E-Center Forecasting Data Service (FDS)

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Introduction

The E-center consists of collection of the loosely coupled applications. The Forecasting Data Service is designed for the forecasting of the future values of the data collected through the perfSONAR-PS service and it works with the DRS E-center service, which retrieves and caches the measurement data.

The FDS service is implemented as REST webservice with GET and POST HTTP operations supported. The list of supported response formats include JSON, XML, YAML but JSON is preferred. The only supported format for the data string request is JSON.

FDS Request

ecenter_server_hostname := <hostname of the E-Center data service>;
ipv4 := <ipv4 address, dotted>;
datetime := < YYYY-MM-DD%20hh:mm:ss >;
data_type :='/', ['bwctl'|'owamp|snmp'];
response_format := ['.json'];
data_request := <JSON encoded response from the DRS which can be supplied as data string>;
detection_request := ' GET http://', ecenter_server_hostname , '/fds', response_format,'?',
'data_type=', data_type, ('&data=',data_request,)?, ('&future_points=',integer)?,
['src_ip=', ipv4|'src_hub=',string],'&', [
'dst_ip=', ipv4|'dst_hub=',string], ('&start=', datetime)?, ('&end=',
datetime)?,('&resolution=',integer)?,('&timeout=',integer)?;

The **future_points** parameter is optional and defaults to the 30 or to the 10% of the available time series data points.
The **data** parameter is optional and only expected in the POST type of request. It must contain a JSON encoded data string with pre-fetched DRS results. If you want to get data from the DRS at the time of analysis then do not use this parameter but supply **start,end,src_hub(ip)/dst_hub(ip)** instead. The FDS will analyze **owamp or bwctl** data for each ***source/destination*** pair of IPs separately and for each Layer 2 interface on case of SNMP data and return results accordingly, see below.

Example of FDS request:

GET http://ecenter.fnal.gov:9055/fds.json?data_type=snmp&future_points=20& src_ip=131.243.24.11&dst_ip=198.32.44.130&start=2010-06-05 06:01:02&end=2010-06-05 07:02:01

FDS Response

The query response will return the forecasted data only.
Response is formatted as:

```
number := float|integer;
parameters:= { ['metaid:'|'src_hub:'|'dst_hub']+,':',string }*;
src_ip := ipv4;
dst_ip := ipv4;
metric_name := ['utilization'|'max_delay'|'throughput'];
status := 'OK'|status_data;
 response :=   { src_ip,': {
                        {  dst_ip,': {',  } ?
                              metric_name, ': {' ,
                                    parameters, 'status:"ok"',
                                    'forecast: [',  float*,  ']',
                                    'stderr:[', float*, ']',
                                    'times :[',  integer*, ']',
                              '}',
                        {      '}',   }?
                  '}',  }*;
```

Below is an example of the FDS response (end-to-end metric):


```
 {
      192.12.15.23: {
            134.79.104.209: {
                  src_hub: "BNL",
                  dst_hub: "SLAC",
                  metaid: "1234",
                  status: "OK",
                  forecast: [
                    "0.0656611436197223"
                    "0.0655910374846289"
                    "0.0655910374846289"
                    "0.0655910374846289"],
                  stderr: [
                  "0.09101989616853"
                  "0.09101989616853"
                  "0.09101989616853"
                  "0.09101989616853"
                  ],
                  times: [
                  1316026002
                  1316027009
                  1316028016
                  1316029023
                  ]
            }
      }
}
```


Below is an example of the FDS response (snmp metric):

```
 {
     192.12.15.23: {
                status: "OK",
                forecast: [
                  "0.0656611436197223"
                  "0.0655910374846289"
                  "0.0655910374846289"
                  "0.0655910374846289"],
                stderr: [
                "0.09101989616853"
                "0.09101989616853"
                "0.09101989616853"
                "0.09101989616853"
                ],
                times: [
                1316026002
                1316027009
                1316028016
                1316029023]
      }
}
```