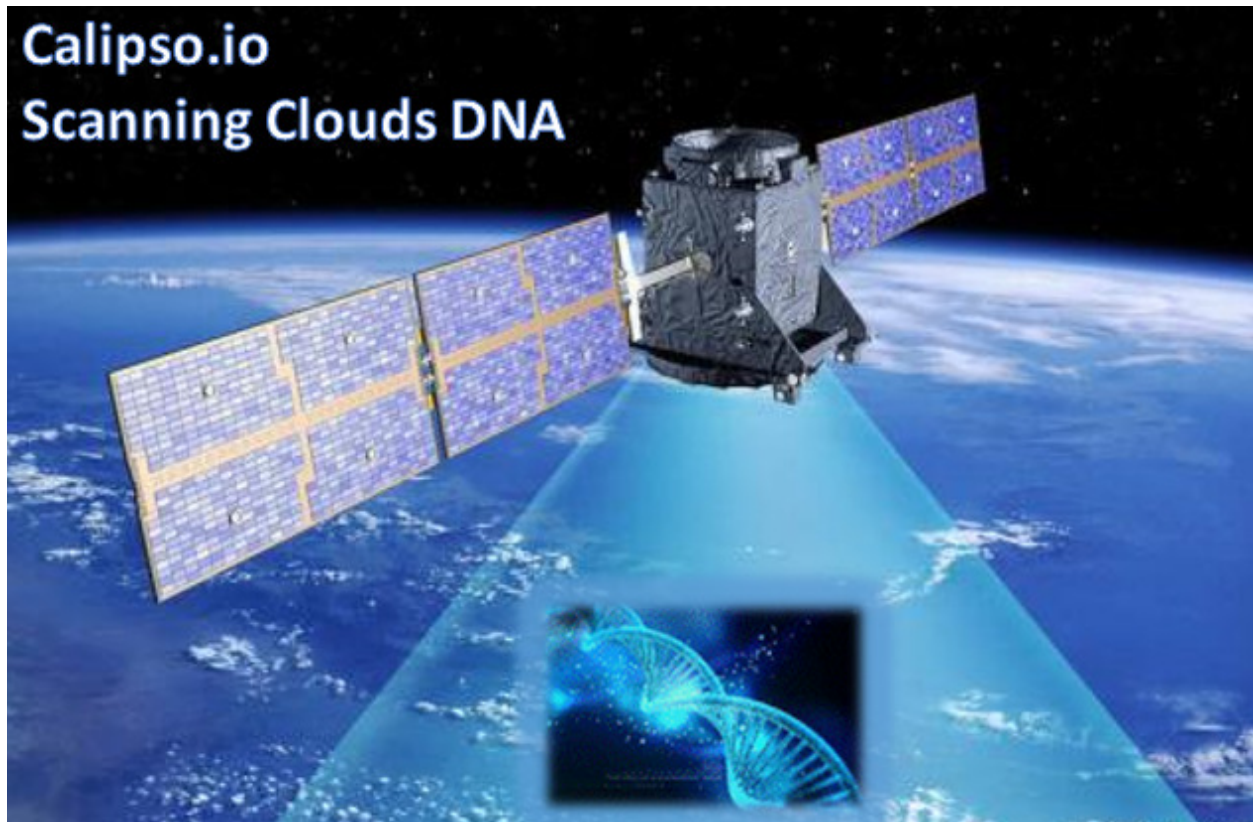


Calipso.io Monitoring Guide



Project “Calipso” tries to illuminate complex virtual networking with real time operational state visibility for large and highly distributed Virtual Infrastructure Management (VIM).

We believe that Stability is driven by accurate Visibility.

Calipso provides visible insights using smart discovery and virtual topological representation in graphs, with monitoring per object in the graph inventory to reduce error vectors and troubleshooting, maintenance cycles for VIM operators and administrators.

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1 Monitoring deployment options

Calipso uses sensu framework that includes a customized calipso sensu server and a set of customized clients, for details on the framework see:

<https://sensuapp.org/docs/latest/overview/what-is-sensu.html>

Calipso uses this framework but further configure and customizes the install, per:

<https://sensuapp.org/docs/1.0/installation/>

Server and clients are deployed with rabbitmq over SSL as the client-server transport:

<https://sensuapp.org/docs/1.0/reference/ssl.html>

Calipso then deploys customized checks and handlers as new types of plugins:

<http://sensu-plugins.io/plugins/>

In order to monitor all virtual components as described in Calipso-model document, Calipso offers two major functions:

1. Calipso scan module: customizes and automatically deploys sensu, config files and all needed plugins and scripts on all clients and the central server.
2. Calipso monitor module: listens for the results of the customized events and updates the inventories with state and statuses, while generating all related messages.

1.1 Calipso monitoring provisioning

Calipso administrator should instruct the main scanning engine whether or not to deploy monitoring across the VIM environment hosts. This is done first by the Calipso scan container that uses a set of “environment_config” parameters (see calipso-model guide for details).

A full scan of an environment is a mandatory pre-requisite for monitoring, because calipso monitoring provisioning uses inventory discovered data as values of several configuration items to be deployed onto the sensu framework.

Here are the important parts of an “environment_config” document that needs to be defined either through UI or API as a pre-requisite for monitoring provisioning:

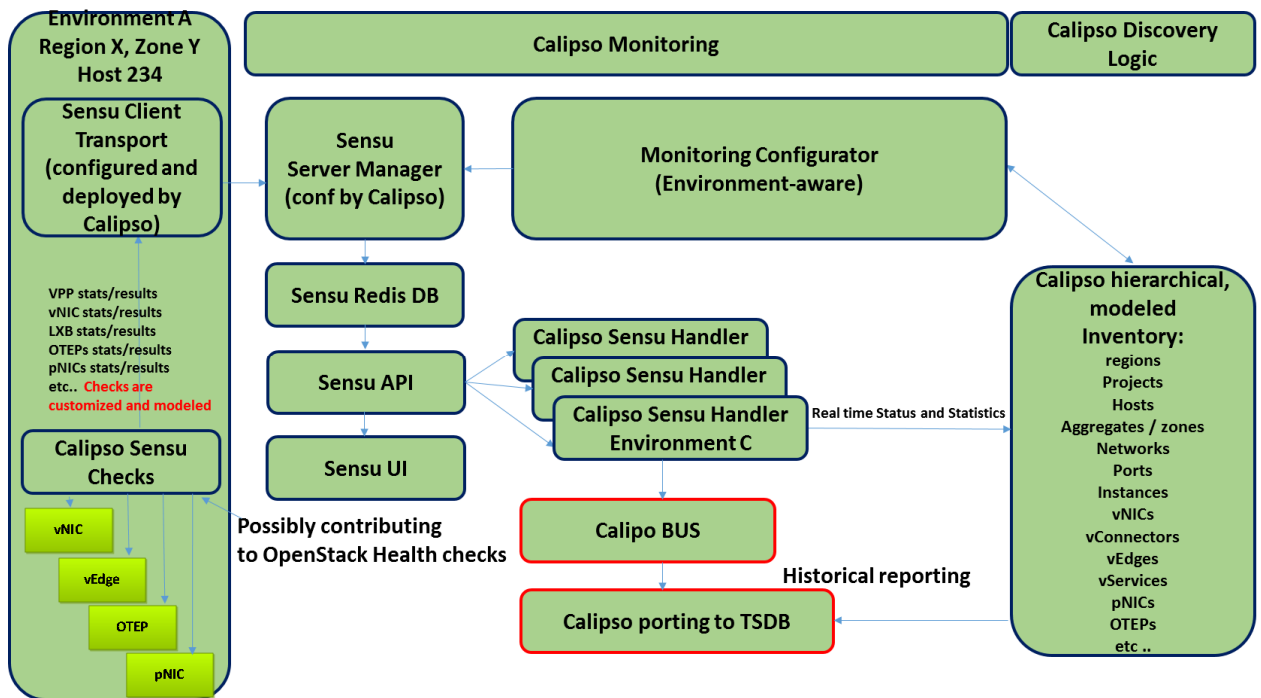
```
{
  "enable_monitoring": true, // this must be “true” for any monitoring result
  "name" : "my-env-with-monitoring", // name is needed as usual
  "distribution" : // other details removed ....
  "configuration" : [ // in configuration: a monitoring section is defined
    {
      "name" : "Monitoring", // name of this configuration section
      "type" : "Sensu", // instruct to use a sensu type of monitoring framework
      "rabbitmq_port" : 5671, // the SSL port used by sensu clients to server
      "rabbitmq_pass" : "dummy_pwd", // clients-to-server rabbitmq password
      "rabbitmq_user" : "sensu", // clients-to-server rabbitmq username
      "server_ip" : "10.0.0.1", // the calipso sensu container ip address
      "ssh_user" : "root", // user used inside the sensu server (container)
      "ssh_password" : "dummy_pwd", // root pwd used inside the sensu server
      "ssh_port" : 20022, // ssh port where sensu container offers ssh access
      "server_name" : "sensu_server", // name to use for the sensu server api
    }
  ]
}
```

```
"env_type" : "production", // a type of environment to setup (sensu's 'type')  
"config_folder" : "/local_dir/sensu_config", // location to place config files  
"api_port" : 4567 // sensu server api port to connect to  
"provision" : "None" // ** see provision options described next ! **  
},  
]
```

** Provision options are:

1. **“None”**: does not deploy any monitoring configurations
2. **“DB”**: creates all necessary configuration files in the mongoDB, placed in “monitoring_config” collection.
3. **“Files”**: creates all necessary configuration files in the mongoDB, placed in “monitoring_config” collection and also in ‘config_folder’ location on the server.
4. **“Deploy”**: Does what “Files” is doing, but also goes and deploys all configuration files and scripts on all servers on the environment.

This is a high level representation of the calipso monitoring provisioning logic:



1.2 Calipso-monitor container

Once sensu clients and all needed configurations and plugins are deployed properly, the sensu server should start receiving results and update the relevant inventory objects with their states and statuses.

The calipso-sensu container is a pre-built sensu server customized for calipso design. The following services are exposed on the calipso-sensu container:

1. Calipso monitoring handling app running in:
/home/scan/calipso_prod/app/monitoring/handlers/monitor.py
2. Sensu-api service accessible on port 4567.
3. Calipso container bash access through ssh on port 20022 (see quickstart-guide).
4. Sensu-server service listening as rabbitmq over ssl on port 5671.
5. Rabbitmq management server on port 15672 (<http://server-ip:15672/> to access).
6. Sensu uchiwa UI listening on port 3000 (<http://server-ip:3000> to access).

All the above services are maintained by calipso and customized for calipso's virtual inventory monitoring design.

2 Monitoring configurations

You can access calipso-sensu container by ssh, using:

ssh scan@localhost -p 20022 with a default password "scan".

Inside the calipso-sensu container the calipso monitoring application is maintained at:
/home/scan/calipso_prod/app/monitoring

SSL keys are shipped with the calipso-sensu container and maintained at:
/etc/sensu/ssl

Check scripts used to run a health check against monitored objects are maintained at:
/home/scan/calipso_prod/app/monitoring/checks

Handling scripts to grab and handle checks results from clients are maintained at:
/home/scan/calipso_prod/app/monitoring/handlers

Configuration deployment setup scripts are maintained at:
/home/scan/calipso_prod/app/monitoring/setup

2.1 Calipso monitoring configuration templates

Calipso application maintained a customizable model for all the configuration files deployed onto the sensu server and clients at provisioning stage of its main scanning engine.

The following configuration files are customizable:

Server side:

redis.json
transport.json
rabbitmq.json
api.json
client.json
filters.json
handlers.json

Clients side:

transport.json
rabbitmq.json
client.json
customized checks to integrate into client.json

We have defined a default set of configuration parameters in those files per our knowledge and best practices, so a typical user would not need to edit any of the above set of configuration files and their options. In case any of these needs customizations we offer a very granular model maintained in Calipso mongoDB under the “**monitoring_config_templates**” collection.

Here is an example of such template, and its options:

```
"type" : "client.json", // this will be used for building client.json files
"order" : "1", // if several of these templates are configured, take a priority to use
"side" : "client", //client.json file deployed onto the client side (env hosts)
"config" : { // the actual configuration txt follows ...
  "client" : {
    "address" : "{client_name}", // take the name of host from scan inventory
    "subscriptions" : [ //a future option

  ],
  "environment" : "{env_name}", // name of the VIM environment for logs
  "name" : "{client_name}" // take the name of host from scan inventory
},
"api" : {
  "host" : "{server_ip}", // take the server_ip of environment_config
```

```

    "port" : NumberInt(4567) // use this port for interfacing with the server
  }
},
"monitoring_system" : "sensu"
}

```

The above is just a simple example, login to mongoDB and check “monitoring_config_templates” collection for recent information on deployment files and their configuration options.

The results of the monitoring provisioning are placed, by default, in mongoDB at the collection – “**monitoring_config**”, locally on the calipso-scan container at **/local_dir/sensu_config** and finally on the server (calipso-sensu container) and on all the hosts (clients). Here is an example of the resulted client.json file on one of the environment hosts (example deployment from real VIM environment):

```

{
  "api": {
    "host": "korlev-calipso-dev.cisco.com",
    "port": 4567
  },
  "checks": {
    "host_pnic_eno16777728-00---.58..---50---.58..---56---.58..---ac---.58..---e8--
--.58..---97": {
      "command": "check_pnic_ovs.py eno16777728",
      "handlers": [
        "file",
        "osdna-monitor"
      ],
      "interval": 15,
      "standalone": true,
      "subscribers": [
        "base"
      ],
      "type": "metric"
    },
    "host_pnic_eno33554952-00---.58..---50---.58..---56---.58..---ac---.58..---c9--
--.58..---a2": {
      "command": "check_pnic_ovs.py eno33554952",
      "handlers": [
        "file",
        "osdna-monitor"
      ],
      "interval": 15,
      "standalone": true,
      "subscribers": [
        "base"
      ]
    }
  }
}

```

```

    ],
    "type": "metric"
  },
  "otep_node-6.cisco.com-otep_vxlan-c0a80201": {
    "command": "check_ping.py -c 10 -i 0.5 -p 4f532d444e41 -w 10 -s 256 -f
192.168.2.2 -t 192.168.2.1 -W 1%/301.11/600 -C 10%/1020.12/2000",
    "handlers": [
      "default",
      "file",
      "osdna-monitor"
    ],
    "interval": 15,
    "standalone": true,
    "subscribers": [
      "base"
    ],
    "type": "metric"
  },
  "otep_node-6.cisco.com-otep_vxlan-c0a80203": {
    "command": "check_ping.py -c 10 -i 0.5 -p 4f532d444e41 -w 10 -s 256 -f
192.168.2.2 -t 192.168.2.3 -W 1%/301.11/600 -C 10%/1020.12/2000",
    "handlers": [
      "default",
      "file",
      "osdna-monitor"
    ],
    "interval": 15,
    "standalone": true,
    "subscribers": [
      "base"
    ],
    "type": "metric"
  },
  "vedge_bc865c43-3dc5-4940-af1d-b4be59df1bd0": {
    "command": "check_vedge_ovs.py",
    "handlers": [
      "default",
      "file",
      "osdna-monitor"
    ],
    "interval": 15,
    "standalone": true,
    "subscribers": [
      "base"
    ],
    "type": "metric"
  }

```



```

    },
    "vservice_qdhcp-6c5ddc76-fcd7-4bdd-bff4-1d08b88b96ca": {
      "command": "PYTHONPATH=/etc/sensu/plugins check_vservice.py
dhcp qdhcp-6c5ddc76-fcd7-4bdd-bff4-1d08b88b96ca",
      "handlers": [
        "default",
        "file",
        "osdna-monitor"
      ],
      "interval": 15,
      "standalone": true,
      "subscribers": [
        "base"
      ],
      "type": "metric"
    },
    "vservice_qdhcp-721f9c95-3042-4840-b8a4-83968c1e92b6": {
      "command": "PYTHONPATH=/etc/sensu/plugins check_vservice.py
dhcp qdhcp-721f9c95-3042-4840-b8a4-83968c1e92b6",
      "handlers": [
        "default",
        "file",
        "osdna-monitor"
      ],
      "interval": 15,
      "standalone": true,
      "subscribers": [
        "base"
      ],
      "type": "metric"
    },
    "vservice_qdhcp-cc7ea40b-bb11-4b51-8e51-1a3b7abd283d": {
      "command": "PYTHONPATH=/etc/sensu/plugins check_vservice.py
dhcp qdhcp-cc7ea40b-bb11-4b51-8e51-1a3b7abd283d",
      "handlers": [
        "default",
        "file",
        "osdna-monitor"
      ],
      "interval": 15,
      "standalone": true,
      "subscribers": [
        "base"
      ],
      "type": "metric"
    },
  },

```

```

    "vservice_qrouter-1833846f-573e-45ef-8c87-3f7df530cddb": {
      "command": "PYTHONPATH=/etc/sensu/plugins check_vservice.py
router qrouter-1833846f-573e-45ef-8c87-3f7df530cddb",
      "handlers": [
        "default",
        "file",
        "osdna-monitor"
      ],
      "interval": 15,
      "standalone": true,
      "subscribers": [
        "base"
      ],
      "type": "metric"
    }
  },
  "client": {
    "address": "Mirantis-Liberty-node-6.cisco.com",
    "environment": "Mirantis-Liberty",
    "name": "Mirantis-Liberty-node-6.cisco.com",
    "subscriptions": []
  }
}

```

All sensu configuration files, keys and scripts are eventually deployed, both on clients and on server side at the following locations:

SSL keys: /etc/sensu/ssl

Calipso monitoring checks: /etc/sensu/plugins

Configuration files: /etc/sensu/conf.d

The calipso-scan container is in-charge of the actual deployment (in case environment_config is configured with needed details and “provision” = “Deploy).

Calipso-scan then uses the calipso-sensu as the target “sensu server” to deploy and all the environment pre-discovered hosts as “sensu clients” to deploy, all pointing their monitoring results back to the calipso-sensu container.

Calipso-scan uses ssh to access all hosts (through the master-host, see admin-guide) and also to access calipso-sensu container on port 20022 to upload all customized files and places them in the above locations.

2.2 Calipso Apex monitoring integration

For OPNFV version 'P' of the calipso application, farther automation has been developed for 'zero touch' automation. Calipso has a built-in 'apex-configurator' that runs at apex install phase (current scenario: os-nosdn-calipso-noha) and deploys the sensu clients themselves with all needed configurations, per apex install parameters and customizes the calipso-sensu container accordingly...no manual UI or API steps are needed for end-to-end functionality.