



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

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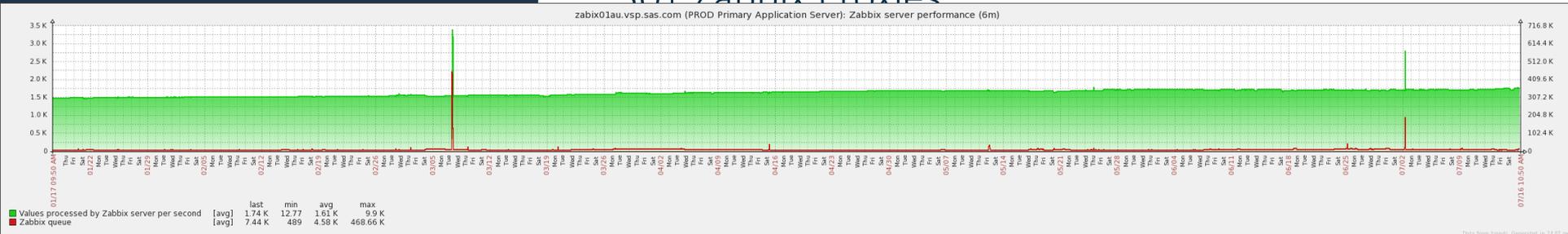
SAS Solutions OnDemand is the division of the SAS Institute that is responsible for delivering and supporting the SAS Cloud Analytics offerings.

- 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

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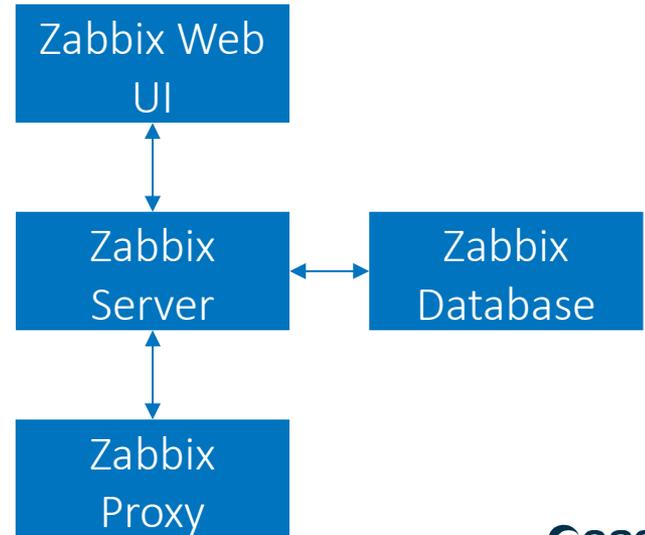
Enterprise Business Requirements

- 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



Meeting Enterprise Business Needs

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

Meeting Enterprise Business Needs

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

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



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

The screenshot shows a Zabbix alert configuration form with the following fields:

- Name:** Global Project Owner JIRA: Satin Drop Dead Panic
- Default subject:** {HOST.HOST}: {TRIGGER.NAME}
- Default message:**

```
Project: {INVENTORY.TAG}
Priority: Critical
{TRIGGER.NAME}
Item values:
1. {ITEM.NAME1} ({HOST.NAME1}:{ITEM.KEY1}): {ITEM.VALUE1}
2. {ITEM.NAME2} ({HOST.NAME2}:{ITEM.KEY2}): {ITEM.VALUE2}
https://status.ondemand.sas.com/zabbix/history.php?action=showvalues&itemid={ITEM.ID2}
https://status.ondemand.sas.com/zabbix/tr_events.php?eventid={EVENT.ID}&triggerid={TRIGGER.ID}
```

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

Name	Interval	Type
SAS Setinit Raw Output (SAS Deployment)	86400	Zabbix agent
Days until end of nearest SAS License grace period (SAS Deployment)		Zabbix trapper
Days until nearest SAS Drop Dead Date (SAS Deployment)		Zabbix trapper
Overall State of SAS Product Licenses (SAS Deployment)		Zabbix trapper
Days until end of nearest SAS License valid period (SAS Deployment)		Zabbix trapper

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



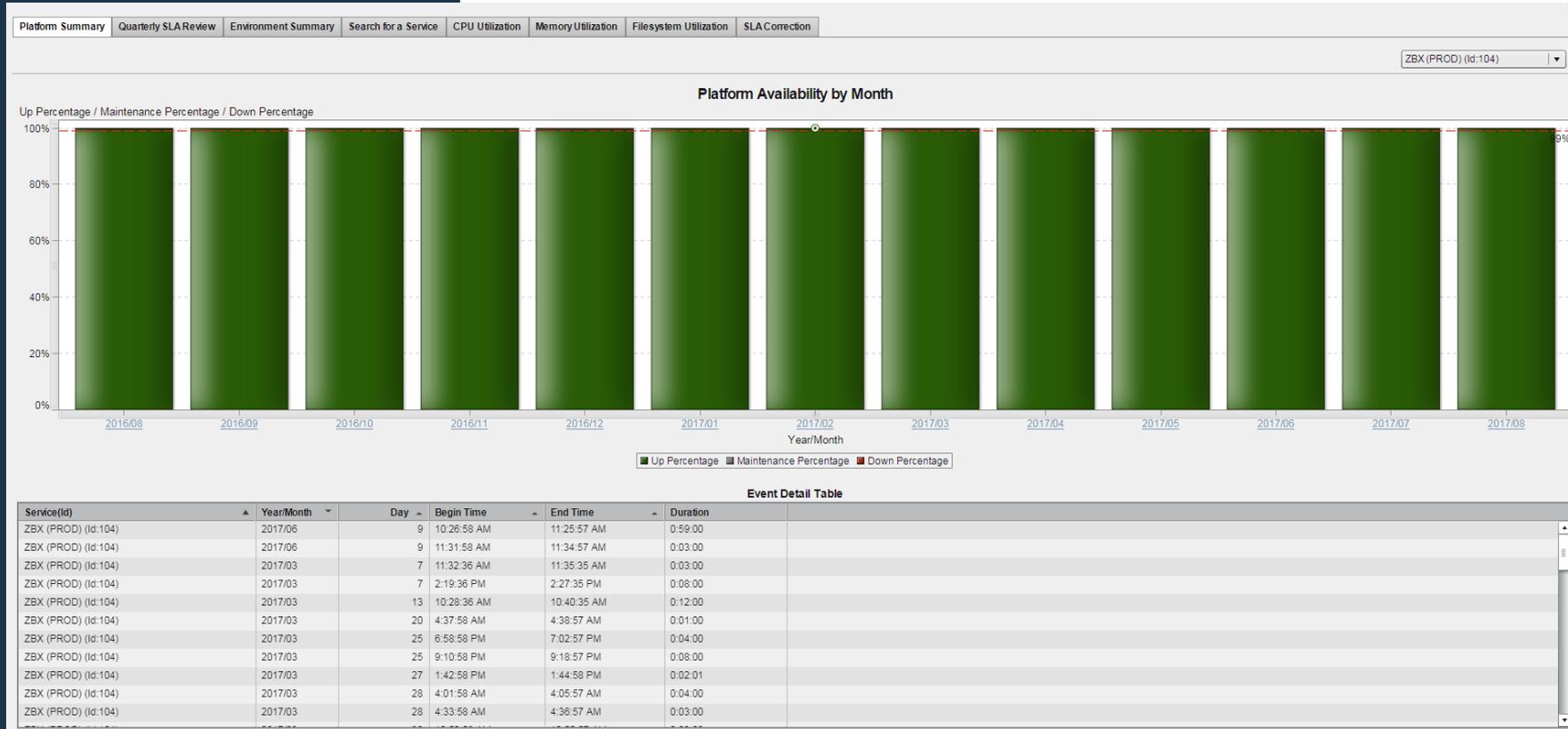
Extending Zabbix

Extensions to Zabbix in SSOD

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

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





Questions?

Reference Material

SAS Setinit Output

Timestamp	Value
	1 The SAS System 21:09 Saturday, July 15, 2017
	Original site validation data Current version: 9.04.01M3P062415 Site name: 'SSOD VISUAL ANALYTICS PERFORMANCE PORTAL'. Site number: 70178829. Expiration: 30JAN2018. Grace Period: 45 days (ending 16MAR2018). Warning Period: 45 days (ending 30APR2018). System birthday: 26DEC2016. Operating System: LIN X64 . Product expiration dates:
07/15/2017 09:09:19 PM	---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

Name [↑]	Key	Interval	History	Trends	Type
Batch Delay Calc - {#PROJECT}	batch.delay.calc[{#PROJECT}]	30	90	365	Calculated
Batch Delay delay_message - {#PROJECT}	batch.delay_message[{#PROJECT}]	0	90		Zabbix trapper
Batch Delayed - {#PROJECT}	vfs.file.exists[{#PATH}/batch.delay,{#PROJECT}.sig]	300	90	365	Zabbix agent
Batch Error - {#PROJECT}	batch.error[{#PROJECT}]	0	90	365	Zabbix trapper
Batch Error Calc - {#PROJECT}	batch.error.calc[{#PROJECT}]	30	90	365	Calculated
Batch Error Details - {#PROJECT}	batch.details[{#PROJECT}]	0	90		Zabbix trapper
Batch Error error_message - {#PROJECT}	batch.error_message[{#PROJECT}]	0	90		Zabbix trapper
Batch Inactive - {#PROJECT}	vfs.file.exists[{#PATH}/batch.inactive,{#PROJECT}.sig]	300	90	365	Zabbix agent
Batch Long Run Time Limit - {#PROJECT}	batch.longtime[{#PROJECT}]	0	90	365	Zabbix trapper
Batch Long Run Time Limit Warning - {#PROJECT}	batch.longtime_warn[{#PROJECT}]	0	90	365	Zabbix trapper
Batch Message - {#PROJECT}	batch.message[{#PROJECT}]	0	90		Zabbix trapper
Batch Name - {#PROJECT}	batch.name[{#PROJECT}]	0	90		Zabbix trapper
Batch Running - {#PROJECT}	batch.running[{#PROJECT}]	0	90	365	Zabbix trapper
Batch Running Calc - {#PROJECT}	batch.calc[{#PROJECT}]	30	90	365	Calculated
Batch Run Time - {#PROJECT}	batch.runtime[{#PROJECT}]	60	90	365	Calculated
Batch Start Time - {#PROJECT}	vfs.file.time[{#PATH}/batch.time,{#PROJECT}.sig]	60	90	365	Zabbix agent
Batch Time Signal File Exists - {#PROJECT}	vfs.file.exists[{#PATH}/batch.time,{#PROJECT}.sig]	60	90	365	Zabbix agent

Zabbix IT Service Definition

VA SLA Dashboard

[-] ZBX (PROD)	OK	-	<div style="width: 100%; height: 10px; background-color: green;"></div>	0.0000	100.0000 / 99.9999
[-] ZBX (Linux)	OK	-	-	-	-
[-] zabbix01au.vsp.sas.com (Primary Application Server)-Zabbix agent on zabbix01au.vsp.sas.com (PROD Primary Application Server) is unreachable for 300 seconds	OK	-	-	-	-
[-] zabbix02au.vsp.sas.com (Backup Application Server)-Zabbix agent on zabbix02au.vsp.sas.com (PROD Secondary Application Server) is unreachable for 300 seconds	OK	-	-	-	-
[-] zabbix03au.vsp.sas.com (Proxy Server)-Zabbix agent on zabbix03au.vsp.sas.com (PROD Proxy Server 1) is unreachable for 300 seconds	OK	-	-	-	-
[-] zabbix04au.vsp.sas.com (Proxy Server)-Zabbix agent on zabbix04au.vsp.sas.com (PROD Proxy Server 2) is unreachable for 300 seconds	OK	-	-	-	-
[-] zabbix10au.vsp.sas.com (Prod Database Server)-Zabbix agent on zabbix10au.vsp.sas.com (PROD Database Server) is unreachable for 300 seconds	OK	-	-	-	-
[-] zabbix11au.vsp.sas.com (Prod Database Server)-Zabbix agent on zabbix11au.vsp.sas.com (PROD Database Server 2) is unreachable for 300 seconds	OK	-	-	-	-
[-] zabbix12au.vsp.sas.com (Prod Database Witness Server)-Zabbix agent on zabbix12au.vsp.sas.com (PROD Database Witness Server) is unreachable for 300 seconds	OK	-	-	-	-