The decision module actually contains the r-SYBL TUW tool for elasticity control.

1. R-SYBL System Configuration

1.1 Monitoring Plugin Configuration

Ganglia Plugin

For working with simple ganglia plugin some information has to be specified:

1. The ganglia plugin class needs to be specified in the config file (MonitoringPlugin = at.ac.tuwien.dsg.sybl.monitorandenforcement.monitoringPlugins.gangliaMonitoring.MonitoringGangliaAPI)
2. Ganglia IP needs to be specified in the config file
3. Ganglia Port needs to be specified in the config file

MELA Plugin

1. The main plugin class implementing MonitoringInterface needs to be specified in the config file of the MonitoringAndEnforcement Service (MonitoringPlugin = at.ac.tuwien.dsg.mela.apis.javaAPI.MELA_API)
2. ACCESS_MACHINE_IP needs to be specified (a machine having ganglia installed with the same port as the rest of the application)
3. GANGLIA_PORT needs to be specified

1.2 Enforcement Plugin Configuration

The **OpenStack plugin** class needs to be specified in the config file (EnforcementPlugin = at.ac.tuwien.dsg.sybl.monitorandenforcement.enforcementPlugins.openstack.EnforcementOpenstackAPI)

Some basic information need to be specified for being able to connect to the cloud for enforcing actions:

1. The name of the certificate used - CertificateName
2. The path towards the certificate - CertificatePath
3. Type of the cloud middleware used - CloudAPIType (in this case openstack-nova)
4. Endpoint for accessing the cloud infrastructure - CloudAPIEndpoint (in this case DSG local cloud http://openstack.infosys.tuwien.ac.at:5000/v2.0)
5. Username for accessing cloud infrastructure - CloudUser
6. Password for accessing cloud infrastructure – CloudPassword

2. Application Specific Configurations

2.1 The cloud service needs to be described, for now following the structure in the *serviceDescription.xml*(\analysis-engine\src\main\resources\config) example based on service units and service topologies.

2.2 SYBL supports elasticity requirements specified either through XML descriptions.

Elasticity requirements can be specified in an XML either separately (see *ElasticityRequirementsSpecification.xml* from analysisEngine\src\main\resources) or integrated in the service description file (as for the *serviceDescription.xml*). If specified in separate XML description file, this needs to be stated in the config file of the Control Service (SYBLDirectives = ./config/ElasticityRequirementsSpecification.xml).

2.3 For enforcement configuration, the following steps need to be followed:

a) The deployment description path (association between service units and snapshots, for being able to scale out when necessary) - DeploymentDescriptionPath (e.g. config/deploymentDescription.xml)
b) The machine which is the access machine, on which some elasticity scripts have to be run (i.e. decomissioning cassandra node) - AccessIP - in the case the Monitoring and Enforcement service is deployed on the access machine, the value equals localhost

3 Development Guide

For customizing r-SYBL in what Monitoring and Enforcement is concerned, the following steps need to be followed.

For creating new plugins, an API of the plugin needs to implement the MonitoringInterface and respectively EnforcementInterface. The basic metrics and actions appear by name, while the ones which are specific to the applications/plugins are to be interfaced through getMetric and enforceAction actions.

Moreover, the needed configuration data needs to be added and processed from the config file of the Analysis Engine, which is the main module of rSYBL tool.

After adding new plugins, the rSYBL tool needs to be recompiled and re-deployed.