**Define, monitor and analyze customer workload health KPIs**

This document provides guidelines and best practices for the observability of the AWS Cloud and application components. This document is customized further after detailed discussion and agreement with customer specific KPI’s

**Standard Workload Meterices**

| **Metric** | **Description** | **AWS Service / 3rd Party Tool** |
| --- | --- | --- |
| **CPU Utilization** | Measures the percentage of CPU resources used by the workload | AWS CloudWatch, Prometheus, Grafana, ELK Stack |
| **Memory Utilization** | Tracks the percentage of memory resources used by the workload | AWS CloudWatch, Prometheus, Grafana, ELK Stack |
| **Network Throughput** | Monitors the amount of network traffic in and out of the workload | AWS CloudWatch, Prometheus, Grafana, ELK Stack |
| **Disk I/O** | Measures the read and write operations performed on the disk | AWS CloudWatch, Prometheus, Grafana, ELK Stack |
| **Latency** | Tracks the response time of the workload requests | AWS CloudWatch, Prometheus, Grafana, ELK Stack |
| **Error Rate** | Captures the percentage of errors encountered by the workload | AWS CloudWatch, Prometheus, Grafana, ELK Stack |
| **Request Count** | Measures the number of requests processed by the workload | AWS CloudWatch, Prometheus, Grafana, ELK Stack |
| **Database Connection Pool Usage** | Tracks the usage of database connections by the workload | AWS RDS Performance Insights, CloudWatch, Prometheus, Grafana, ELK Stack |
| **HTTP Status Codes** | Captures the distribution of HTTP status codes returned by the workload | AWS CloudWatch, Prometheus, Grafana, ELK Stack |

**Exporting Standard Application Logs:**

| **Log Export Method** | **Description** | **AWS Service / 3rd Party Tool** |
| --- | --- | --- |
| **CloudWatch Logs** | Collects and stores logs generated by the application in AWS CloudWatch Logs | AWS CloudWatch Logs |
| **CloudWatch Agent** | Enables the collection of application logs and sending them to CloudWatch Logs | AWS CloudWatch Logs Agent |
| **AWS SDKs and APIs** | Utilizes AWS SDKs and APIs to programmatically send logs to CloudWatch Logs | AWS SDKs, AWS CLI |
| **Third-Party Log Management** | Utilizes third-party log management tools like Elasticsearch, Logstash, and Kibana (ELK Stack) to collect and analyze logs | ELK Stack (Elasticsearch, Logstash, Kibana) |

Defining Thresholds for Operational Metrics:

| **Metric** | **Description** | **Tool** | **Threshold** |
| --- | --- | --- | --- |
| **CPU Utilization** | High CPU utilization can indicate resource contention or inefficient code execution | AWS CloudWatch, Prometheus, Grafana, ELK Stack | Threshold: >80% for an extended period |
| **Memory Utilization** | High memory utilization can lead to performance issues and potential out-of-memory errors | AWS CloudWatch, Prometheus, Grafana, ELK Stack | Threshold: >80% for an extended period |
| **Network Throughput** | Sudden drops in network throughput may indicate connectivity issues or network congestion | AWS CloudWatch, Prometheus, Grafana, ELK Stack | Threshold: Below expected baseline |
| **Disk I/O** | High disk I/O can indicate performance bottlenecks or disk saturation | AWS CloudWatch, Prometheus, Grafana, ELK Stack | Threshold: Above expected baseline |
| **Latency** | High latency can impact user experience and indicate issues with network, compute, or database performance | AWS CloudWatch, Prometheus, Grafana, ELK Stack | Threshold: Above acceptable range |
| **Error Rate** | An increasing error rate may indicate application issues or integration failures | AWS CloudWatch, Prometheus, Grafana, ELK Stack | Threshold: Above acceptable range |
| **Request Count** | Significant deviations in request count may indicate spikes or drops in workload traffic | AWS CloudWatch, Prometheus, Grafana, ELK Stack | Threshold: Above expected baseline |
| **Database Connection Pool Usage** | Monitoring database connection pool usage helps identify connection leaks or inefficient resource utilization | AWS RDS Performance Insights, Grafana | Threshold: Above expected baseline |
| **HTTP Status Codes** | Tracking HTTP status codes helps identify errors or issues with the workload's API or web application | AWS CloudWatch, Prometheus, Grafana, ELK Stack | Threshold: Non-200 status codes |

Note: Thresholds may vary based on workload characteristics and business requirements. It's recommended to monitor and establish threshold values based on workload-specific benchmarks and historical patterns.

Please refer to the following resources for additional information and configuration details:

* [AWS CloudWatch](https://aws.amazon.com/cloudwatch/)
* [Prometheus](https://prometheus.io/)
* [Grafana](https://grafana.com/)
* [Elasticsearch](https://www.elastic.co/elasticsearch/)
* [Logstash](https://www.elastic.co/logstash/)
* [Kibana](https://www.elastic.co/kibana/)