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Making Monasca Monitor More:

Extending Monasca's Data Gathering & Reporting Capabilities

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Who we are

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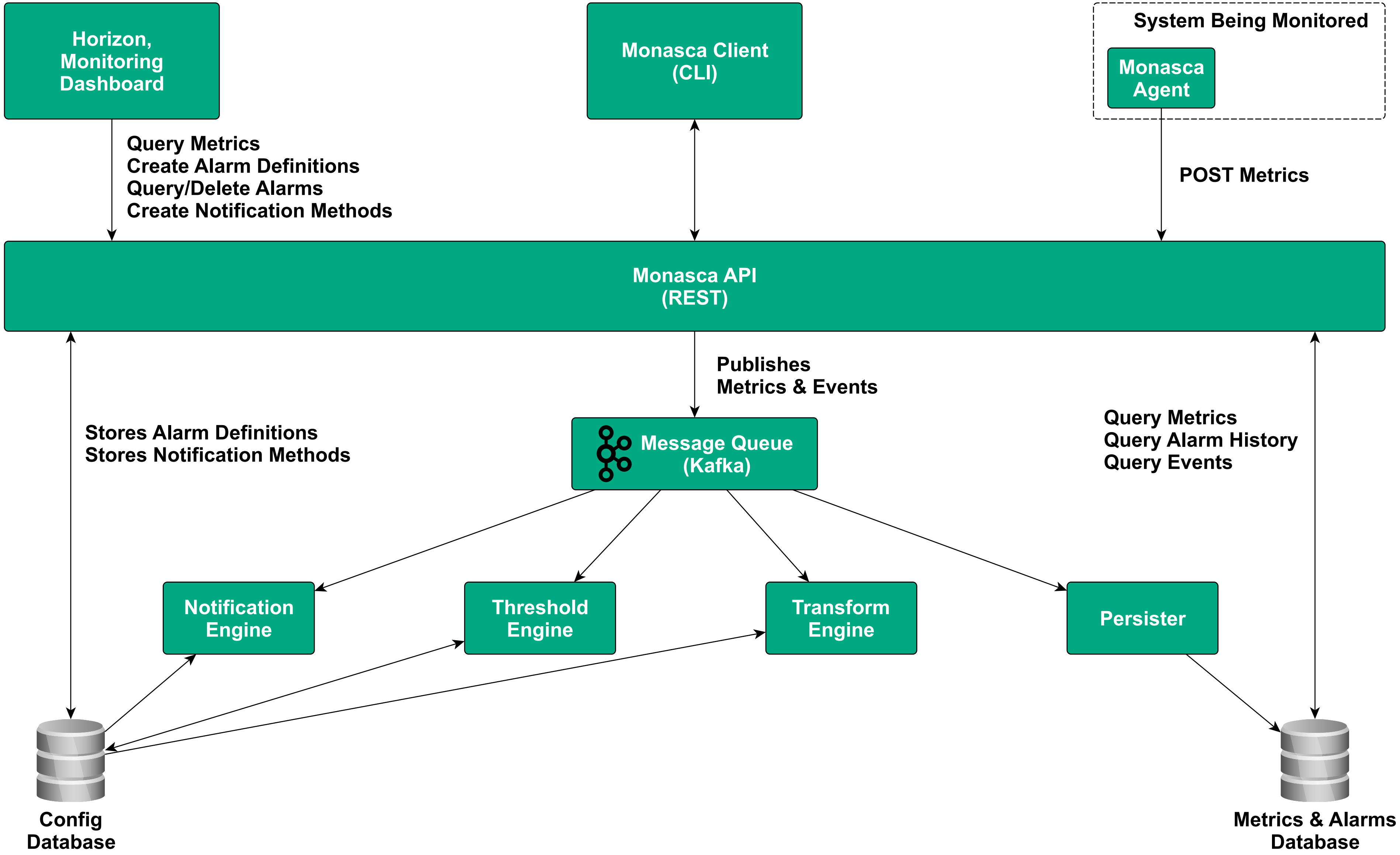
What is Monasca?

- Monasca is a “…high-performance, scalable, fault-tolerant and extensible monitoring system based on a micro-services bus architecture”
- Read all about it at http://monasca.io/
- If you have time, please complete the Monasca team’s survey at https://goo.gl/1smB6i - it’d help a lot!

What is Monasca?



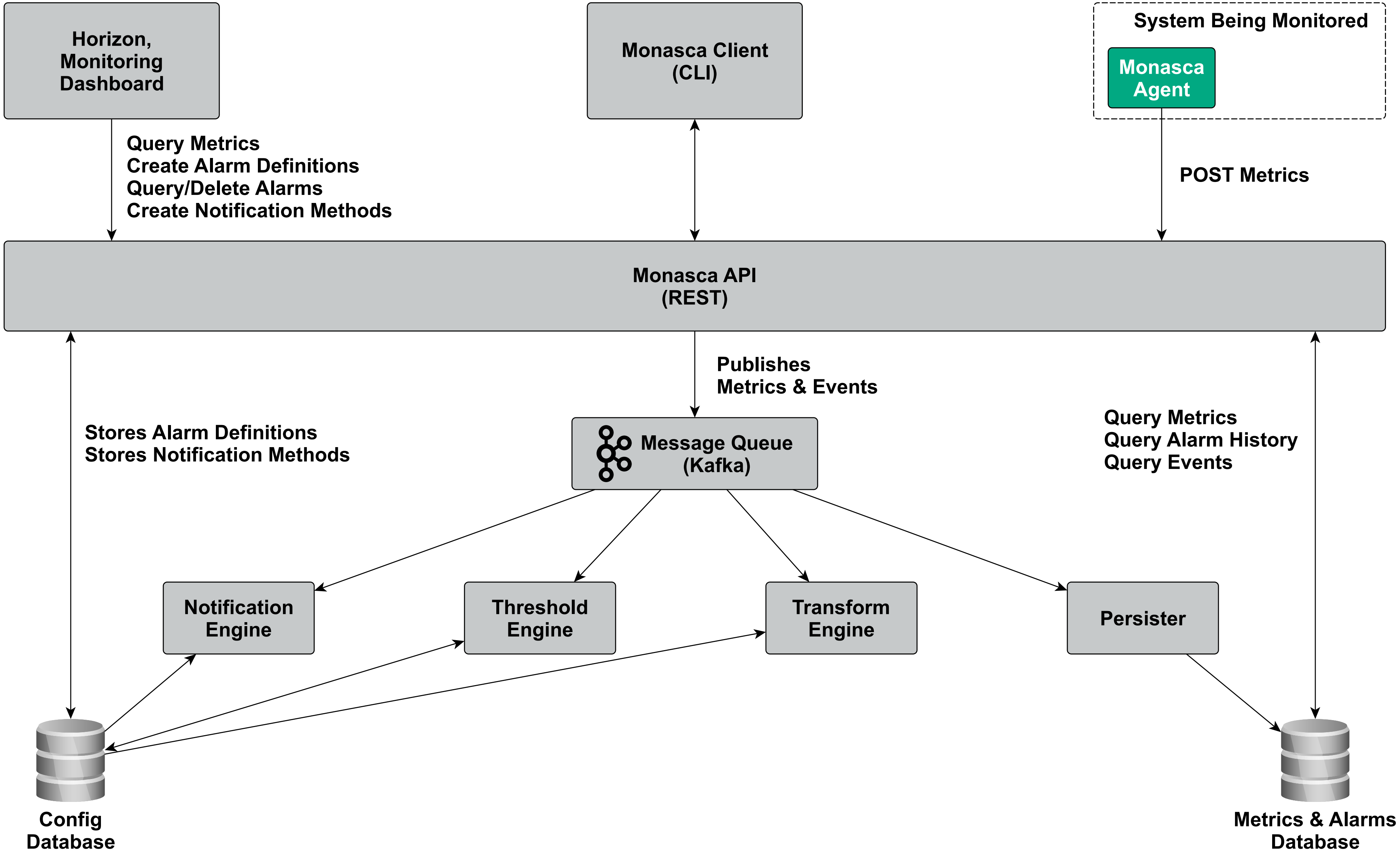
Monasca Terminology

- Metric – An attribute or property that we want to monitor
- Dimension – A property of a metric that helps define what it applies to, e.g. hostname, role, etc.
- Event – either:
  - An OpenStack event that Monasca consumes, or
  - What is raised when an alarm is triggered
- Measurement - an individual value for a metric – i.e. the state of that metric at a specific time
- Alarm definition
  - The rules that define when an alarm should be triggered
  - What should happen when it is triggered, i.e. what gets notified
- Alarm state
  - Several possible states – ALARM, OK, UNDETERMINED
- Notification Method - A mechanism that can inform something outside Monasca that an alarm triggered.

Customer Requirements

- Monitor storage clusters that were acting as Cinder back-ends
- Integrate Monasca alarms with their existing alerting system
  - Alerting system accepted input in the form of SNMP traps
- Generate reports about the status of their OpenStack cloud
- Integrate Monasca into their existing Nagios monitoring system

Monitoring Storage with Monasca



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Monitoring Storage with Monasca

- **Tasks at hand:**
  - Determine what data needed to be collected
  - Find out how to access that data
  - Store that data in Monasca in the form of Metrics
- **Monasca uses an agent for monitoring**
  - We can extend that agent with **plugins**

Monasca Agent

- **Installed on every node that needs to monitor (or be monitored)**
- **Collects data from:**
  - `statsd` interface to various applications
  - Checks
- **Checks are just plugins**
  - Many included out of the box
  - Custom checks can be added

Monasca Agent Plugins

- **Types:**
  - **Detection:** detects, configures and activates check plugins
  - **Check**: perform checks on other applications, servers, or services
- **How they are run:**
  - **Detection**
    - When Monasca Agent starts up
    - When Monasca Agent is reconfigured (using `monasca-setup)`, or…
    - When explicitly invoked by `monasca-setup` (using `-d <plugin name>`)
  - **Check:** On a regular schedule, configurable for each plugin

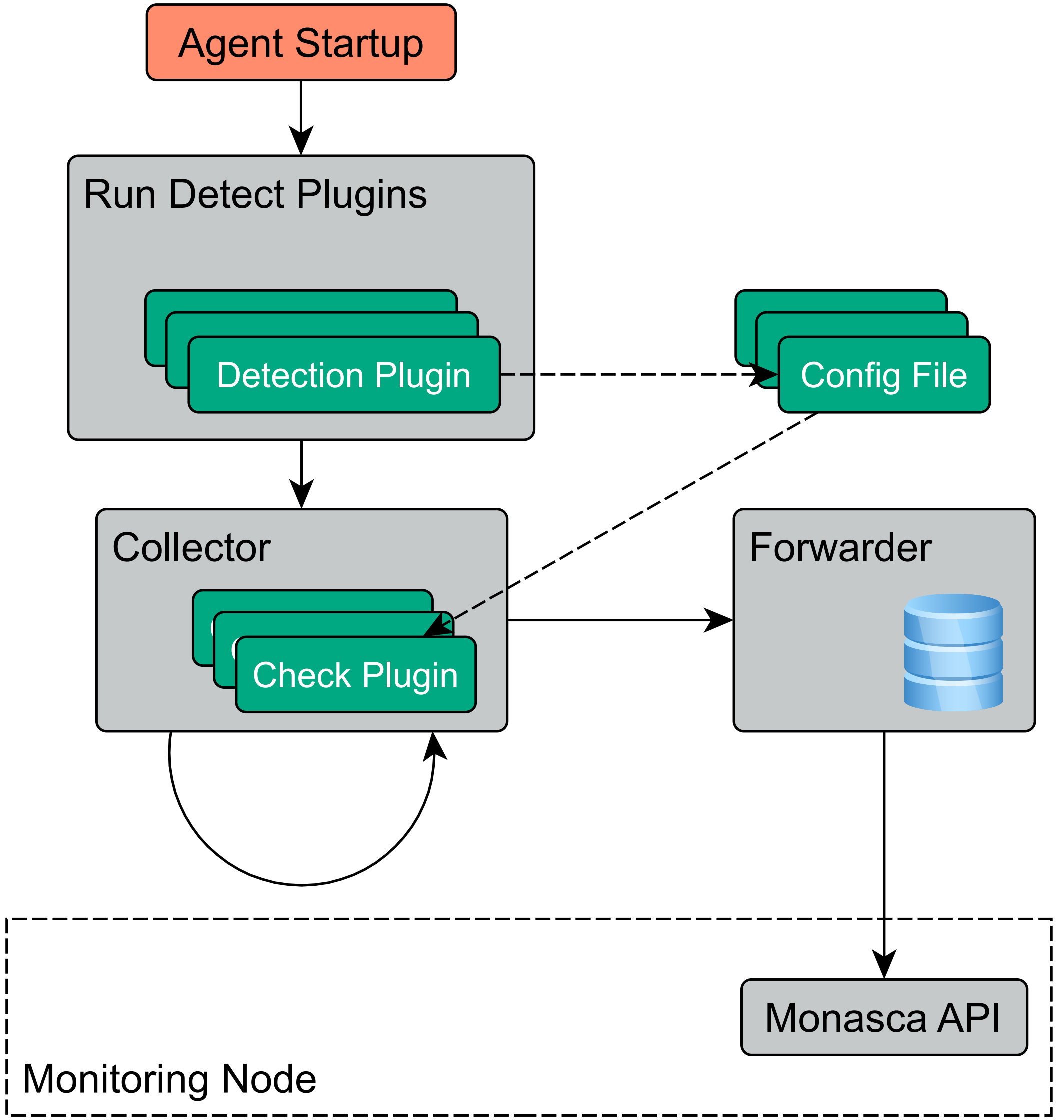
Our Solution

- **Our storage cluster (HPE VSA StoreVirtual) featured two APIs**
  - HTTP REST
  - Command-line via SSH with XML output
- **Each API provides only a subset of the required data**
  - REST API fast but lacking performance data
  - Command line interface (SAN/iQ) can produce performance data, but task is resource intensive
- **Solution: Use both = two check plugins, one per API**
  - Plugins can be run at different intervals for flexible configuration
- **One “master” source of config data to set up both checks:**
  - A list of clusters to monitor (“instances”)
  - Credentials for each one
- **Single detection plugin creates configuration files for both check plugins**

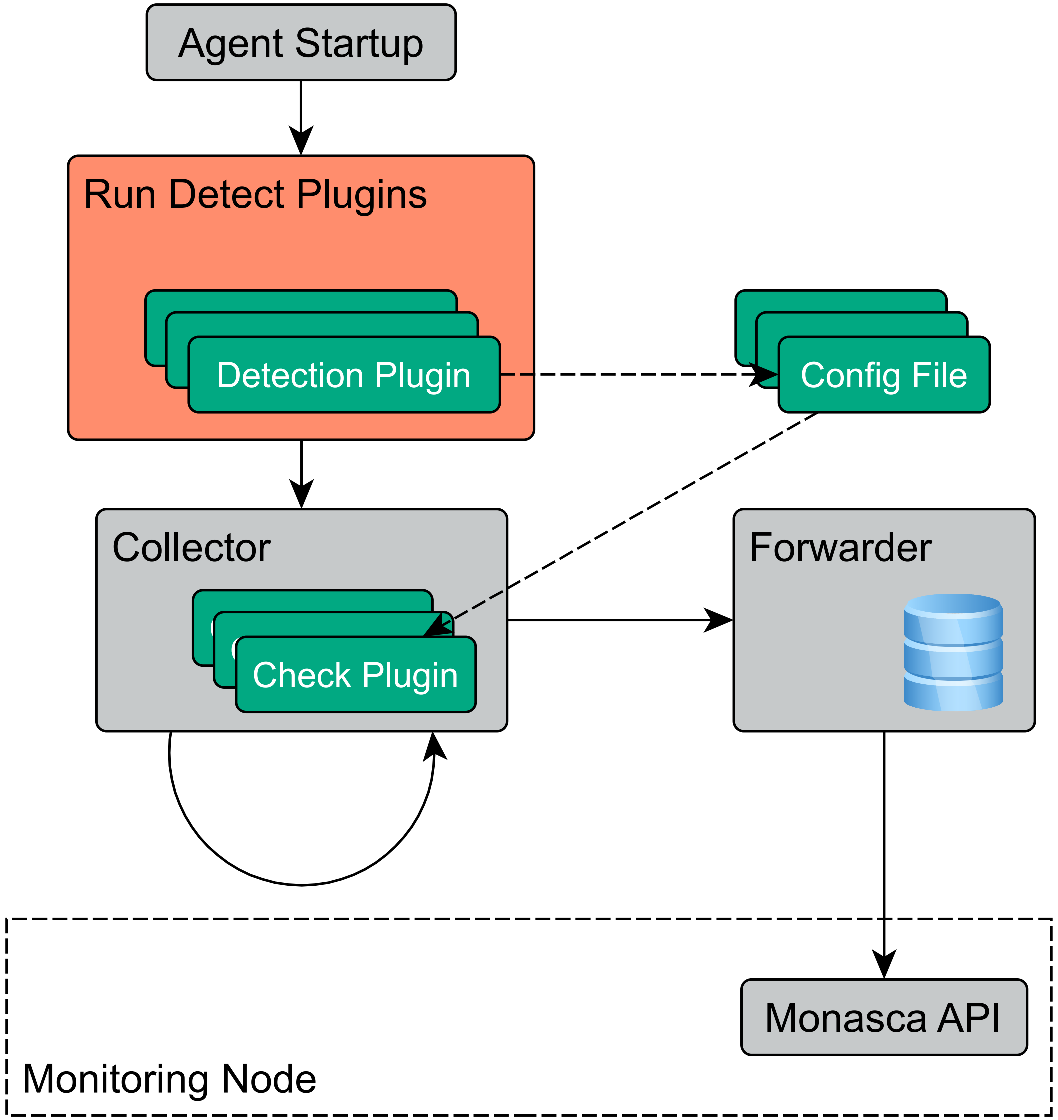
Our Solution

- **Normally, Monasca Agent monitors locally – the node it lives on**
  - In this case, we are checking a remote system, so have two points of failure
- **Run multiple instances for redundancy**
  - Checks are resource intensive, so elect one node to run checks at any given time
  - (Slight cheat...) Only run if ZooKeeper on same node is “leader” (not “follower”)
  - To Do – replace ZooKeeper dependency with own election process
- **Tune configuration to balance appliance load from monitoring against frequency of measurement**

How Monasca Agent Plugins Run



How Monasca Agent Plugins Run



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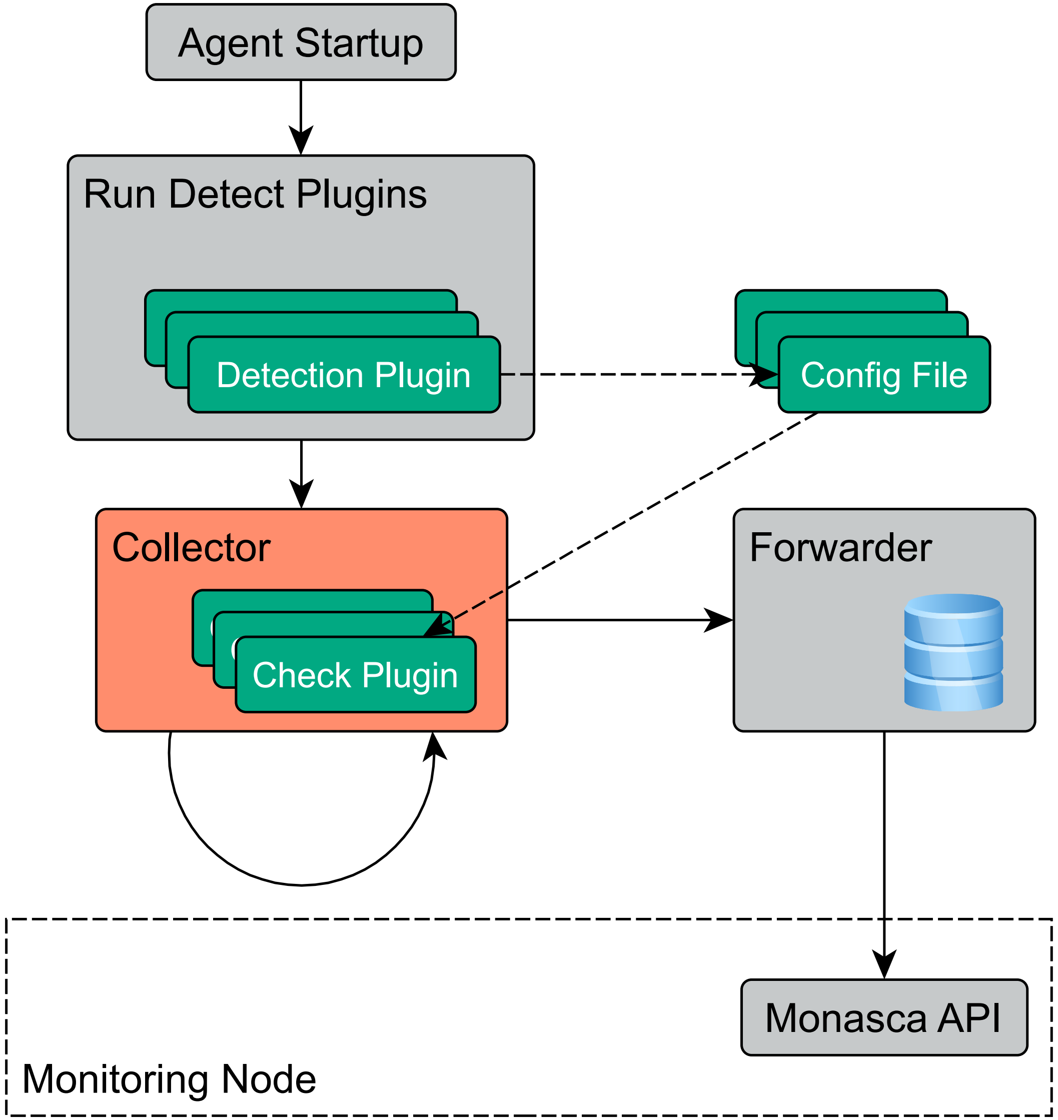

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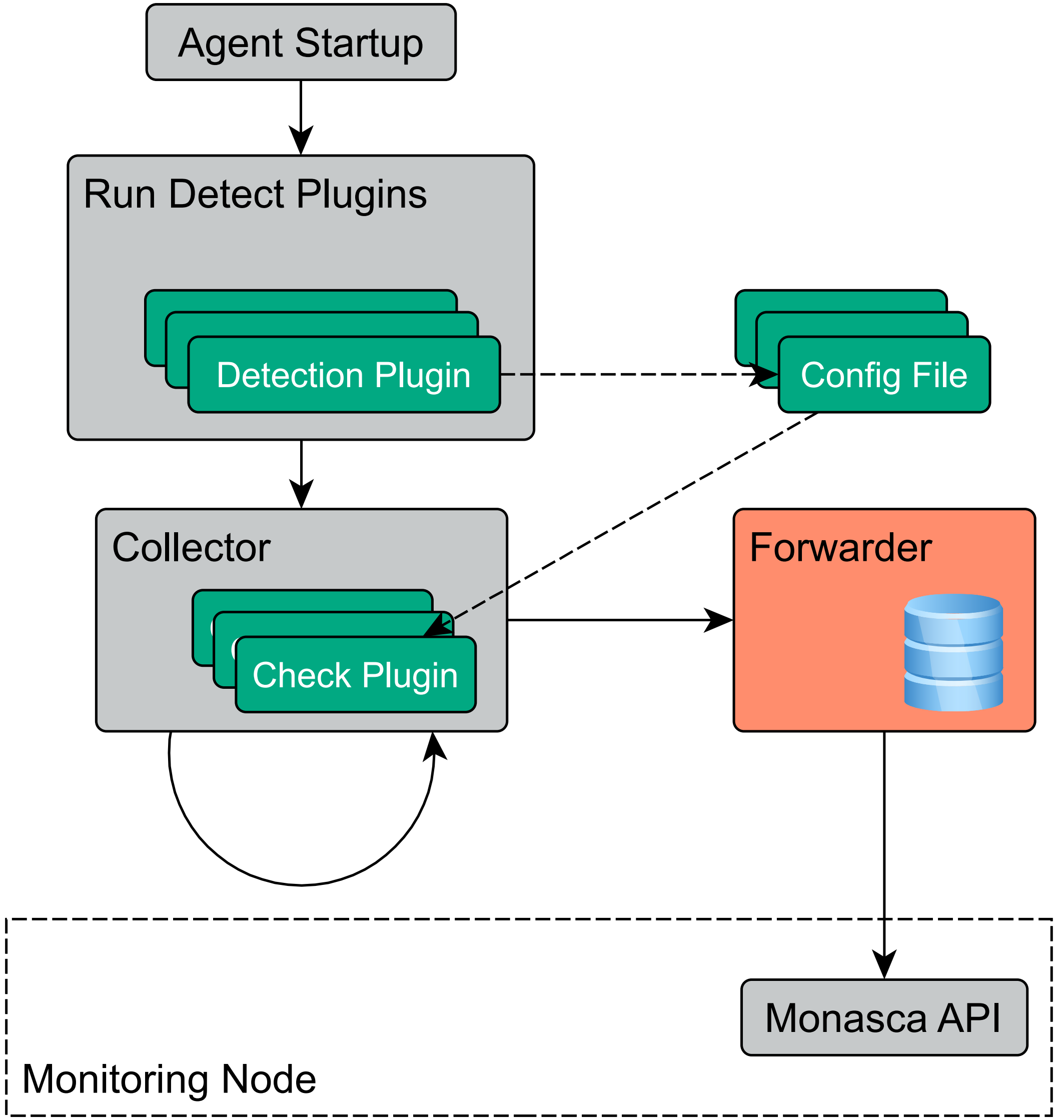

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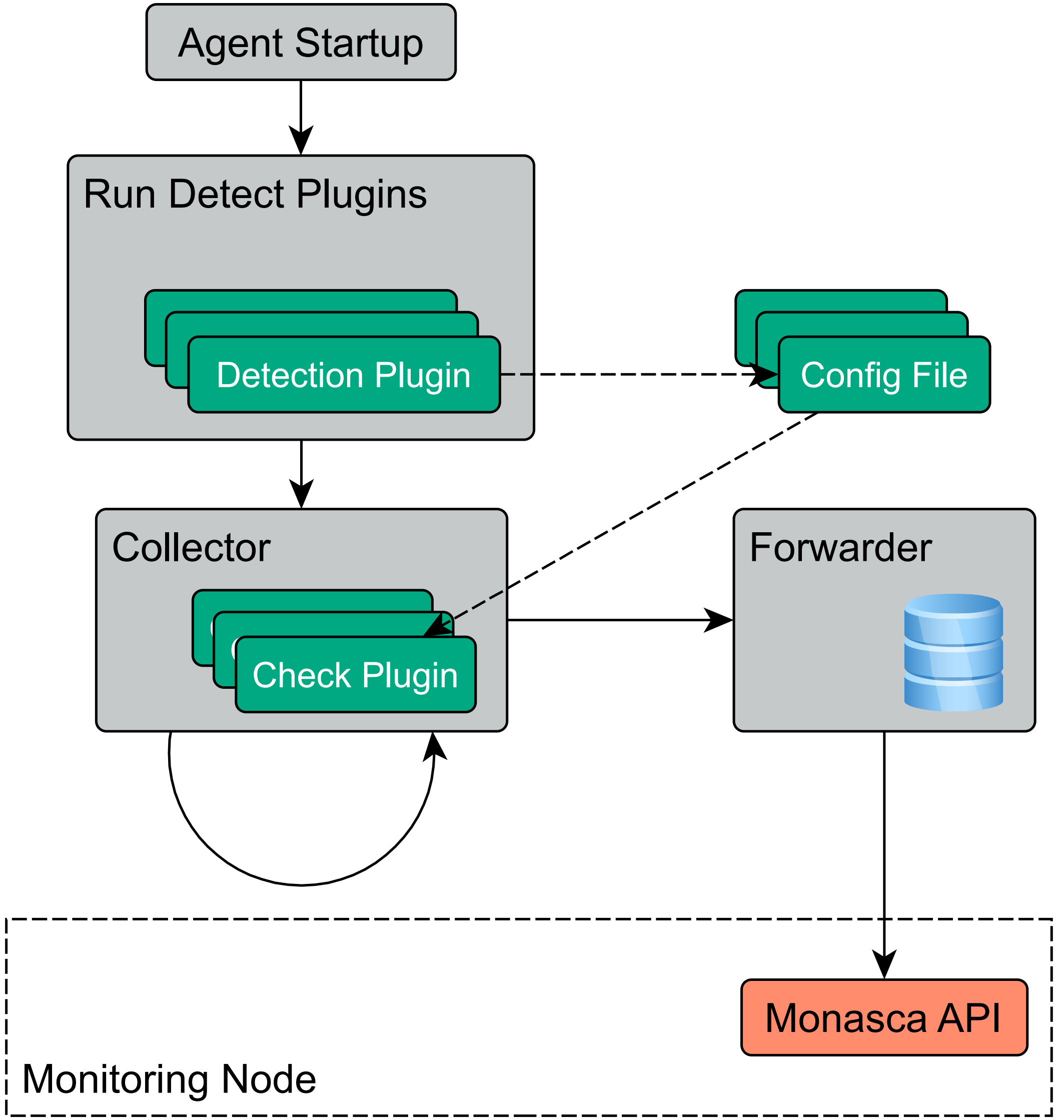

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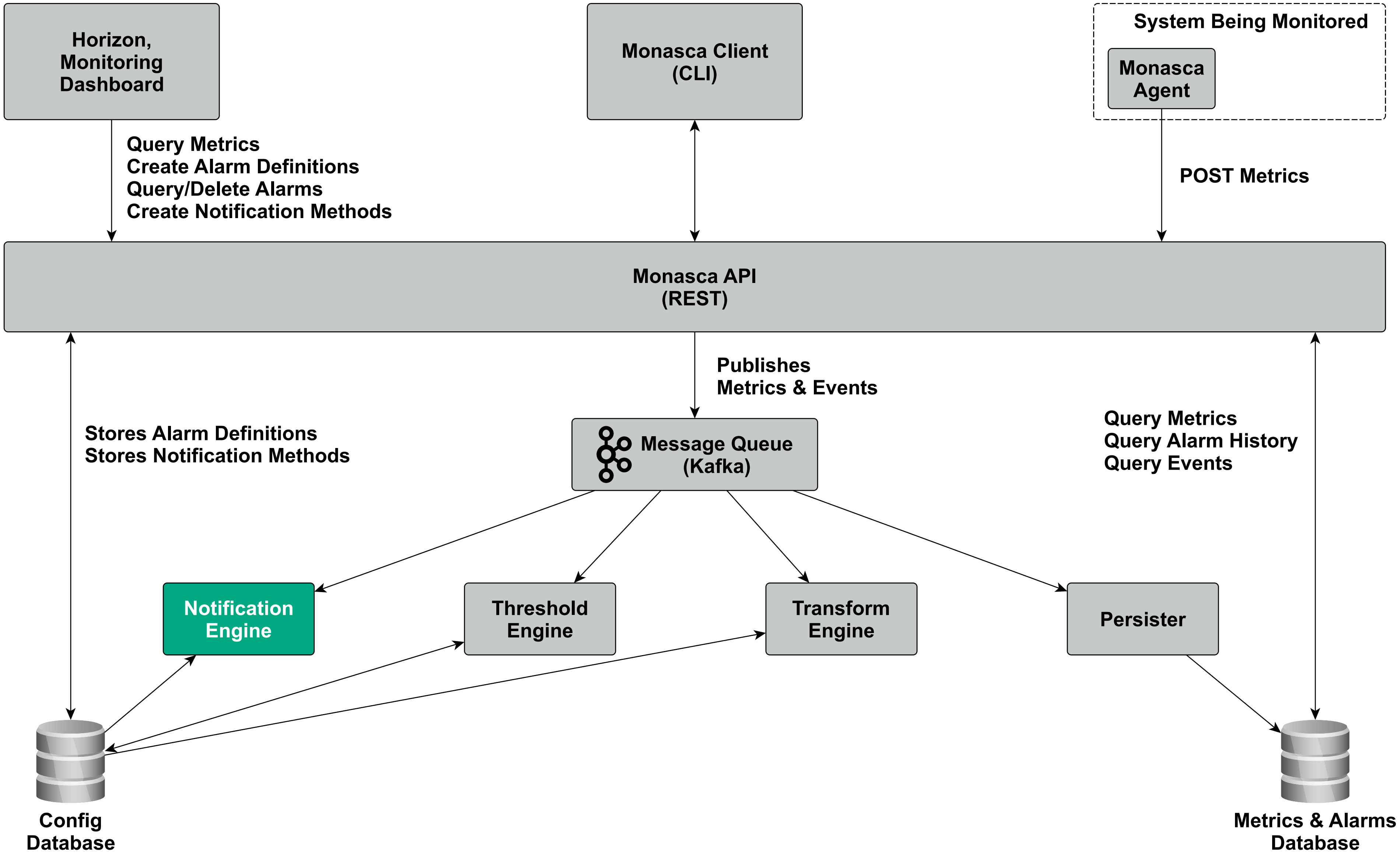
Monasca Agent File Locations

- **`/etc/monasca/agent` – Agent files**
  - `(…)/agent.conf` – Master configuration file for the agent.
  - `(…)/conf.d` – Config files for check plugins
    Each file is matched to a check plugin of the same name
- **`/usr/lib/monasca/agent/` - Plugin files**
  - `(…)/custom_checks.d` – Custom check plugins
  - `(…)/custom_detect.d` – Custom detection plugins

Plugin Config File Structure

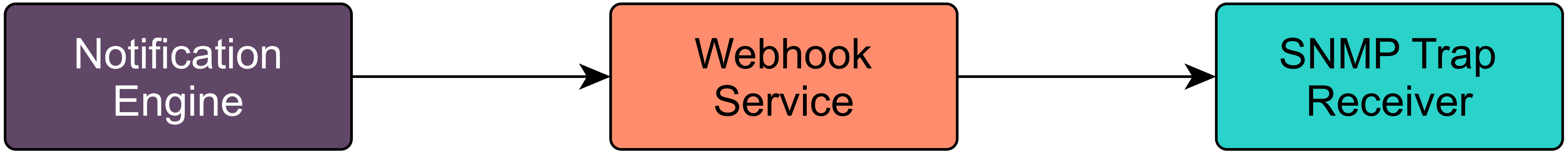
- **YAML, two main sections:**
  - `init-config` – used to inform Monasca Agent how to run the plugin. Important settings:
    - `check_frequency` – how often to run the check (sec)
    - `collect_period` – how often to send (buffered) data back to Monasca (sec)
  - `instances` – the items to check
    - Each must include all required data as key/value pairs, e.g. paths, login credentials, etc.

Monasca Notification Forwarding

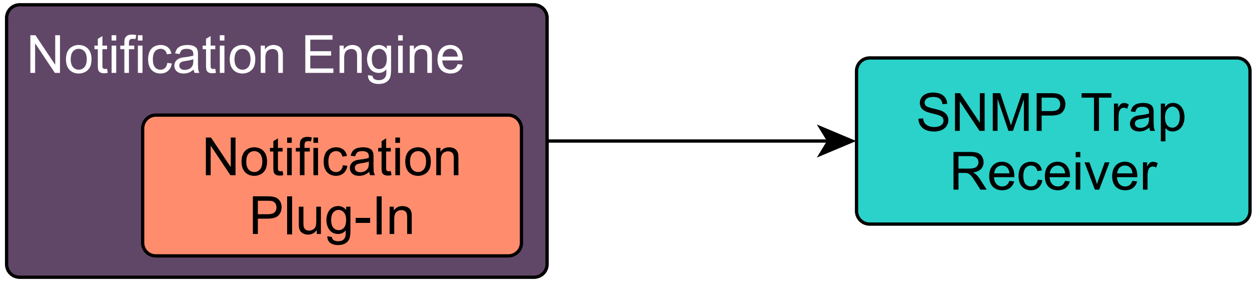


Monasca Notification Forwarding

– **The old way:**



– **The new way:**



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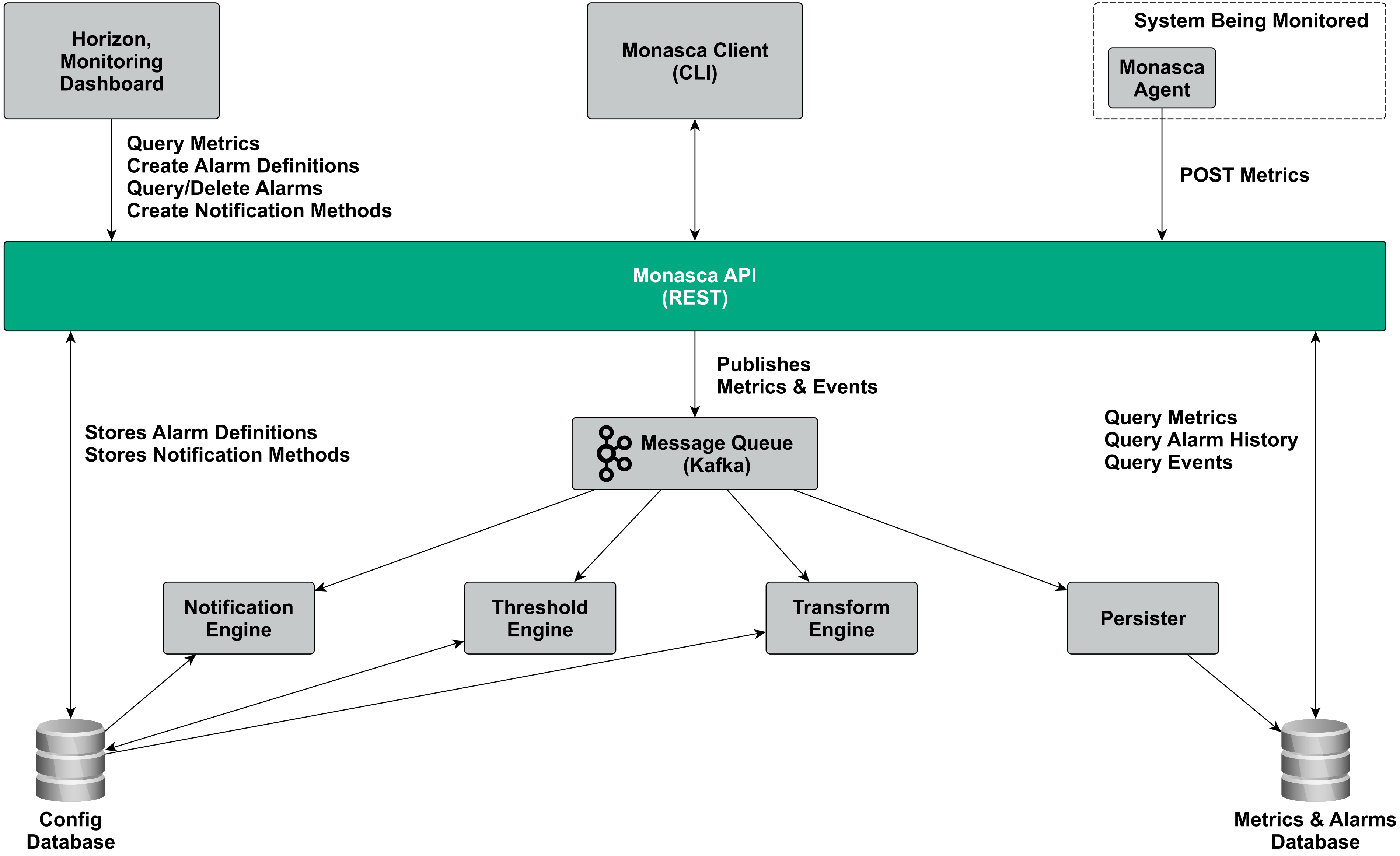
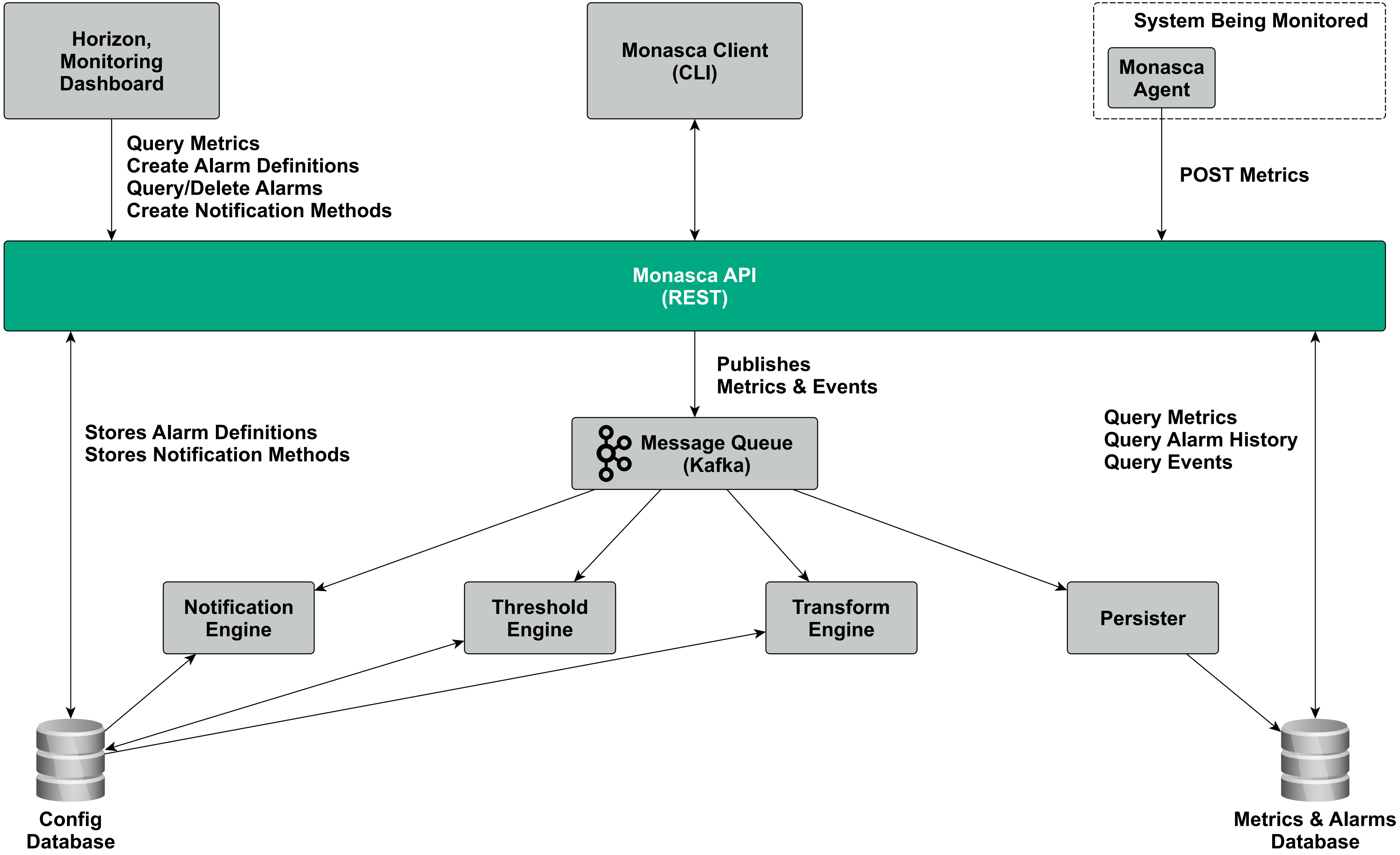
Reporting from Monasca



Reporting from Monasca

- **Get input from user:**
  - Start date
  - End date
  - Data to collect
- **Access measurements via API**
- **Collect data into temporary storage**
- **Render data as a PDF**

Integrating with Nagios



Integrating with Nagios

- **Nagios (and its clones) get data by running scripts that output data**
- **We have two ways to interact with Monasca API:**
  - Using the Python `monasca-client`
  - Accessing the REST API endpoints and interpreting the JSON results
- Monasca client package does all of the hard work for you
- Using the OpenStack REST APIs directly means you have to do all the work:
  - Managing Keystone tokens
  - Building API requests and parsing the results

Summary – Why is this Useful?

- **Agent Plugins**
  - Enable monitoring of items that Monasca can’t (yet)
- **Forwarder / Notification System**
  - If you need to hook Monasca (or just specific alarms) up to an external monitoring service
- **Reporting**
  - To generate reports <u>directly</u> from your monitoring system
- **Nagios Integration**
  - Export Monasca data to existing customer monitoring solution(s)

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Q & A