

Monitoring at LinkedIn



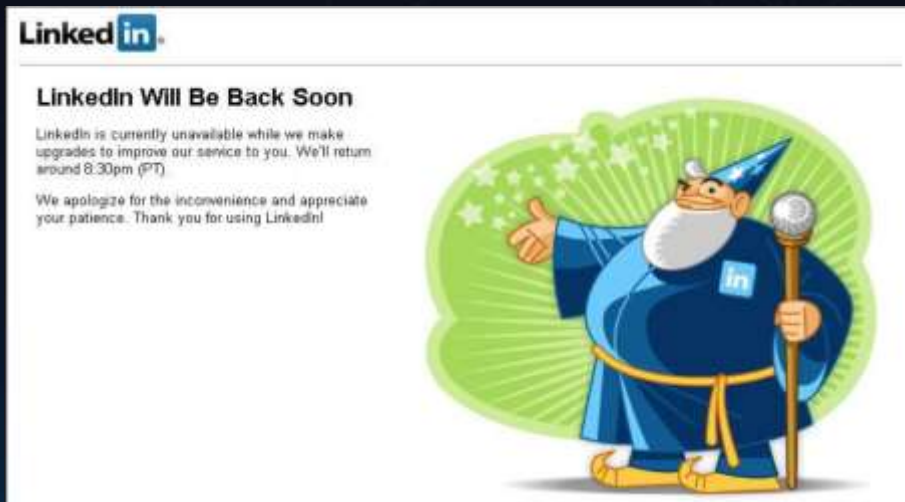
Mahak Lamba
Site Reliability Engineer



What gets measured, gets fixed.



Site situation: Before 2010



- Peak traffic periods Mon-Wed ~ 8am.
- Regular capacity related outages Mon-Wed ~ 8am
- Bi-weekly downtime maintenances
- Zero tolerance for failure in application stack

Open Source
Tool

2010



Visualization

Alerting



2011

2012



Synthetic Monitoring

Notification

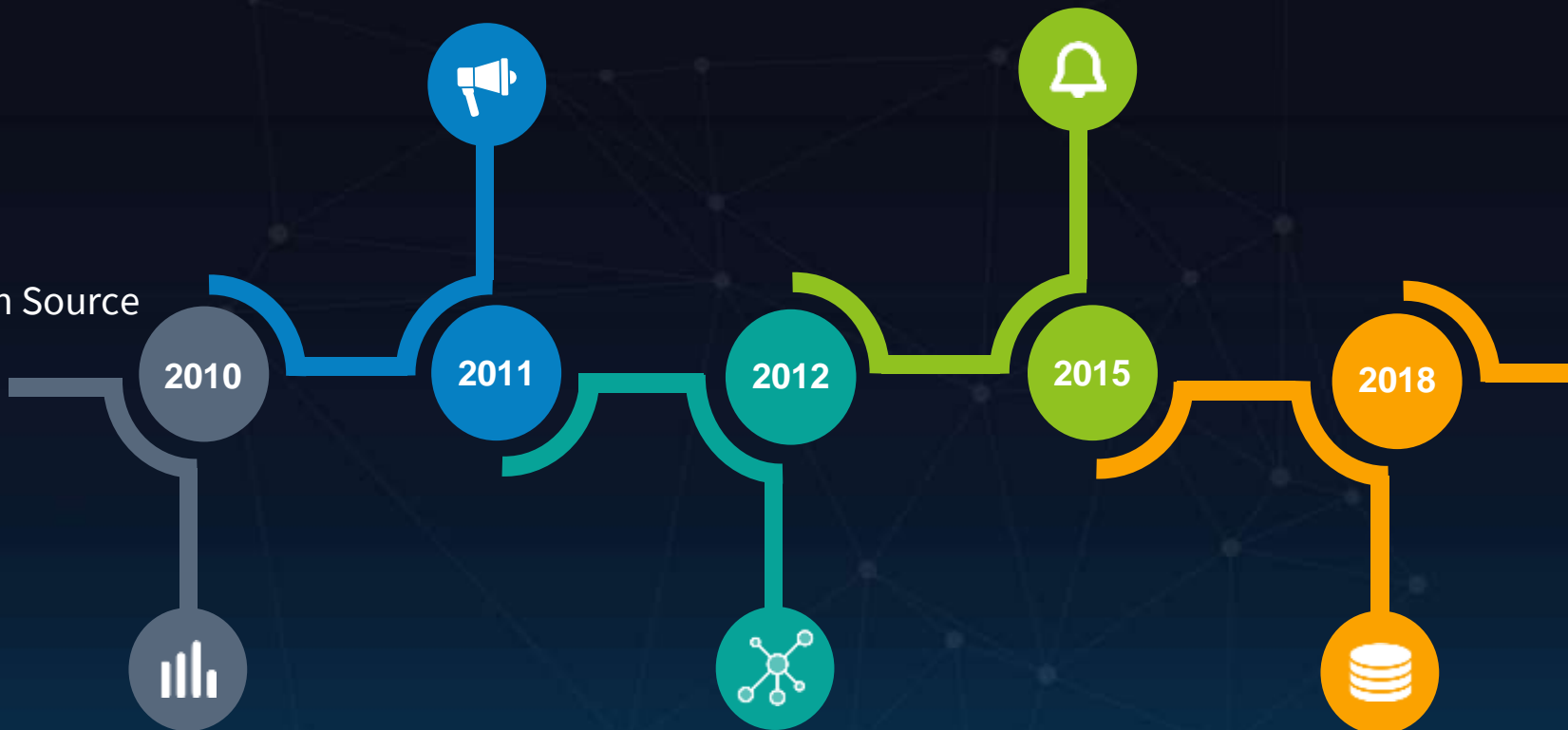


2015

2018



Storage



Open Source Tool

Before
2010

Used for data storage, visualization and alerting

Metrics:

- Health checks
- CPU
- SNMP
- MBean

Metrics were not being properly used

Those are good numbers.
Don't just throw them away.



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inGraphs

2010

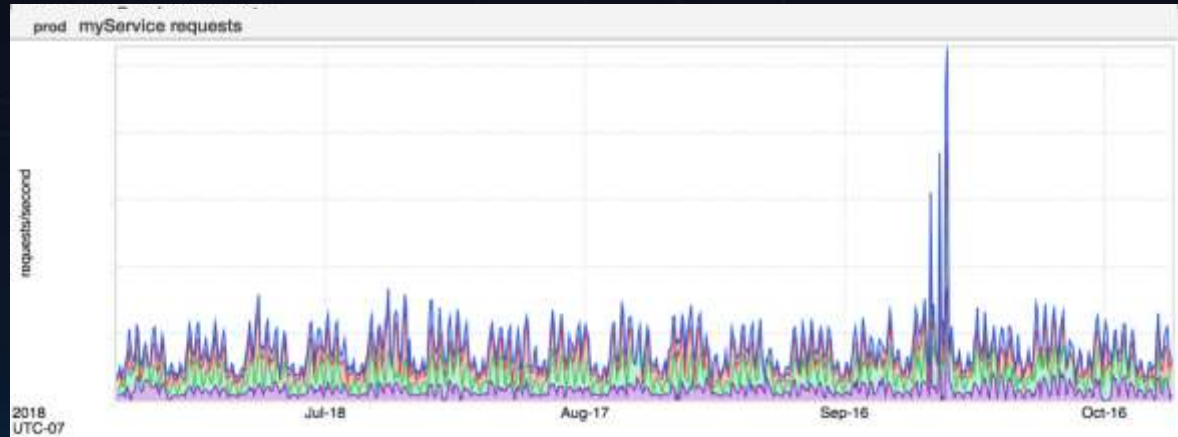
LinkedIn's graphing system which lets you visualize the metrics/data.

Uses RRDs to plot the metrics.

inGraphs

Features

- Granularity selection
- Regex matching
- Dashboards
- Test graphs and dashboards



Too late to act !



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Autoalerts

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Autoalerts



2011

It is LinkedIn's automated alerting system.

Alerts on the metrics fetched from RRDs.

Autoalerts

It is LinkedIn's automated alerting system.

Features

- Yaml format
- State checks
- Plugins
- Alert history
- Suppression

```
autoalerts:
  itr-url: "https://www.instructions-to-follow.com"
  contacts:
    - "team_name@linkedin.com"
  state-check-order: "wow,datetime,AND"
  state-check-groups:
    - state-check: datetimestampcheck
      state-check-args:
        hours:
          - 2
          - 3
          - 4
          - 5
          - 6
          - 7
    - state-check: week-over-week
      state-check-args:
        consecutive-events: 30
        min-percentage: 0.75
        max-percentage: 1.5
        weeks: 1
        window: 10
        label: wow
  alert-plugin: emailer
  alert-plugin-args:
    recipients:
      - "email_this_person@linkedin.com"
    interval: 3600
    send-clears: true
  zones:
    - Zone1
    - Zone2
  notes: "- metrics for a my_service"
```

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Autometrics

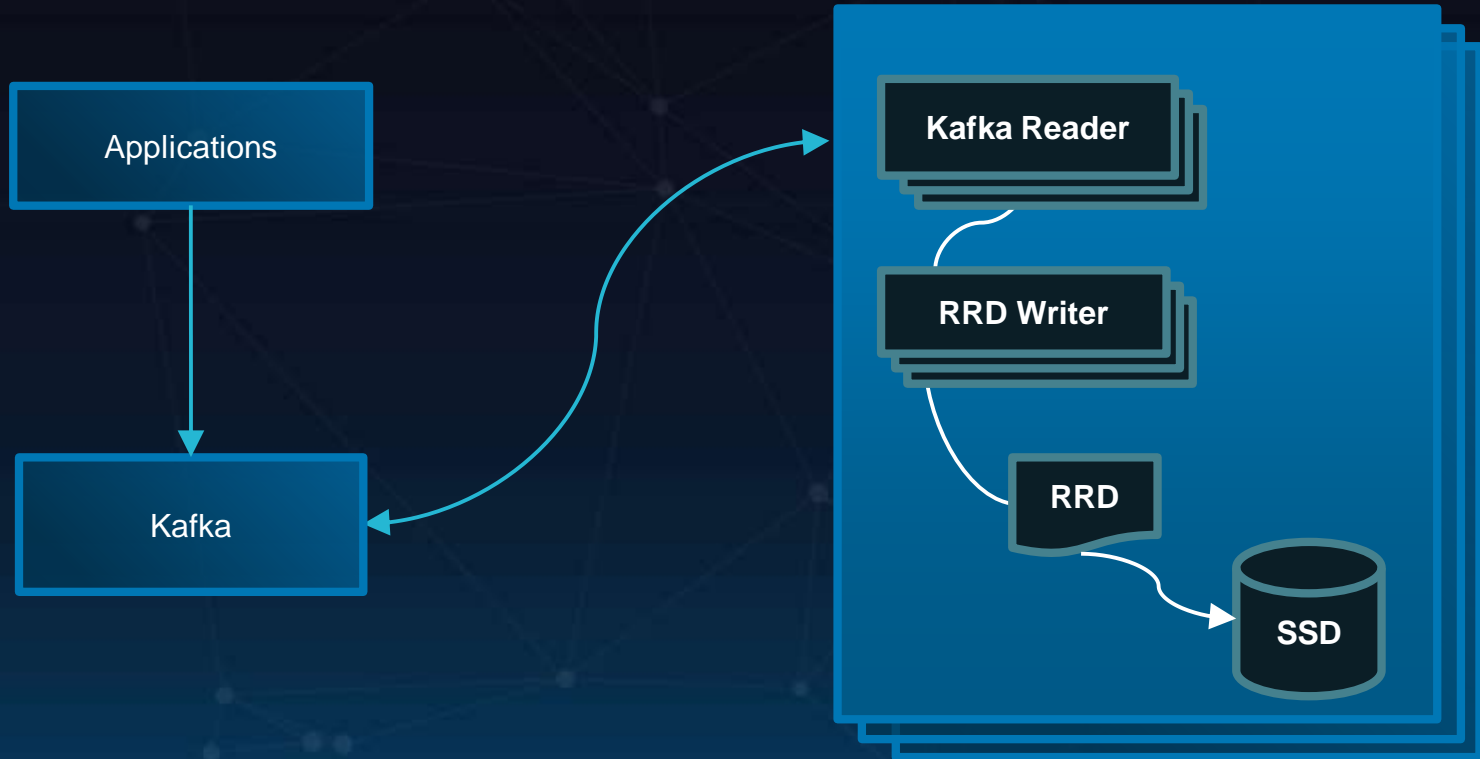


2011

Self service model to add metrics

- Metrics pushed into Kafka
- Read by Kafka consumers
- Stored as RRDs

Autometrics



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Inmon

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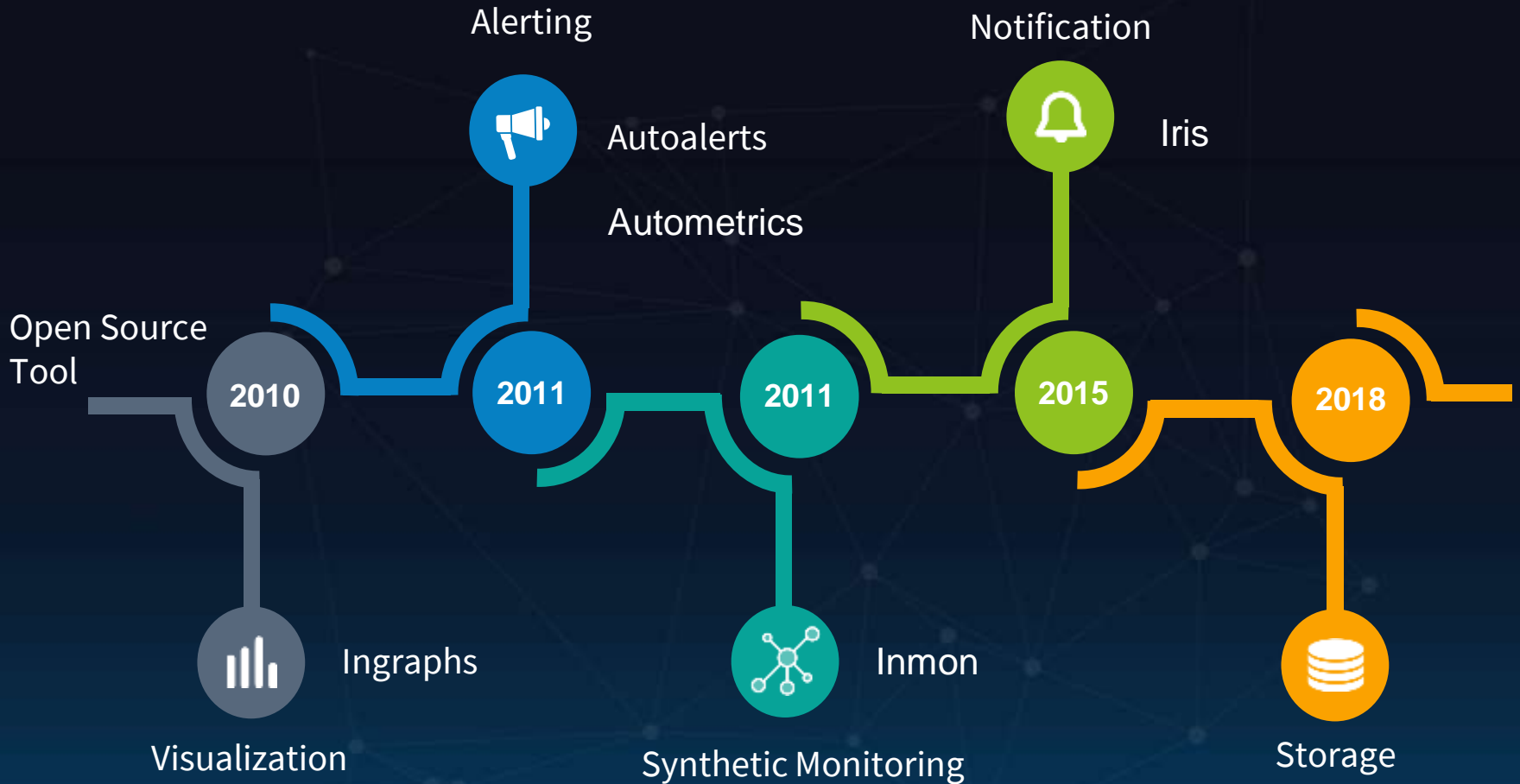
2018

InMon

2012

Internal synthetic monitoring tool

- Inside LinkedIn Datacenters
- Closer to servers
- No licensing cost involved



Iris

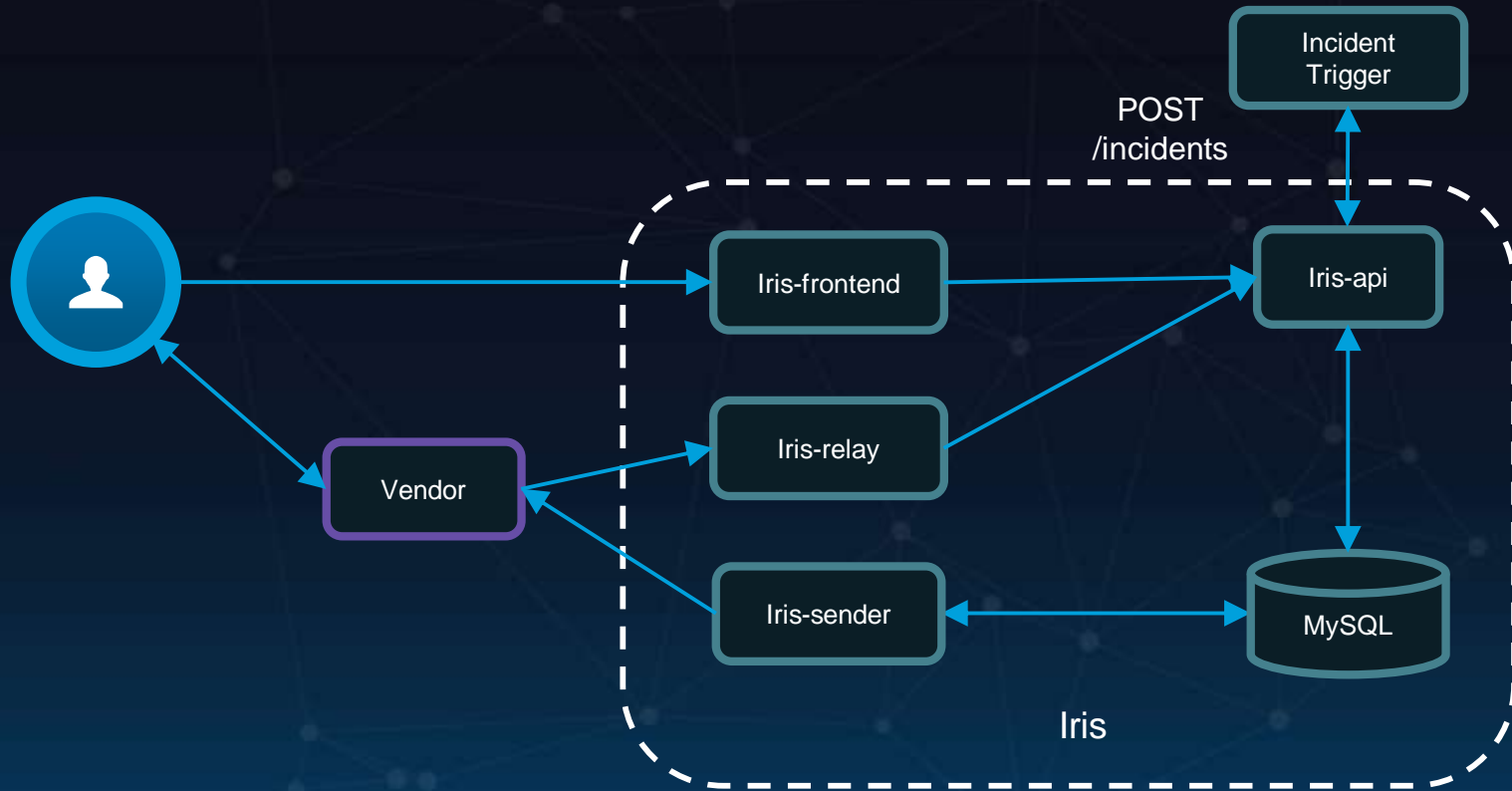
2015

An alert notification and escalation platform.

<https://github.com/linkedin/iris>

<https://github.com/linkedin/iris-mobile>

Iris



Plans

1

Step time:
5 minutes

Role: oncall

Target: monitoring-infra

Priority: high

Wait: 5 minutes

Count: 1 times

Template [Oncall Default](#):

Optional: No

Role: team

Target: monitoring-infra

Priority: low

Wait: 5 minutes

Count: 1 times

Template: [Oncall Default](#)

Optional: No

Plans

2

Step time:
10 minutes

Role oncall

Target monitoring-infra

Priority urgent

Wait 5 minutes

Count 2 times

Template [Oncall Default](#)

Optional No

Oncall Calendar

The screenshot displays the 'Oncall Calendar' interface for a team named 'team-awesome'. The top navigation bar includes 'ONCALL', 'MY DASHBOARD', 'BROWSE TEAMS', and a 'Create a team' button. The team's contact information is shown as 'team-awesome@linkedin.com' and '#team-awesome'. The main content area is divided into three sections:

- On Call Now:** Lists active team members with their names, roles, and contact details. For example, 'Superman' is the Primary on-call, and 'Prof. Dumbledore' is the Manager.
- Show on calendar:** A legend for calendar events, including Primary (orange), Secondary (blue), Shadow (grey), Manager (green), Vacation (yellow), and Unavailable (pink).
- Calendar View:** A monthly calendar for May 2019 showing on-call assignments for each day. The calendar is color-coded by team member: Superman (orange), Wonder Woman (blue), Captain America (green), Thor (yellow), and Harry Potter (pink).

The calendar shows a repeating pattern of on-call assignments for Superman (orange) and Wonder Woman (blue) on most days, with other team members like Captain America, Thor, and Harry Potter also having specific on-call periods.

Why do the same task twice manually ?



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Inmon

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Iris

Nurse

2015

2018



Storage

Nurse

2015

Nurse is a platform for codifying operations workflows into plans.

Features

- Triggers deployments, run commands, etc.
- Integrated with our existing tooling (JIRA, Iris, Autoalerts, etc.)

Concepts

- Plans
- Jobs

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Tool

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Inmon

2015



Notification

Iris

Nurse

2018



Storage

RRDs

- Random access
- Preallocated
- Bucketed or Window-fitted

Requirements



- Write heavy system
- Frequent data compaction
- Faster replication
- Easy to maintain

Options



MySQL



RocksDB



cassandra



LEVELDB



InfluxDB



OPENTSDDB

Create Distributed Data Store



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TSDS

Storage

TSDS



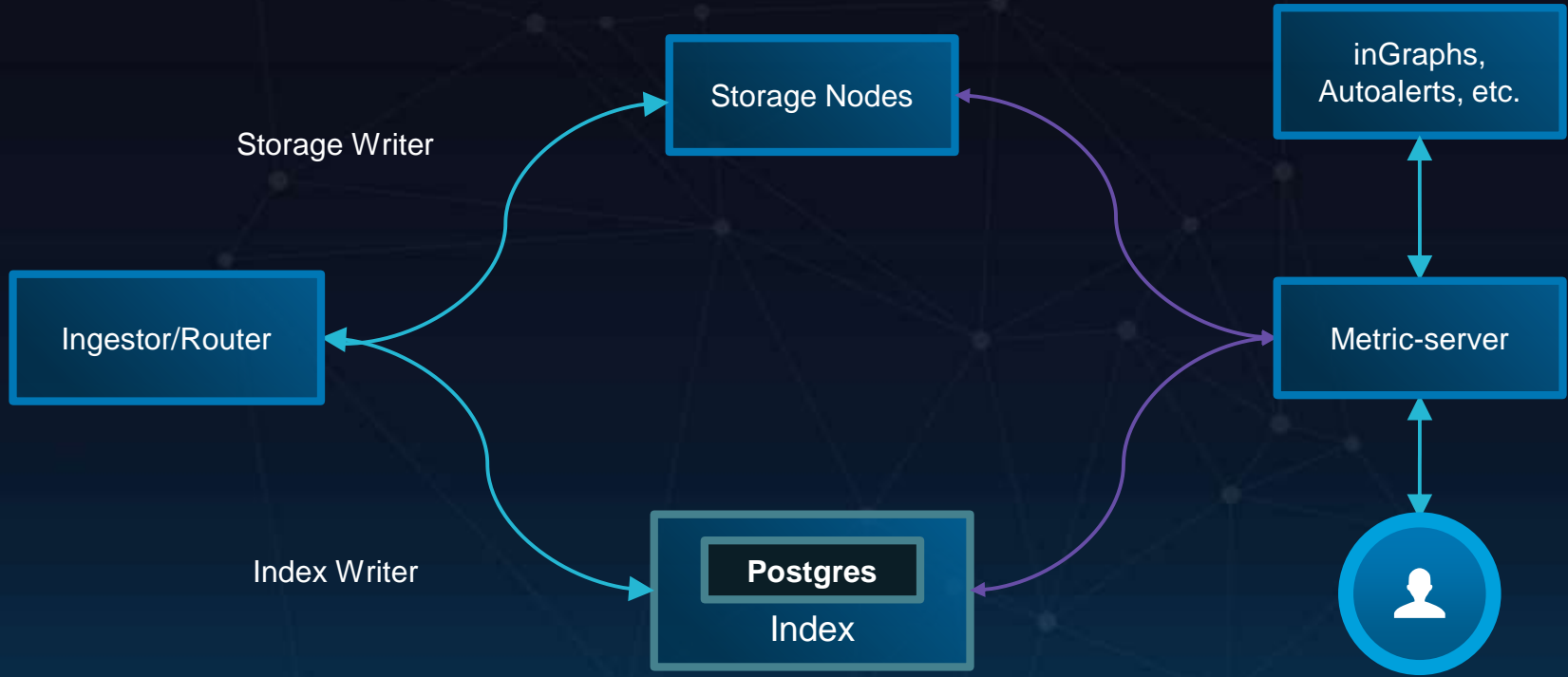
2018

Responsible for collecting, storing and serving application metrics

Components

- Ingestor/Router
- Index
- Storage Nodes

TSDS



Pillars of Monitoring at LinkedIn

1



TSDS: Storage

2



InGraphs: Visualization

3



Autoalerts: Alerting

4



Iris: Notification and Escalation

5



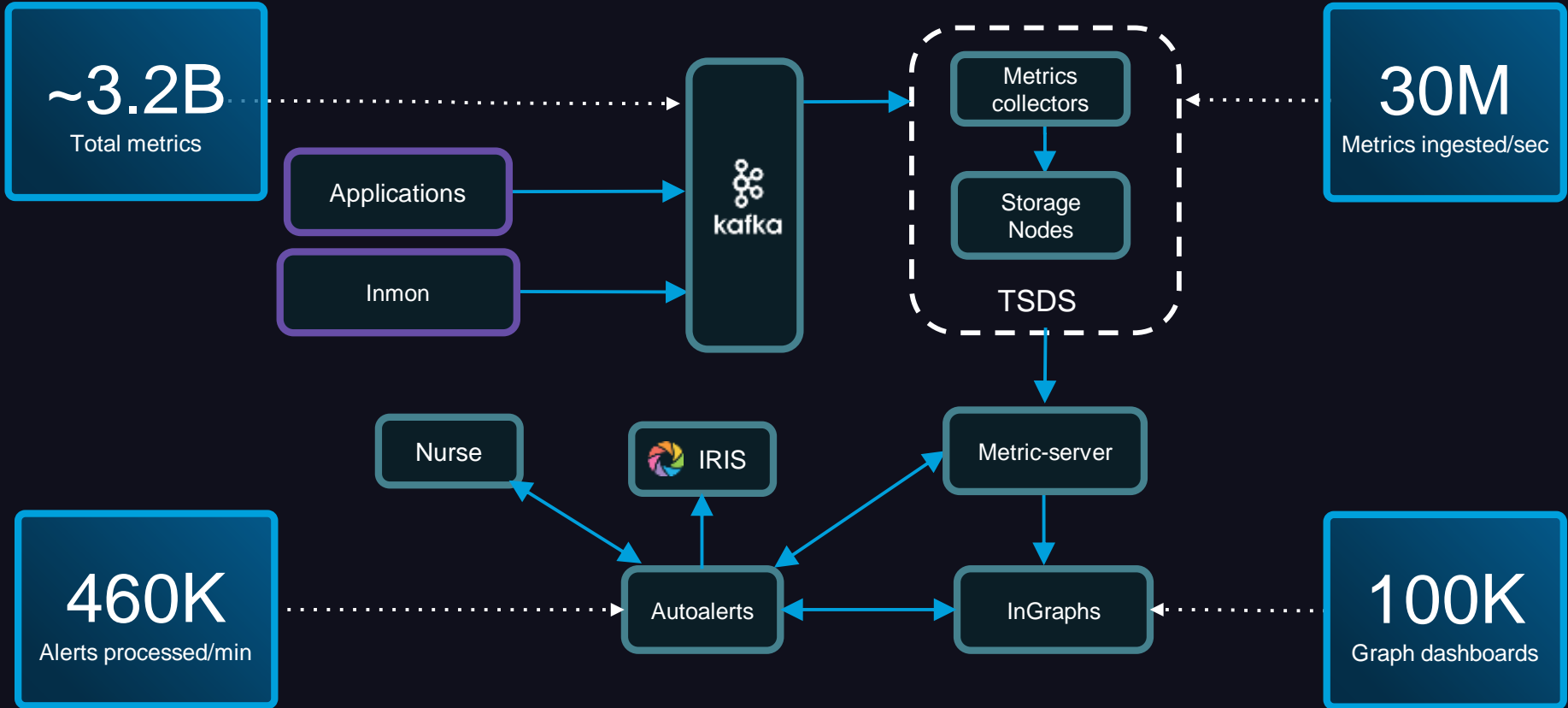
Nurse: Auto Remediation

6



Inmon: Synthetic Monitoring

Monitoring Infrastructure



Future Plans



- Automatic dashboard generation
- Alert correlation
- Cost to Serve

Thank you!!





Questions?