FDSN Web Services in Antelope

Rohan Ambli
Ambli, LLC

September 2019
Calgary, Canada

Outline

- Background
- Web-services Overview
- FDSN web-service (data export)
- Client access (data import)
- Demo/user interactive session
- Feedback/discussions/questions

Background

- 10+ years in the industry
- Automation Engineer, currently working with (and interest in) Kubernetes and Docker
- From India. Living in Denver, Colorado since 2005

BRTT
BOULDER REAL TIME TECHNOLOGIES, INC.

Kinemetrics

Background

- Ambli, LLC Contracting with BRTT
- Ported Antelope Python modules to Python 3 (part of Antelope 5.9 release)
- On-going effort
  - FDSN Web-service implementation
  - First demo'ed in May 2019

Web services

- What
  - A software system designed to support machine to machine interaction over a network.
- Why
  - Interoperability between distributed systems over the internet/intranet

BRTT
BOULDER REAL TIME TECHNOLOGIES, INC.

Kinemetrics

Web services

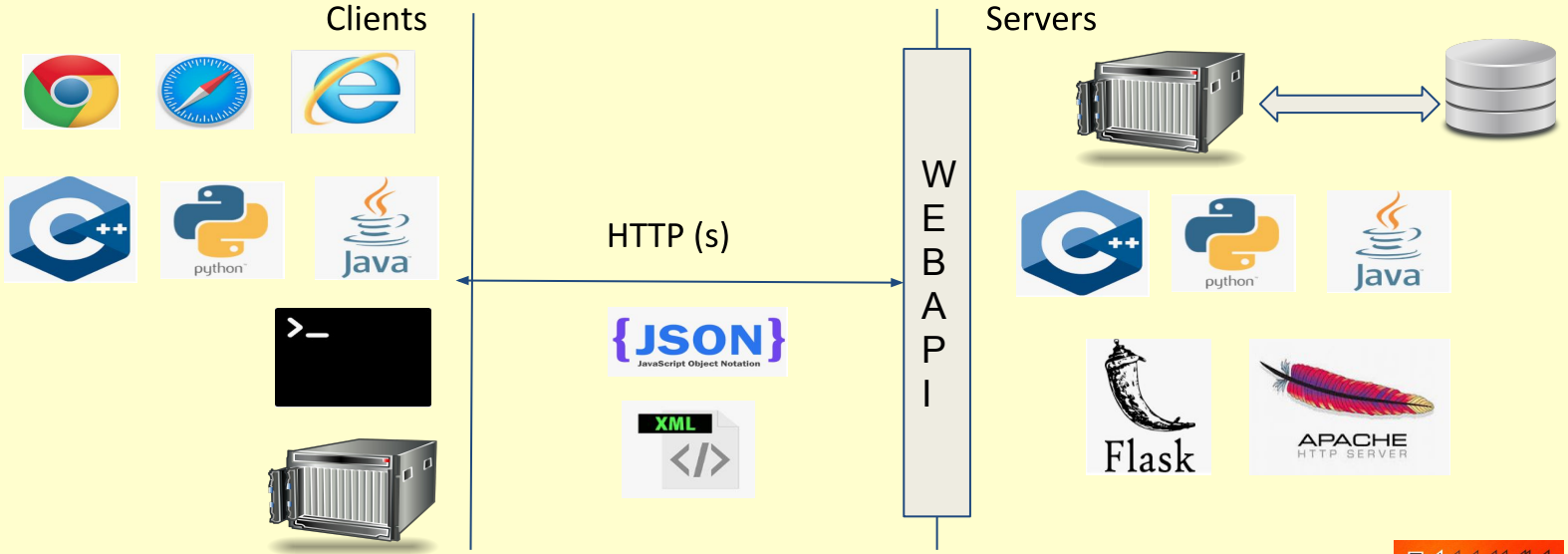
- How
  - Protocol: HTTP/s (HyperText Transfer Protocol)
  - Well defined interface: REST/SOAP
  - Same language: XML or JSON

BRTT
BOULDER REAL TIME TECHNOLOGIES, INC.

Kinemetrics

Web services

- De-couple client implementation from server implementation - platform independent



Web services

- Easy data access
- Standardize local data access as well
- Service description information over WADL

BRTT
BOULDER REAL TIME TECHNOLOGIES, INC.

Kinemetrics

FDSN Web-service

- Growing interest in Federated* Data Services for Seismology
- "*Members agree to coordinate station siting and provide free and open access to their data*" - www.fdsn.org
- FDSN web service specification defines RESTful web-service interfaces for accessing common FDSN data types.
- Antelope Prototypes started March, 2019

* Federated architecture (FA) is an architectural pattern that allows interoperability and information sharing between semi-autonomous de-centralized organized entities

Federated Metadata Aggregator

Data Services Newsletter

Volume 21 : No 1 : Spring 2019

Previous: ISPAQ V2.0 - Improvements to the IRIS System for Portable Assessment of Quality

Next: Jerry A Carter - Director of Data Services

Web Update

Federated MetaData Aggregator (MDA)

Introduction

The IRIS MetaData Aggregator has been redesigned to show metadata summaries from global data centers supporting FDSN Web Services. In addition to SEED metadata information, MDA presents other details such as data availability, virtual network affiliations, response curves, and links to dynamic maps. MDA adds to the IRIS DMC's suite of federated web tools including GMAP and Wilber 3, which collectively provides users a convenient view of the station holdings provided by all participating FDSN data centers.

MDA exposes five levels of metadata summary: network list, network, station, location and channel. At each summary level, metadata from different federated datacenters is related using SEED metadata identifiers and time spans.

http://ds.iris.edu/ds/newsletter/vol21/no1/507/federated-metadata-aggregator-mda/

FDSN Web-service

`station/` – Returns metadata in FDSN StationXML and alternate formats (Initial version completed in May 2019)

`event/` – Return event (earthquake) information (Initial version was under development in May, ready for demo today)

`dataselect/` – Provides access to time-series data for specified channels and date ranges (Initial version ready for demo today)

Data export

- Data *export* is handled by Antelope FDSN web-server
  - `station/` - Backed by StationXML export based on ***db2stationxml***(3) written by Celso Reyes
  - `event/` - Backed by QuakeML export currently based on ***event2qml***(1) contrib code written by Juan Reyes
  - `dataselect/` - Current implementation backed by ***trexcerpt***(1)

Data import

- Data *import** can be performed by any client supporting REST calls.
  - `curl` command
  - Web UI
  - Obspy Python package: Python framework for processing seismological data

** import here refers to importing data for analysis, not to Antelope db (not stationXMLtoDB)*

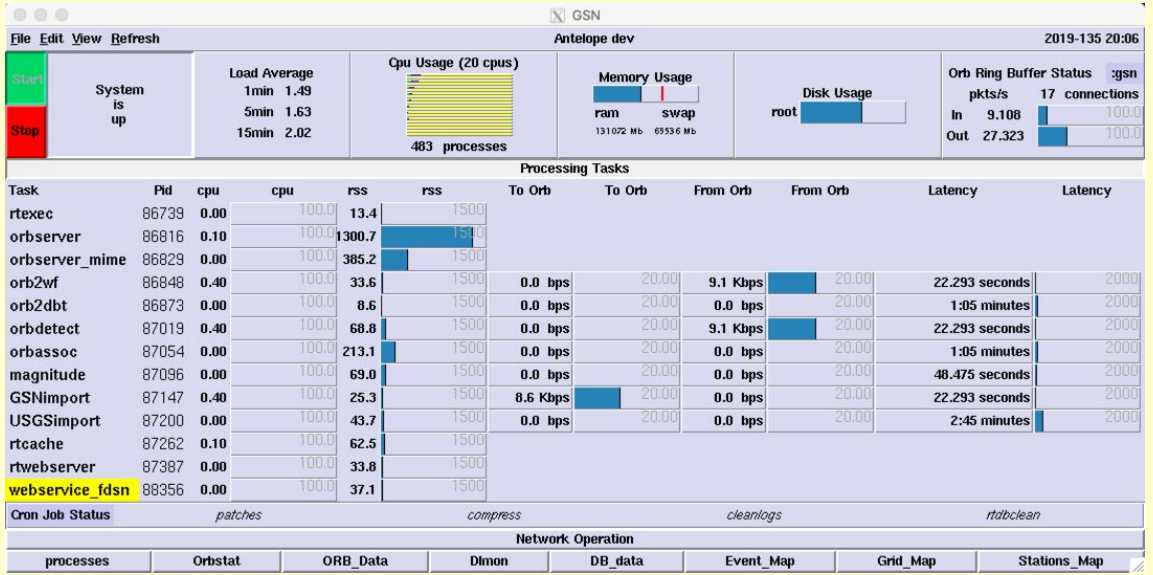
FDSN Server Export from Antelope - Server within rtdemo_gsn

New experimental server ***'webservice_fdsn'***

In rtexec.pf:

Processes &Tbl{
webservice_fdsn webservice_fdsn
}

Run &Arr{
webservice_fdsn yes
}



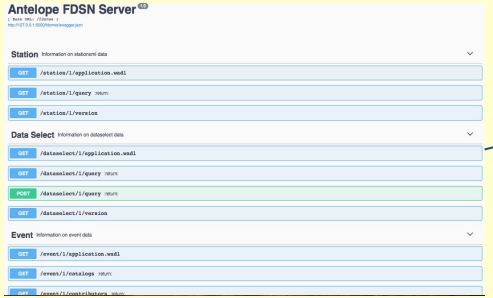
Demo setup

Antelope environment

Obspy

aws

antelope.kinemetrics.com




```
curl http://antelope.kinemetrics.com:5000/fdsnws
```

BRTT
BOULDER REAL TIME TECHNOLOGIES, INC.

Kinemetrics

Demo time!

Antelope FDSN Web-service reachable at:
http://antelope.kinemetrics.com:5000/fdsnws
Please feel free to navigate to the above URL and check it out.

Disclaimer: This is a work in progress, so not all parameters are supported. Ready to enter alpha testing phase, looking for volunteers! :)*

* https://en.wikipedia.org/wiki/Software_testing#Alpha_testing

BRTT
BOULDER REAL TIME TECHNOLOGIES, INC.

Kinemetrics

Thank You!
Questions?

BRTT
BOULDER REAL TIME TECHNOLOGIES, INC.

Kinemetrics

References

- FDSN Web-service specification: http://www.fdsn.org/webservices/FDSN-WS-Specifications-1.2.pdf
- OpenAPI 2.0: https://swagger.io/specification/
- REST: https://en.wikipedia.org/wiki/Representational_state_transfer
- FDSN Metadata aggregator: http://ds.iris.edu/ds/newsletter/vol21/no1/507/federated-metadata-aggregator-mda/

Feedback

Very early prototype: Questions? Concerns?

Priorities?

- QuakeML import
- StationXML import
- Waveforms import
- QuakeML export
- StationXML export
- Waveforms export

BRTT
BOULDER REAL TIME TECHNOLOGIES, INC.

Kinemetrics