The Scalable Dashboard Solution

WPI x Juniper Networks

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Meet the Team

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Introductions to Dashboards

- Devices at client locations send logs to the JSAS' AWS CloudWatch
- Logs help keep track of device status and enable troubleshooting
- A huge volume of logs is imported on a daily basis
- Dashboards are made up of widgets
Assessing Need

Over the years...

20+

Client Devices

The Beta version of the JSAS has been deployed at an increasing number of client sites

10000+

Log Messages

Thousands of log messages are received every day by the AWS CloudWatch Console
Develop scalable, filtered, and organized dashboards to facilitate faster debugging and provide an enhanced user experience with increased readability of logs.
Dashboard Creation Using AWS CloudFormation

Diagram:

- **Template**: JSON/YAML formatted file
  - Parameter definition
  - Resource creation
  - Configuration actions

- **CloudFormation**: Framework
  - Stack creation
  - Stack updates
  - Error detection and rollback

- **Stack**: Configured AWS resources
  - Comprehensive service support
  - Service event aware
  - Customizable
Learned the technologies
Assessed and analyzed problems in the current state of the dashboard
Provided documentation
Developed solutions
JSAS Dashboard Solution Approaches

01 Naïve Stack Approach
Naïve Stack Approach

Design

- IaC iteratively builds templates and stacks for each filtered dashboard
Naïve Stack Approach

Benefits

- Separate filtered dashboards
- Increased readability of log data
- Programmatic creation
Naïve Stack Approach

Drawbacks

- Abundant memory required
- Individual deployment, update and deletion
- Time consuming build
JSAS Dashboard Solution Approaches

01 Brute Force Approach

02 Singular Stack Solution
**Benefit**
- Time efficient
- Doesn’t clutter stack storage

**Design**
- IaC tool generates templates and deploys them all in one stack
- Utilizes S3 to avoid CLI size limits

**Drawbacks**
- New file size limit concerns
- Process lacks automation at points
JSAS Dashboard Solution Approaches

01 Brute Force Approach
02 Singular Stack Solution
03 Nested Stack Approach
Nested Stack Solution

Benefit
- Prevents file size limit issues
- Complete automation

Design
- IaC tool handles template creation utilizing nested stack logic
- S3 Buckets store templates to bypass file size limits

<table>
<thead>
<tr>
<th>Stack name</th>
</tr>
</thead>
<tbody>
<tr>
<td>jsas-dashboard-dev</td>
</tr>
<tr>
<td>jsas-dashboard-dev</td>
</tr>
</tbody>
</table>
JSAS Dashboard Solution Approaches

01 Brute Force Approach
02 Singular Stack Solution
03 Nested Stack Approach
04 Organizing Dashboard Data
### Everything in One Place Widget

#### Organized Logs
The widget displays the completed events first followed by in-progress events.

#### Centralized Widget
Joins multiple log streams to display multiple statistics in one log table.

#### Highlight Inconsistencies
The unaccounted columns display any unusual or inconsistent behaviors.

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<tr>
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<th>endTime</th>
<th>time_scheduled</th>
<th>last_response_or_s3_url</th>
<th>time_elapsed_or_s_f</th>
<th>issue_urlbid_all</th>
<th>expectedTargetCol</th>
<th>actualTargetCol</th>
<th>s3/uploads</th>
<th>success_count</th>
<th>failure_count</th>
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Future Work

1. **Data visualization and insights**

2. **Improving the user experience of the AWS Dashboards**

3. **Adding filters for log tables in AWS Dashboards**
Conclusion

These are our results from this term of work

Filtered Dashboards
Dashboards with content filtered to specific serial numbers, to ensure ease of viewing specified log data

JSAS Dashboard Creation IaC Tool
A robust, scaled, and tested tool to create, package, and deploy nested stacks containing filtered dashboards

Everything in One Place Widget
A dashboard widget which displays a plethora of relevant and important data, enabling quicker access to vital info
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Mentor
Thank you, it's been a pleasure!

Any Questions?