PHEMI-Semios Architecture Integration Guide

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Introduction

Introduction to Semios Integration Architecture Guide

This document specifies the high level architecture for Semios system integration with PHEMI Central. It describes the Semios - PHEMI Central system integration points and their use, and the deployment and configuration of PHEMI Central for Semios.

M2M integration with PHEMI Central is achieved with the PHEMI REST interface, which is also used internally by PHEMI Central's Web and Command Line interfaces. The PHEMI REST interface provides the capability to write data into the system (ingest) and read data from the system (query).

The Semios system uses PHEMI Central in a headless configuration utilizing the PHEMI REST interface. Semios raw sensor data is ingested into the system using this interface. Queries are conducted on Semios raw and derived data (e.g. sensor aggregation) using the same interface. For example, the Semios App Server queries PHEMI Central to provide analytical information back to users to satisfy the Semios "Read Logs" and "Drill Down" use cases.

During ingestion the sensor data are stored, processed and aggregated. The parsing, processing and aggregation tasks are done by custom Data Processing Functions (DPFs). The resulting data structures support the following calculations at scale by providing appropriate sensor aggregations:

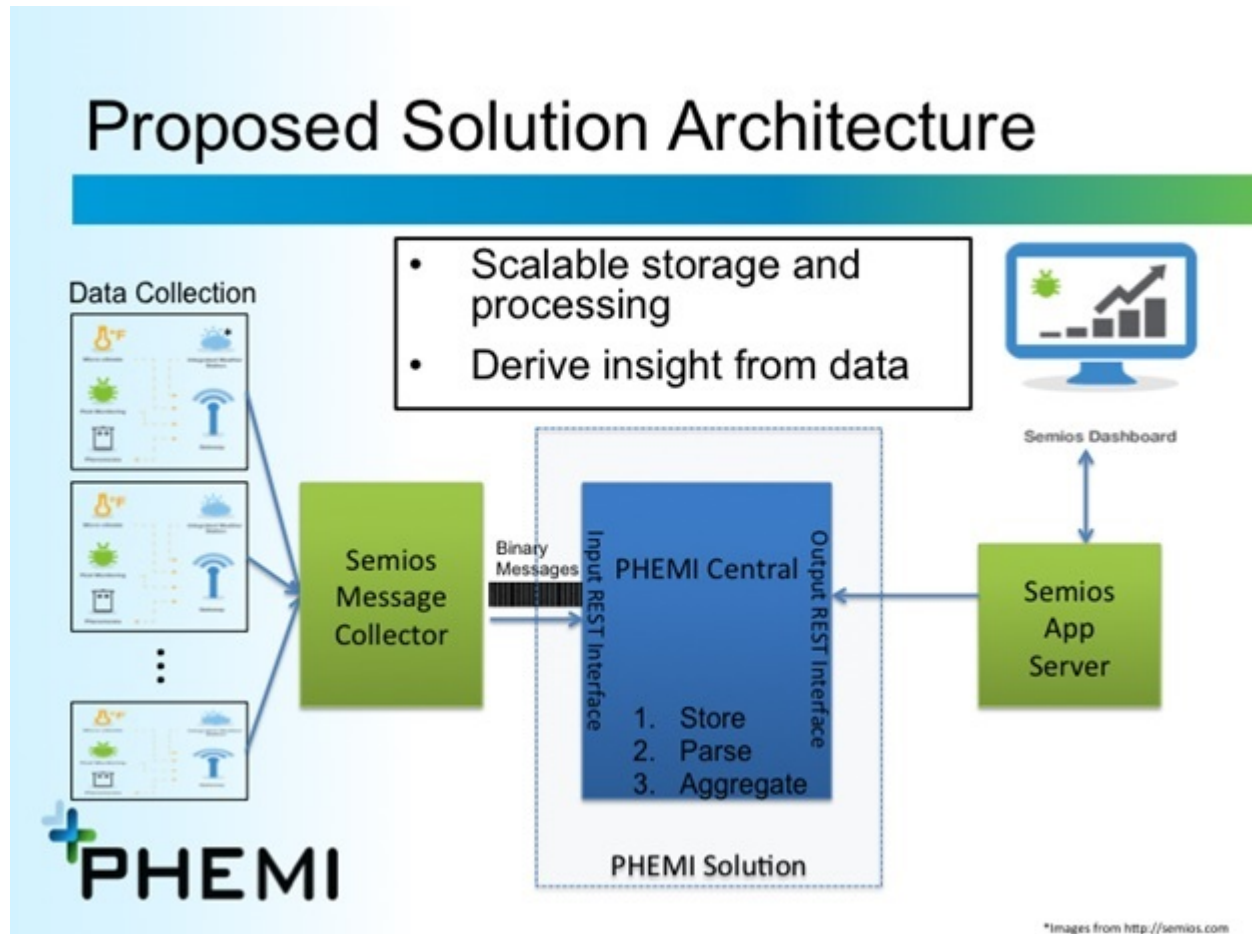- Degree Days
- Frost
- Fireblight

PHEMI Central provides efficient and scalable methods utilizing aggregations to calculate running averages, summations, minimums and maximums of the Semios data. To describe sets of aggregated data, sets are tagged with user defined labels, such as 'Block', 'Property' or 'Crop Type'. By using the aggregations, the task of calculating combinatory values is aided and accelerated by PHEMI Central, simplifying the Semios application.

The following diagram illustrates the high level architecture of the Semios-PHEMI integration. The flow of data between PHEMI Central and the Semios components is managed by the PHEMI REST interface.

Proposed Solution Architecture

Architcture, deployment, and infrastructure of proposed solution

The following diagram illustrates the high level architecture of the Semios-PHEMI integration.

This architecture is deployed with the following infrastructure details

PHEMI Agile Deployment

Semios Message Collector

Semios App Server

pr1semiosbox0
Frontend Server
NGINX
Tornado
PHEMI Agile
pyAccumulo

MongoDB
2 CPU / 7.5GB

Host: ec2-54.185.161.218.us-west-2.compute.amazonaws.com
URI: http://54.185.161.218:80
User: admin

pr1semiosbox3
ZooKeeper
DataNode
NodeManager

Acc. Tablet Server

2 CPU / 7.5GB

pr1semiosbox2
ZooKeeper
DataNode
NodeManager
ResourceManager
JobHistory

Acc. Tablet Server

2 CPU / 7.5GB

pr1semiosbox1
NameNode
SecondaryNameNode
ZooKeeper
DataNode
NodeManager

Acc. Tablet Server
Acc. GC
Acc. Master
Acc. Monitor
Acc. Tracer
Acc. Proxy

Raindrop
Thrift
Hive
2 CPU / 7.5GB