Using Zabbix in Cloud Analytics Hosting

Zabbix at SAS Solutions OnDemand
Overview

• What is SAS Solutions OnDemand
• Meeting Enterprise Business Needs
• Large Scale User Support
• Integrating with SSOD’s Systems
• Extending Zabbix
What is SAS Solutions OnDemand
SAS Solutions OnDemand is the division of the SAS Institute that is responsible for delivering and supporting the SAS Cloud Analytics offerings.

- Results as a Service
- Software as a Service
- Remote Managed Software & Services
- Hosted Managed Services
What is SAS Solutions OnDemand

What does this mean for Zabbix?

- 4000+ Monitored Hosts
- 900+ Host Groups
- 500000+ Monitored Items
- 270000+ Enabled Event Triggers
- 1100+ Users
- 30+ Zabbix Proxies
Meeting Enterprise Business Needs
Meeting Enterprise Business Needs

Enterprise Business Requirements

• High Availability
• High Data Volume
• High User Count
• Robust Multitenancy Support
• Multiple Datacenters
Meeting Enterprise Business Needs

Enterprise Architecture

- Dedicated Server for each role
- Warm backup servers for all key systems
- Run web UI on nginx
- Use Postgres as enterprise DB
- Off load all direct monitoring to Proxies

Zabbix Web

Zabbix Server

Zabbix Proxy

Zabbix Database

Zabbix UI
Web UI Specifics

- Utilize nginx on a midtier virtual machine
  - 16 Cores
  - 256 GB Memory
- Run all traffic via a load balancer so capacity can be expanded as needed
- Run additional Zabbix Web UI on the Zabbix Server
  - No external access
  - No load balanced web traffic
  - Used for automation and admin access during midtier outages
Meeting Enterprise Business Needs

Enterprise Database

- Utilize Postgres on a dedicated virtual machine
  - 16 Cores
  - 256 GB Memory
  - 2 TB of data space
- Live data feed to backup database server
- All read only data interactions by external systems pointed at backup database where possible
- Migrating to Oracle for improved performance and support
  - Hosted on Exadata appliance dedicated to leveraged services such as Zabbix
Meeting Enterprise Business Needs

Zabbix Servers
• Dedicated virtual machine
  • 4 Cores
  • 8 GB Memory

Zabbix Proxies
• Dedicated virtual machine
  • 4 Cores
  • 8 GB Memory
Distributed Data Center Support

• SAS Data Centers
• Co-located Data Centers
• Customer Data Centers

Zabbix Solution

• NAT IP to Zabbix Server
• Firewall only requires 10051 one direction
Large Scale User Support
Requirements for Users

• All SSOD Employees must be able to see the information for all production systems

• Self Service must be available for basic monitoring changes

• SAS Application Administration and Database Administration teams must be able to accomplish tasks without assistance

• Existing controls and processes must be used to grant all access

• Customer users must only be able to see information for their own environments

• Users must be authenticated by the SSOD LDAP
Large Scale User Support

Design for Users

• Use native Zabbix LDAP support for authentication

• Synchronize membership in selected AD user groups to Zabbix via the Zabbix API
  • Global groups are explicitly identified
  • Project specific groups are named in a fixed pattern
  • Users’ user type must be updated to match highest privilege
  • Users and their media are created to match LDAP

• Grant appropriate user group access to all new host groups via API automation

• Modify ‘IT Services’ monitoring page as well as Macro API Code to filter content
Large Scale User Support

State at a Glance for Internal Users Only

- Synthetic Transaction system built to test all customer-facing endpoints and display their state.
Integration with SSOD’s Systems
Integration with SSOD’s Systems

Key Integration Points

• Alerting (JIRA, PERC)
• IT Host Auto Deploy
• Agent Modules for SAS Internal Metrics
• Amazon Web Services
• Batch Monitoring
**Alerting**

- **External alert scripts utilized**
  - Tokenized parameters added to the start of the message body to pass additional needed fields
  - Alert scripts coded with default values to use in fields were missing/incorrect
  - Zabbix Log monitoring of the alert script logs to notify Zabbix Admins of any issues
IT Host Auto Deploy

- API Script Inputs: Hostname, Project, Category, OS, and Label (optional)
  - Creates Host, with label if given
  - Applies the appropriate OS template
  - Adds host to the host group “Project (Category)”
  - Creates the host group ”Project (Category)” if needed
    - Grants global user groups the appropriate permissions
    - Grants project specific user groups appropriate permissions
    - Creates project specific user groups if needed
Integration with SSOD’s Systems

Agent Modules for SAS Internal Metrics

• Loadable agent modules for accessing SAS internal metrics such as queue length and user counts

• User parameters for simple system commands

<table>
<thead>
<tr>
<th>Name</th>
<th>Interval</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>SAS Setinit Raw Output (SAS Deployment)</td>
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<td>Zabbix agent</td>
</tr>
<tr>
<td>Days until end of nearest SAS License grace period (SAS Deployment)</td>
<td></td>
<td>Zabbix trapper</td>
</tr>
<tr>
<td>Days until nearest SAS Drop Dead Date (SAS Deployment)</td>
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<td>Overall State of SAS Product Licenses (SAS Deployment)</td>
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<tr>
<td>Days until end of nearest SAS License valid period (SAS Deployment)</td>
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Amazon Web Services

- Use Cloud watch to pull metrics
  - Pull metrics from AWS and add to Zabbix using low level discovery on the AWS host
  - Sender based LLD key allows external script to determine what is present in AWS and send in the metrics at the same time

- Lambda functions to handle auto scaling
- Create hosts in Zabbix for Redshift and other AWS serverless components
Batch Monitoring

• Simple wrapper scripts is used at the start and stop of batch
  • Can be used for an entire schedule with one start and stop, or a start and stop of each step.

• Low Level Discovery allows multiple work streams to have their batch tracked separately

• Allows Zabbix to alert for the various stages of batch

• Batch running state can be used as a dependent trigger or an event to start other types of monitoring
Extending Zabbix
Extending Zabbix

Extensions to Zabbix in SSOD

• Visual Analytics Service Level Agreement Dashboard
• Customer Data Feeds
• Analytical Systems
• SAS Synthetic Transactions Monitoring System
Extending Zabbix

Visual Analytics Service Level Agreement Dashboard

- Extracts data from Zabbix daily
- Defines each Service Level Agreement based on the Zabbix IT Service definition
- Pulls key metrics from Zabbix history tables to present to customers
- Merges IT Service downtime with Maintenance definitions to differentiate outages from maintenance
- Allows override of observed state in a SAS Stored Procedure for corrections, but records the correction and displays to all users
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<th>Timestamp</th>
<th>Value</th>
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<tbody>
<tr>
<td></td>
<td>The SAS System 21:09 Saturday, July 15, 2017</td>
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Original site validation data
Current version: 9.4.0.01M83082410
Site name: "SGOD VISUAL ANALYTICS PERFORMANCE PORTAL"
Site number: 70178823.
Expiration: 30JAN2018.
Grace Period: 45 days (ending 16MAR2018).
Warning Period: 30 days (ending 30APR2018).
System Birthday: 25DEC2016.
Operating System: LIN X64.
Product expiration dates:
---Base SAS Software 30JAN2018
---SAS/GRAPH 30JAN2018
---SAS/CONNECT 30JAN2018
---SAS Integration Technologies 30JAN2018
---SAS/Secure 168-bit 30JAN2018
---SAS Enterprise Guide 30JAN2018
---SAS/ACCESS Interface to Oracle 30JAN2018
---SAS/ACCESS Interface to PC Files 30JAN2018
---SAS Workspace Server for Local Access 30JAN2018
---SAS/ACCESS to Postgres 30JAN2018
---High Performance Suite 30JAN2018
---SAS Search and Indexing Server 30JAN2018
---SAS Web Crawler Server 30JAN2018
---SAS LASR Analytic Server 30JAN2018
---SAS Visual Analytics Hub 30JAN2018
---SAS Visual Analytics Services 30JAN2018
---Advanced Programming for LASR Analytic Server 30JAN2018
---High Performance Analytics Distributed Mode 30JAN2018
---SAS Visual Analytics Server Components 30JAN2018
---Visual Analytics Explorer 30JAN2018
### Batch Monitoring Low Level Discovery Items

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<th>Name</th>
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<th>Trends</th>
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<td>batch.delay_calc([#PROJECT])</td>
<td>30</td>
<td>90</td>
<td>365</td>
<td>Calculated</td>
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<td>Zabbix trigger</td>
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<td>Batch Name - (#PROJECT)</td>
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Zabbix IT Service Definition

VA SLA Dashboard