itspeople

Database Links 2.0
Access Remote Tables with REST and JSON

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Technical Architect

TECH 16
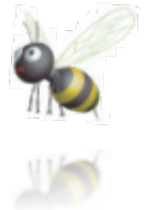▶ UKOUG Technology Conference & Exhibition

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

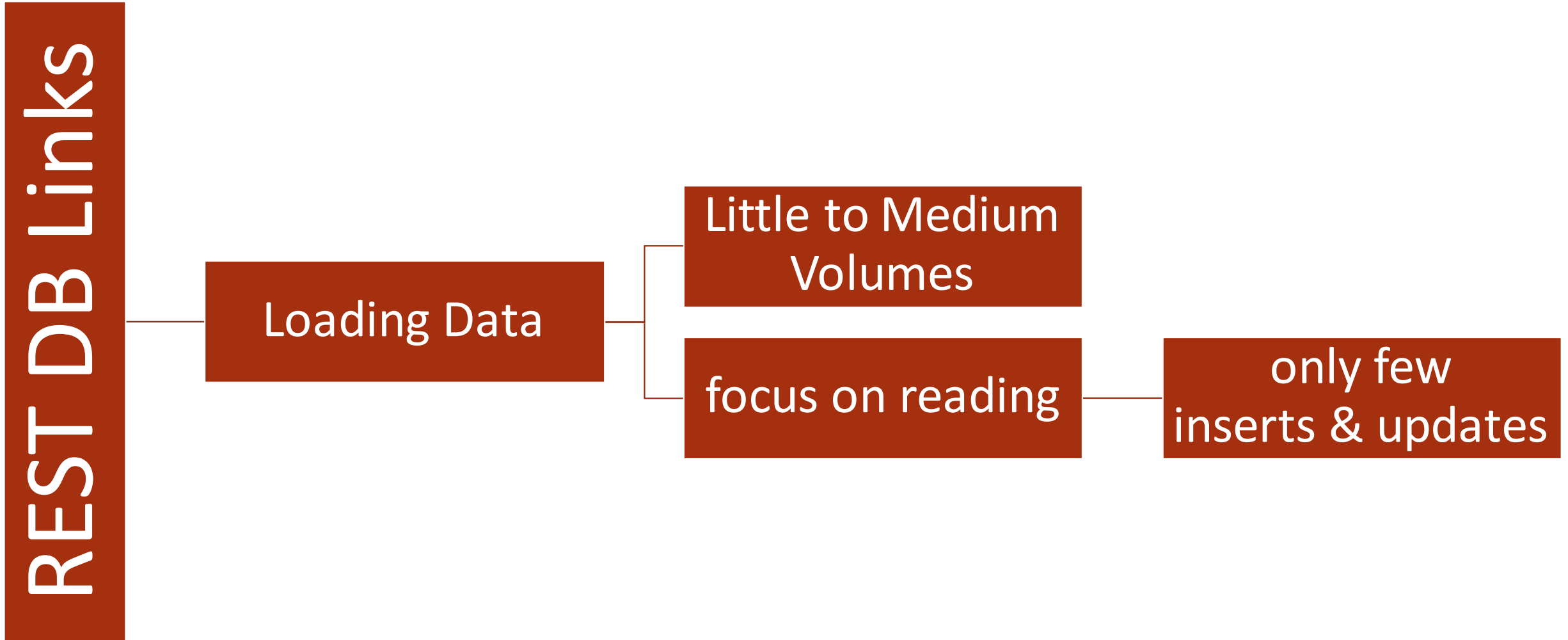@RobbieDatabee   blog.its-people.de   Robert.Marz
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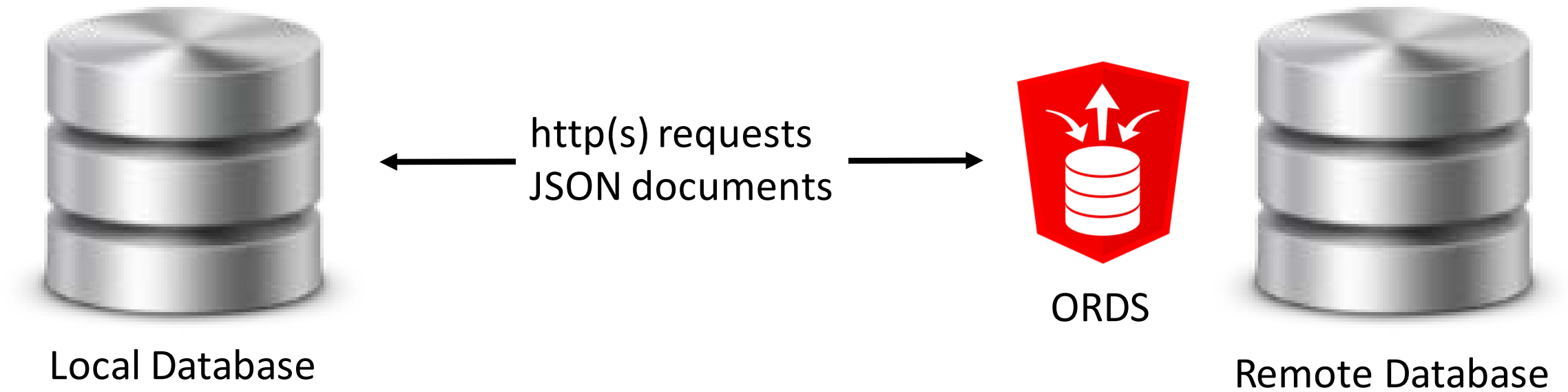
Database Links

Are trapped inside the Oracle world

Only work within local or private networks: SQLNet

Objects are treated as local

REST DB Links

Loading Data

Little to Medium Volumes

focus on reading

only few inserts & updates

Database Links 2.0 – Architecture

http(s) requests
JSON documents

Local Database

ORDS

Remote Database

REST	Representational state transfer	
	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

JSON

Java **S**cript **O**bject **N**otation

```
{
    "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/"
        }
    ]
}
```

"Key":"Value" Pairs

Think of XML with <Tags> replaced by brackets

{} – Groupings

[] - Arrays

Schemaless

no constraints for your implementation

Developers hell when dealing with documents not produced by your code

Java

Evloved from APEX Listener

Deploy in Application Server

- Tomcat
- Glassfish
- WebLogic

Standalone mode

- Brings own http-server

Links

Installation

- Install ORDS in less than 5 Minutes by Colm Divilly (@cdivilly): http://blog.cdivilly.com/2015/03/11/install-ords-3.0.0/

Official Homepage

- http://www.oracle.com/technetwork/developer-tools/rest-data-services/overview/index.html

Documentation

- https://docs.oracle.com/cd/E56351_01/doc.30/e56293/develop.htm

Video

- Oracle REST Data Services by Oracle Database Development Tools: https://www.youtube.com/watch?v=8XlbFRm-c6w

REST

- Restful Services: Implement full
- SODA: Simple Oracle Document Access

AutoRest

- Rest enable tables
  - very easy
  - some limitations

Provides

Schemas

PL/SQL Package

ORDS_METADATA

ORDS_PUBLIC_USER

ORDS

OAUTH

DEMO Environment

OTN Developer Day VM

- Virtual Box Appliance (June 22th, 2016)
  - Oracle Linux 7
  - Oracle Database 12c EE (12.1.0.2 with In-Memory Option)
  - Oracle Application Express 5.0
  - Oracle REST Data Services 3.0.5
  - http://www.oracle.com/technetwork/database/enterprise-edition/databaseappdev-vm-161299.html

Schemas

- restdblinksCons: Consumer: Local Database
- restdblinksProv: Provider: Remote Database (Data Source)

Client

- Browser: Google Chrome
- REST Client: Insomnia
- SQL Developer
- sqlcl

Anatomy of a ORDS AutoREST URL

ORDS Base   Table   Parameter

http://192.168.56.101:8080/ords/rdbl/Tab-StockTicker/?offset=55&limit=100

/ORCL,2016-01-08

PKCol1,PKCol2

Protocol   Host:Port   Schema   or Primary Key

HTTP Method	ORDS AutoREST Action
GET	Retrieve Data – Single Row or Rowset
PUT	Insert or Modify Row
POST	Bulk Insert csv-data
DELETE	Delete Row

The JSON produced by ORDS is NOT schemaless

Oracle has defined a new Media Type

- application/vnd.oracle.resource+json

Whitepaper

- http://www.oracle.com/webfolder/technetwork/tutorials/appdevinfo/New%20REST%20Media%20Type.pdf
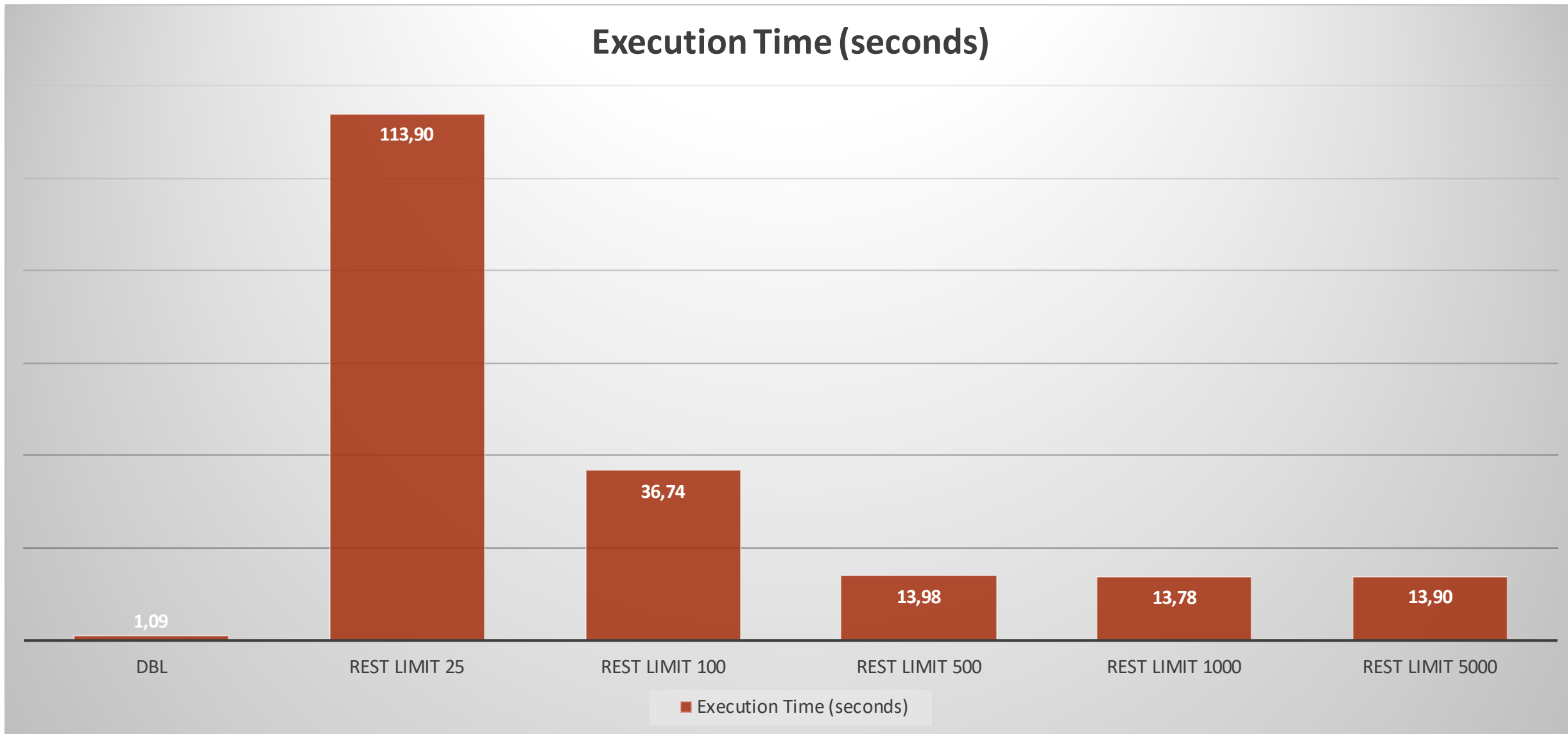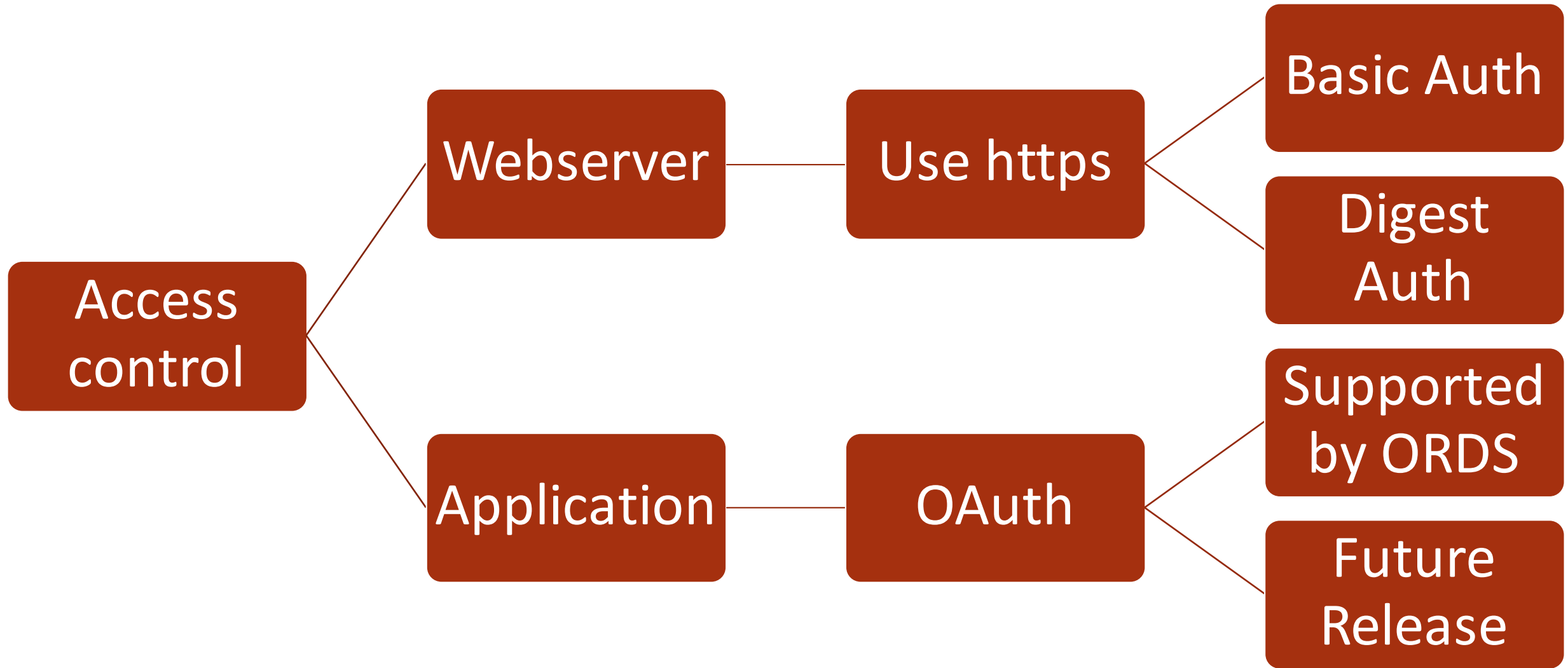
Generator

Use from sqlcl.

- JavaScript based

Parameter:

- View Name
- ORDS Metadata URL
- opional: Parameter for URL

```
script ../generator/generator
        v_stock
        http://localhost:8080/ords/rdbl/metadata-catalog/Tab-StockTicker/
        ?limit=5
-- call from single line
```

Limitations

simple data types only

- No Spatial
- No Object Types

Planned enhancements

OAuth

Complex data types

Move from AutoREST to custom implementation

Integrate intoSQLDeveloper (oddgen)

conference website	Slides and scripts uploaded to
	http://www.tech16.ukoug.org/
GitHub	Latest version always here
	You can help enhance the generator – I'm accepting pull requests
	https://github.com/its-people/rest-db-links
notification	Twitter: @RobbieDatabee
	Blog: http://www.its-people.de/blog

Only a little magic is needed.

Performance is worse, but acceptable in most cases.

With REST and JSON, you can reach out from your database to the Internet.

Database Links can be replaced by a modern Architecture.

Herzlichen Dank für Ihre Aufmerksamkeit !

Questions ?

Portfolio

Anwendungsentwicklung
Performance-Tuning
Virtualisierung
Hochverfügbarkeit
Datenbanken
Oracle
IT-Architekturberatung
Performance-Tuning
Microsoft
OWB
ITMS
ETL
Prozessoptimierung
BI
Data Warehouse
Projektmanagement
Data Governance
Test-Management
ODI
CDI
ERP-Logistkberatung
Customer Analytics
Customer Data Integration

People

BI Spezialisten
Integrationsarchitekten
Report Designer
ETL Modellierer
Performance Tuner
Data Warehouse Architekten
IT Coach
Middleware Entwickler
Oracle APEX Berater
Datenbank Entwickler
Oracle Experten
Projektleiter Datenbanken
ERP Consultant Logistics
Microsoft Professionals
Testmanager

Success

Lösungs-Finder
Chancen-Aufzeiger
Kunden-Versteher
Team-Player
Prozess-Optimierer
Erstklassig
Fokussiert
Zertifiziert
Umsetzungsstark
Ergebnisorientiert