{mthree}

Service Level Indicators

Site Reliability Engineering

Objectives

In this module, we will look at the concept of service level indicator, and how it is different than a simple metric.

Learning Objectives

- Define service level indicator (SLI)
- Explain the importance of service level indicators
  - Business
  - Personnel

{mthree}

Service Level Indicator (SLI)

- Key to evaluating the performance of the business
- Quantitative measure of service
  - >>> Based on Service Level Objectives
- Business focused
  - >>> Service results that matter to the user
  - >>> Rises and falls along with user happiness
  - >>> Shows obvious difference during service outage
  - >>> Oscillates in a narrow band during normal operations

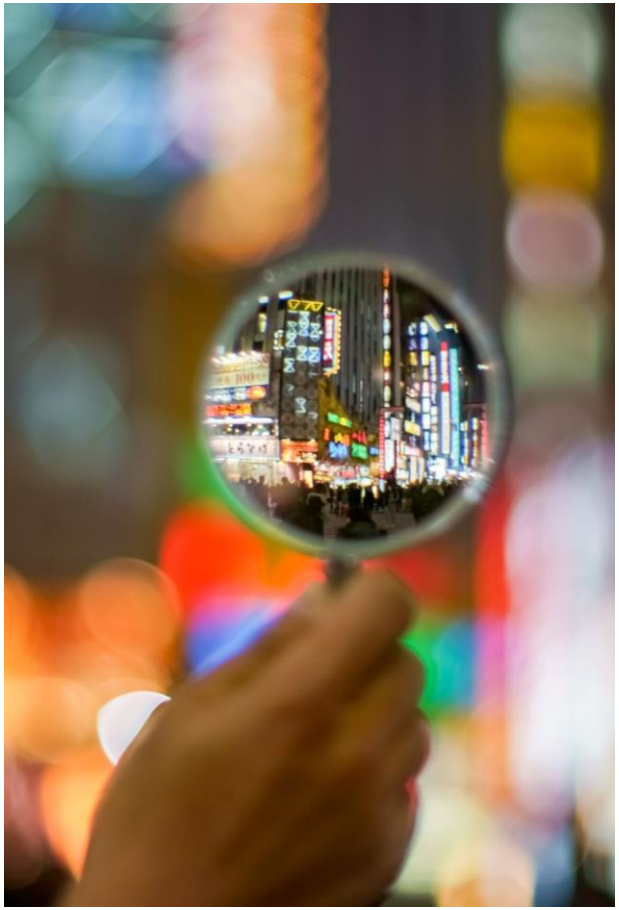
{mthree}

Common SLI Attributes

- Aggregates or percentiles relevant and meaningful
  - >>> SLO target
  - >>> Ranges match expectations
- Indicate progress in continuous improvement
- Measures related to
  - >>> User experience
  - >>> Complex system performance
- Need strong correlation between SLI and user happiness
  - >>> Tune up your SLI metrics: CRE life lessons | Google Cloud Blog

Service Level Indicator Focus

- Application availability and uptime
  - >>> Percent
- Request rates / throughput
  - >>> Compared to baseline
- Error rates
- Satisfaction
  - >>> Latency
  - >>> Availability
  - >>> Response time



{mthree}

Selecting SLI

- Identify system boundary
  - >>> Identify user-facing expectations at boundary
    - ~ What does availability look like
    - ~ How to measure
    - ~ Capture baseline
  - >>> Based on baseline and expectations
    - ~ Track as time-based data
    - ~ Confirm correlation of SLI with user expectations
- Fine tune SLI as business/user changes

SLI Specification Example

- User Transaction: Buying a Stock
- SLI Type: Availability
- SLI Specification: Proportion of buy page requests that are served successfully.
- SLI Implementations:
  - >>> Proportion of buy page requests that return a status code of 2xx.
    - ~ # buy page requests returning 2xx / total # buy page requests * 100
    - ~ Should be greater than X
  - >>> Proportion of time that the OrderbookAPI container is accepting requests.
    - ~ successful page requests processed by orderbookapi / successful page requests through web server * 100
    - ~ Should be greater than Y

{mthree}

Actual Prometheus Metrics

Proportion of buy page requests that return a status code of 2xx

$$\left(\frac{count(http\_server\_requests\_seconds\_bucket\{container="orderbookapi",uri="/buy",status="200"\})}{count(http\_server\_requests\_seconds\_bucket\{container="orderbookapi",uri="/buy"\})}\right) \times$$

Proportion of time that the OrderbookAPI container is accepting requests.

$$\left(\frac{count(http\_server\_requests\_seconds\_bucket\{container="orderbookapi",status="200"\})}{sum(nginx\_ingress\_controller\_requests\{exported\_namespace="orderbook-dev",status="200"\})}\right) \times 1$$

{mthree}

Example using Prometheus Metrics

- Success in using our sites ingress proxy
- Number of 200 successful requests in the last hour

$$count\_over\_time(nginx\_ingress\_controller\_requests\{exported\_namespace="orderbook-dev",status="200"\}[1h])$$

- Number of total requests in the last hour

$$sum(count\_over\_time(nginx\_ingress\_controller\_requests\{exported\_namespace="orderbook-dev"\}[1h])$$

- Total successful requests compared to total requests

{mthree}

Example - Calculation

Ideally, we express this as a percentage

$$\left(\frac{\begin{array}{c}("count\_over\_time(nginx\_ingress\_controller\_requests\{exported\_namespace = \\ " @"\"orderbook - dev\",status = \"200\"\}[1h]) ")\end{array}}{\begin{array}{c}("sum(count\_over\_time(nginx\_ingress\_controller\_requests\{exported\_namespace = \\ " @"\"orderbook - dev\"\}[1h])) ")\end{array}}\right) \times 100$$

{mthree}

Frequently-Used KPIs

- Response Time (usually measured in minutes)

$$\frac{(When\ you\ respond\ to\ the\ alert)\ -(When\ the\ failure\ was\ detected)}{\#\ of\ Failures\ in\ a\ given\ time}$$

- Mean Time To Repair (MTTR)

$$\frac{Fixed\ DateTime - Time\ Detected}{\#\ of\ Failures\ in\ the\ given\ period}$$

- Average Cycle Time (measured for most important processes)

$$\frac{Finish\ Time\ - Start\ Time}{Total\ \#\ of\ Cycles}$$

{mthree}

SLI for People

- SLI not restricted to technology monitoring
- Can be used to justify SRE efforts and watch for negative trends
- Positive metrics
  - >>> Mean Time to Restore decreasing
  - >>> Mean Time to Detect decreasing
  - >>> Number of backlog issues decreasing
  - >>> Velocity of updates increasing
- Negative metrics
  - >>> Burn out flagged by increasing Recovery Time
  - >>> Runaway toil flagged by increasing issue backlog

{mthree}

Activity: SLI calculation in Prometheus/Grafana

Create the SLI metric in Prometheus or Grafana for the following:

- SLI Type:
  - >>> Latency
- SLI Specification:
  - >>> Orderbook API **buy** requests served within **300ms**
  - >>> Time period for this check is per **hour**
- Step-By-Step

{mthree}

Summary Q&A

{mthree}