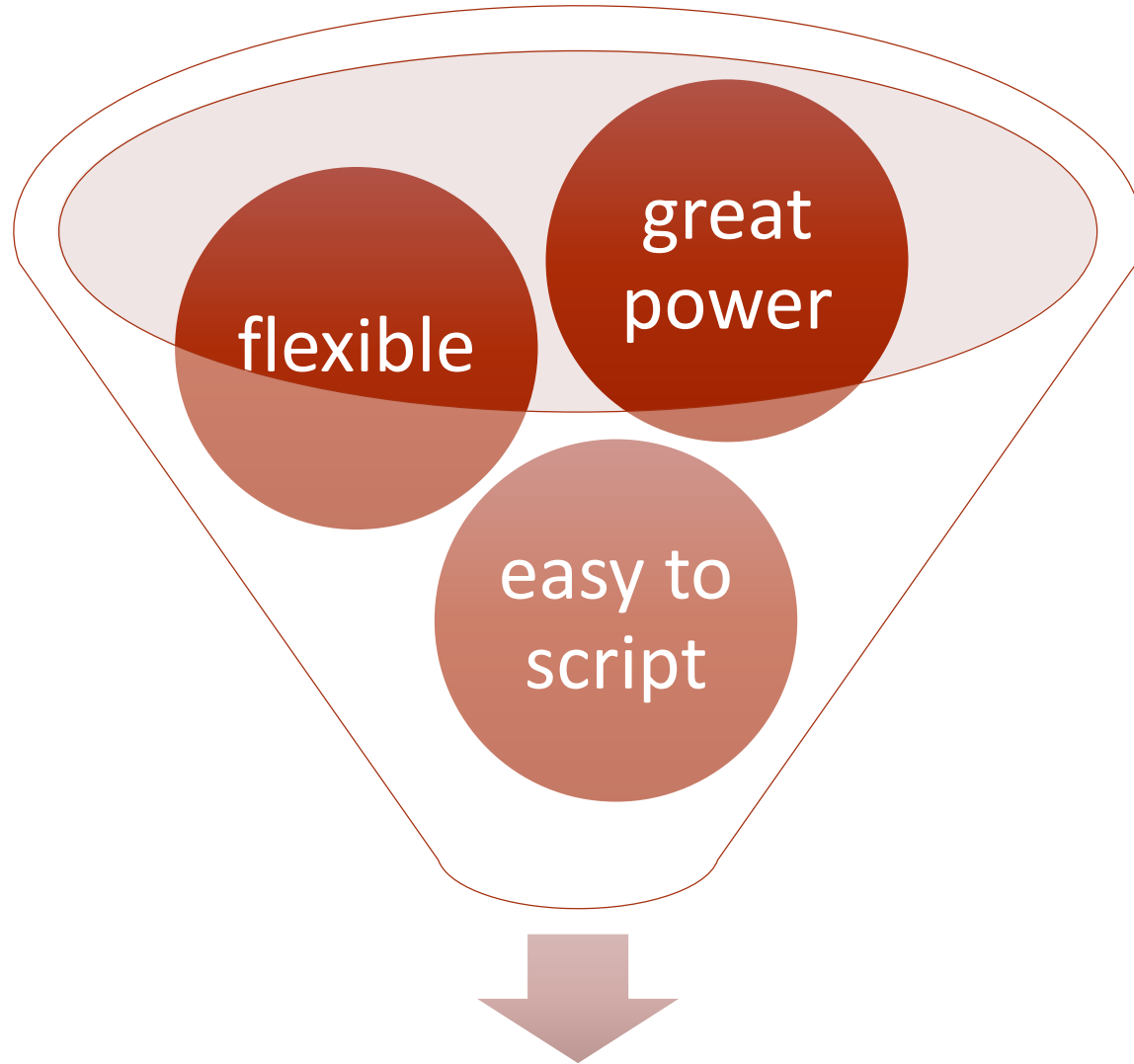
OVM Reporting with node.js

A special Workflow: Cloning Prod-DB into Dev-Environment

German & English

**ORACLE®**

**VM  
REST API**



**Try this @127.0.0.1!**



# Thank you!

we make the difference  
[www.its-people.de](http://www.its-people.de)

# Questions?



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