Journey to Next-Gen AIOps Powered by eBPF and GenAI

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Michele Dodič
Anastasia Archangelskaya

Speakers

Michele Dodič

SRE Co-Lead ASG
AIOps & Observability SME
Accenture

Nastia Archangelskaya

Cloud Advisory Manager
AIOps & Observability SME
Accenture

Speakers

Michele Dodič

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Agenda

Journey to Next-Gen AIOps Powered by eBPF and GenAI

01 MOTIVATION

02 AIOPS JOURNEY

03 INTRODUCTION TO EBPF

04 NEXT-GEN AIOPS

05 DEMO

06 CONCLUSION & TAKEAWAYS

Motivation

Why do SREs need AIOps?

Key SRE Challenges

Current challenges on the market identified in the field of SRE and DevOps

alert fatigue

capacity planning

data overload

incident resolution time

lack of proactive insights

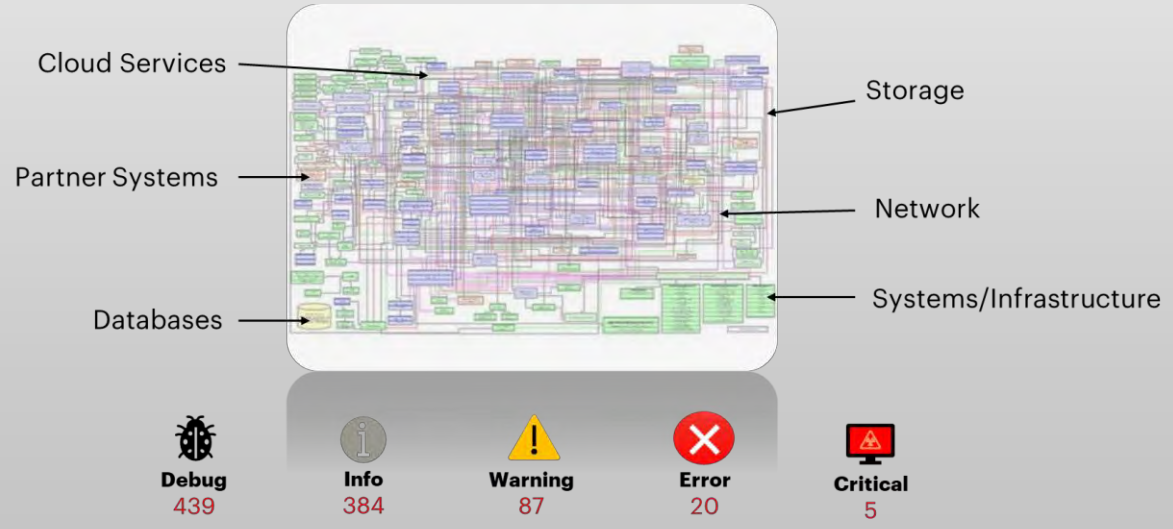
cost optimization

change management

analysis paralysis

performance issues

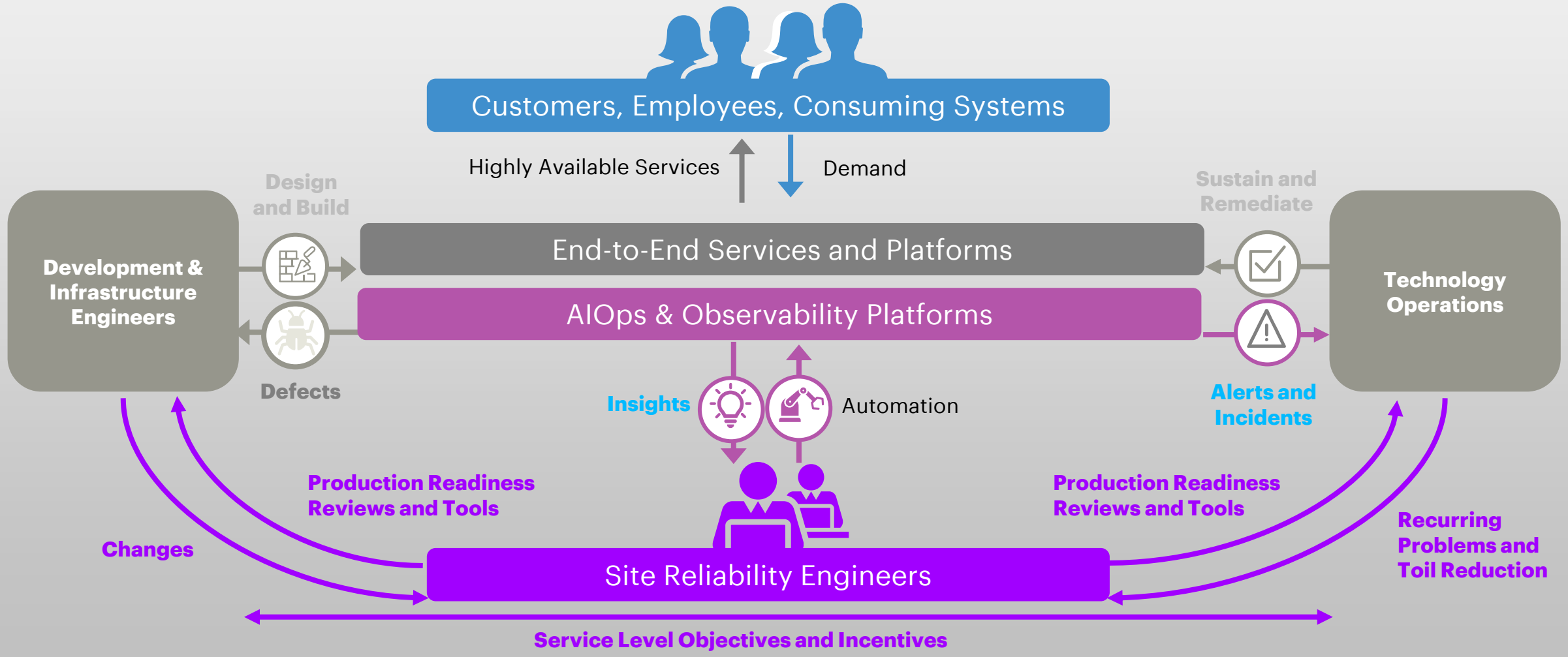
Systems are becoming more and more critical...



ILLUSTRATIVE

Why Do SREs Need AIOps?

Transformation efforts should focus on maturing tightly coupled SRE principles and AIOps capabilities into modern engineering and DevOps processes



AIOps Journey

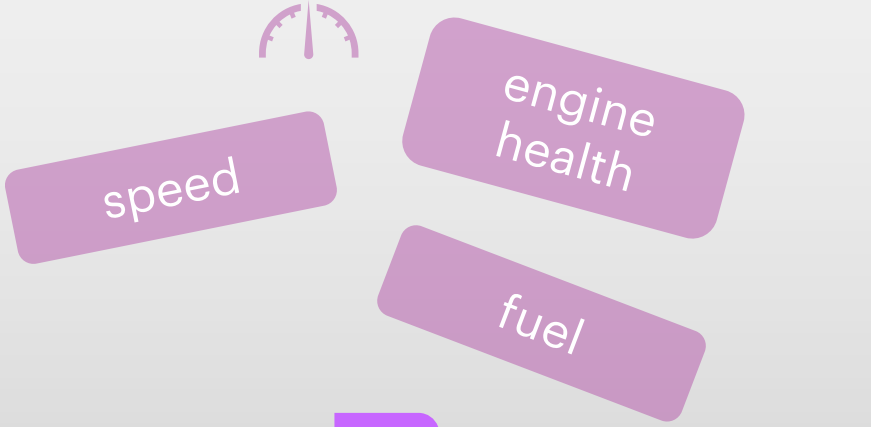
From Reactive Monitoring to Zero-touch

Transformation from Monitoring to Zero-touch

Observability Maturity

Business Impact

The Vigilant Lookout

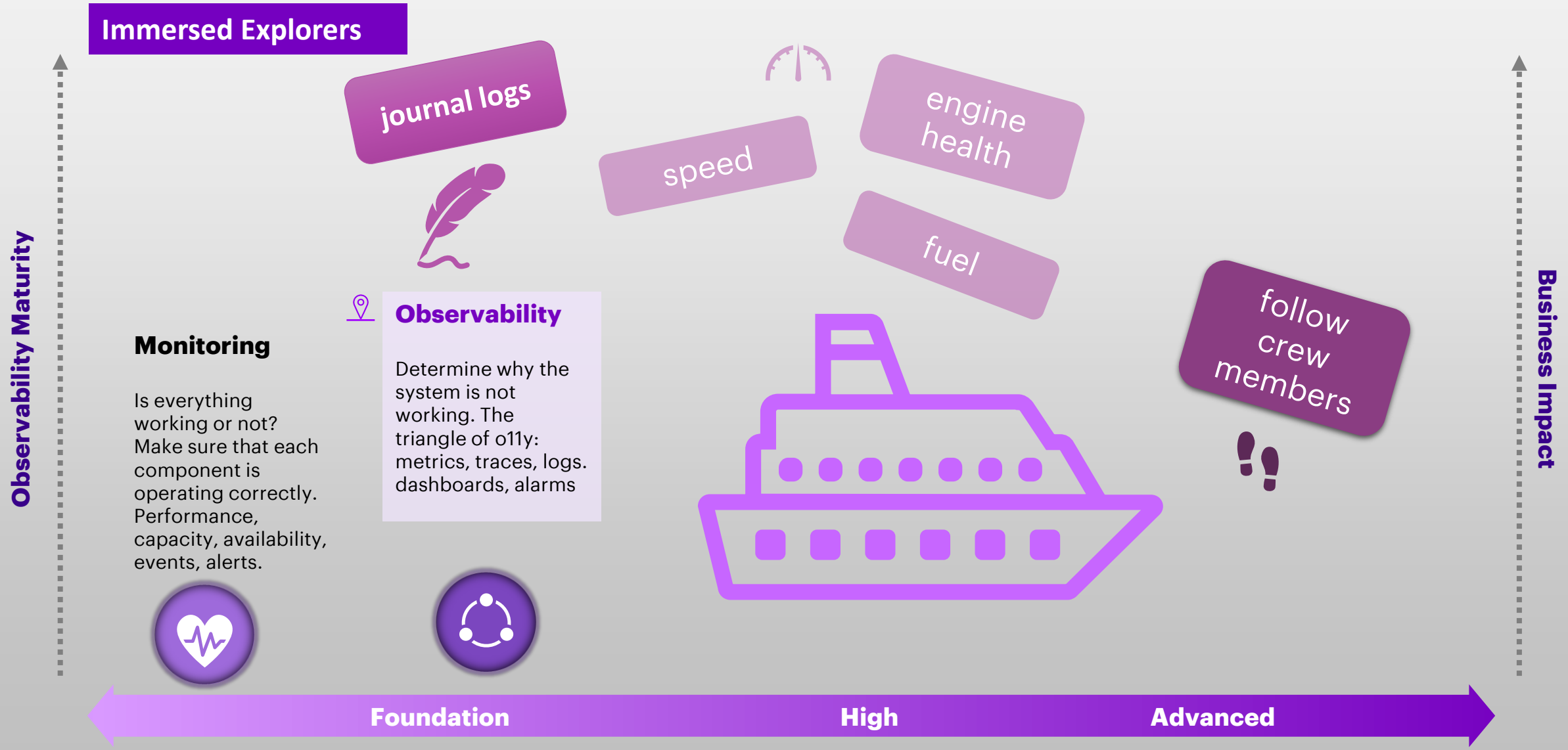


Monitoring

Is everything working or not? Make sure that each component is operating correctly. Performance, capacity, availability, events, alerts.

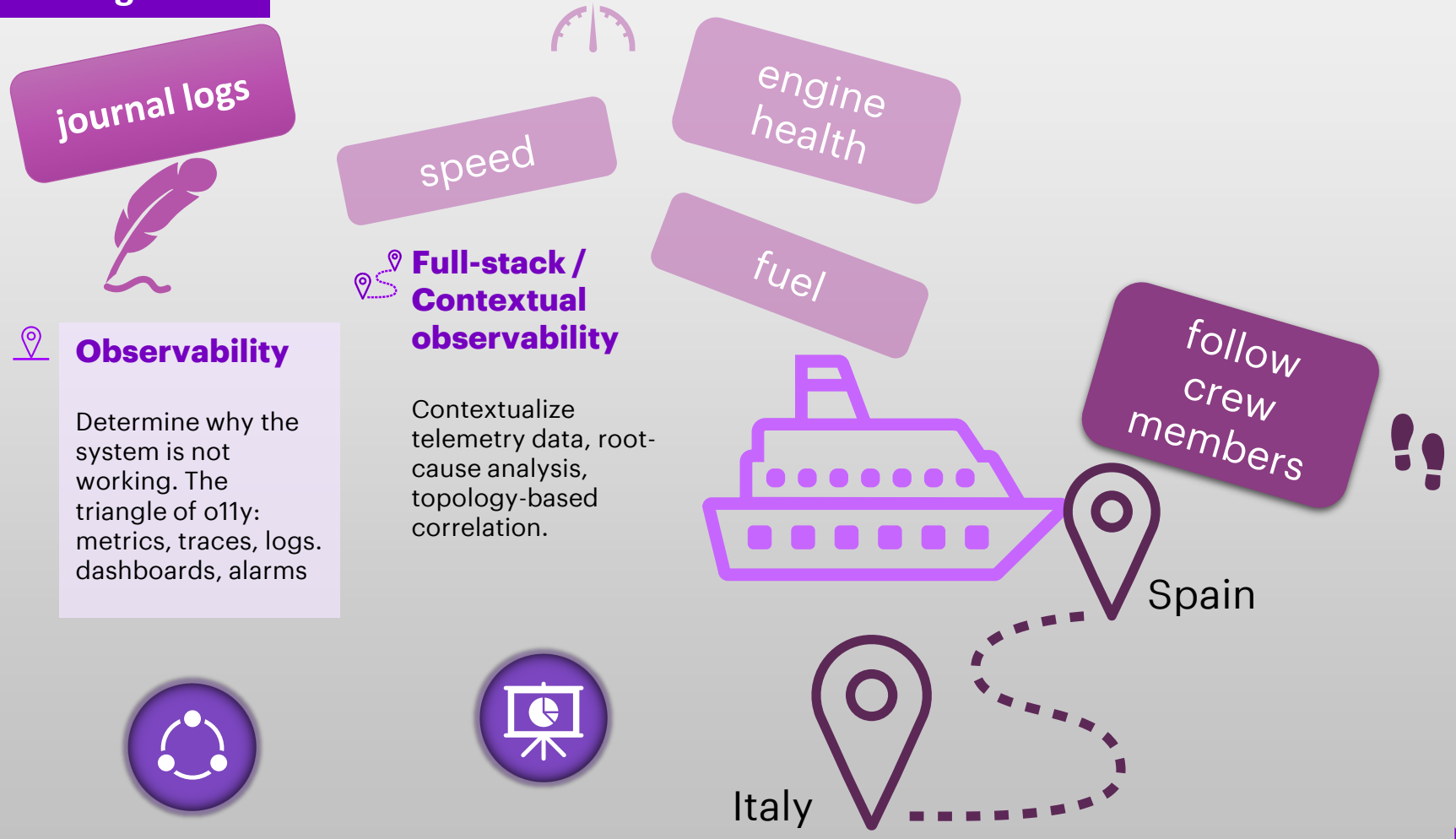
Foundation → High → Advanced

Transformation from Monitoring to Zero-touch



Transformation from Monitoring to Zero-touch

The Comprehensive Navigator



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Observability

Determine why the system is not working. The triangle of o11y: metrics, traces, logs. dashboards, alarms

Full-stack / Contextual observability

Contextualize telemetry data, root-cause analysis, topology-based correlation.

Observability Maturity

Business Impact

Foundation → High → Advanced

Transformation from Monitoring to Zero-touch

The Foretelling Oracle

Observability Maturity

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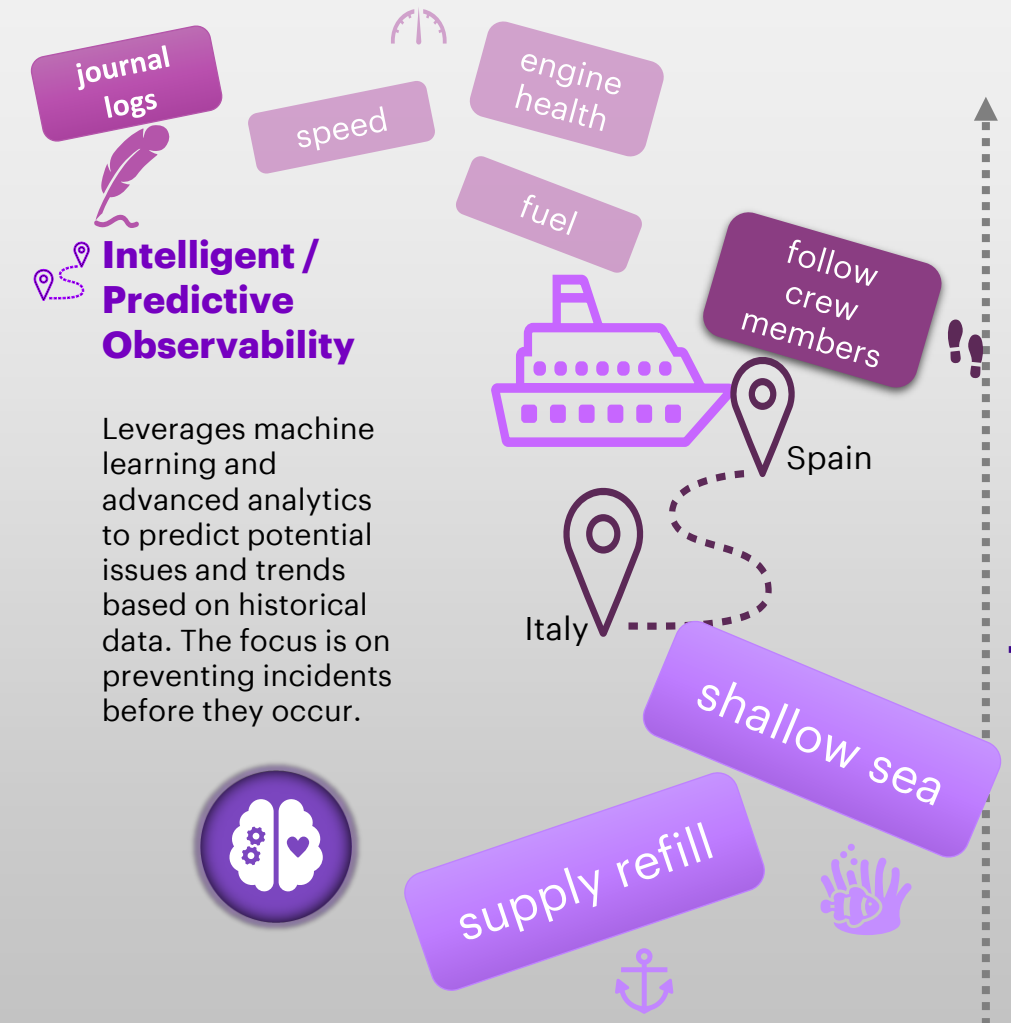
Intelligent / Predictive Observability

Leverages machine learning and advanced analytics to predict potential issues and trends based on historical data. The focus is on preventing incidents before they occur.



Foundation → High → Advanced

Transformation from Monitoring to Zero-touch

Observability Maturity

Business Impact

The Autonomous Voyager

automated haul off

automated repair

#poweredbyAI

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Federated / Autonomous Observability + AIOps

Zero-touch operations with automation for self-healing.
Any data available to any consumer on demand.
Highest business impact at lowest possible cost.

Foundation

High

Advanced

Transformation from Monitoring to Zero-touch

Observability Maturity

Business Impact

Reactive

Monitoring

Is everything working or not? Make sure that each component is operating correctly. Performance, capacity, availability, events, alerts.

Aware

E2e connection of the teams – you can find root cause faster

Observability

Determine why the system is not working. The triangle of o11y: metrics, traces, logs. dashboards, alarms

Proactive

Things are getting slower before they break down – use signals to identify future breakdown

Full-stack / Contextual observability

Contextualize telemetry data, root-cause analysis, topology-based correlation.

Preventive

Intelligent / Predictive Observability

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Automation

Federated / Autonomous Observability + AIOps

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Any data available to any consumer on demand.
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Foundation → **High** → **Advanced**

Introduction to eBPF

What is eBPF and why do we need it?

source: *https://pixabay.com/photos/honey-bees-insects-hive-bee-hive-401238/*

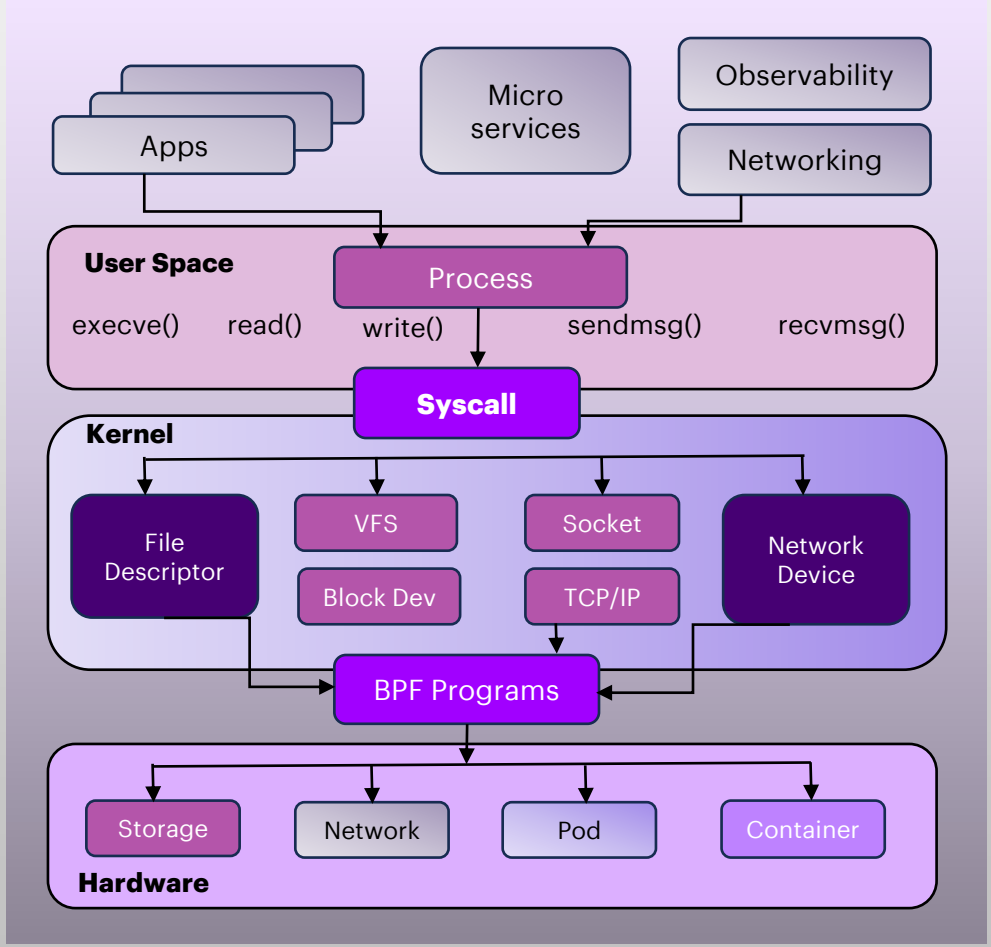
What is eBPF?

„eBPF, which stands for extended Berkeley Packet Filter, is an extraordinary technology with origins in the Linux Kernel, that can run sandboxed programs in a privileged context."

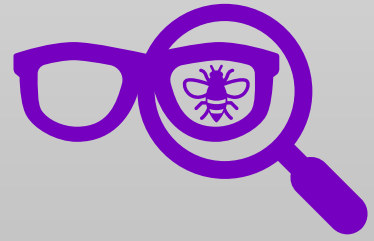
Source: *https://ebpf.io/what-is-ebpf/*

How does eBPF work?

eBPF makes the kernel programmable



- **eBPF** tools instrument the system **without any app or config changes**
- The **kernel** is with eBPF like the **Big Brother** now. It sees everything!



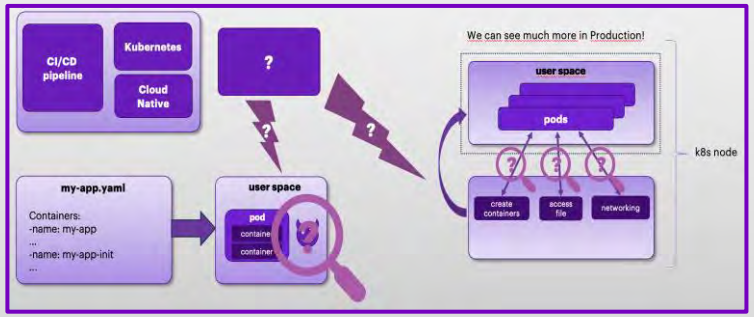
Next-Gen AIOps

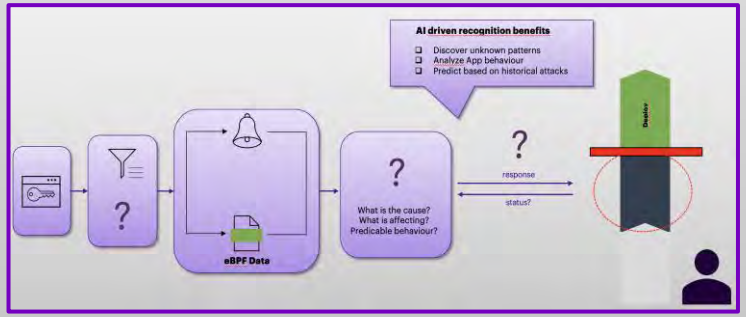
Key Challenges, Trends and Use Cases

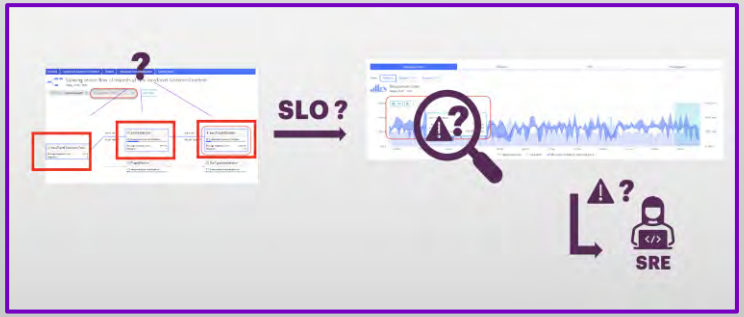
AIOps: Current Challenges on the Market

Challenges

1. Cloud-Native & k8s: Risk Assessment in Containerized Applications
2. Securing Deployment Pipelines
3. Achieve Maximum Reliability Context-Awareness throughout the Entire SDLC



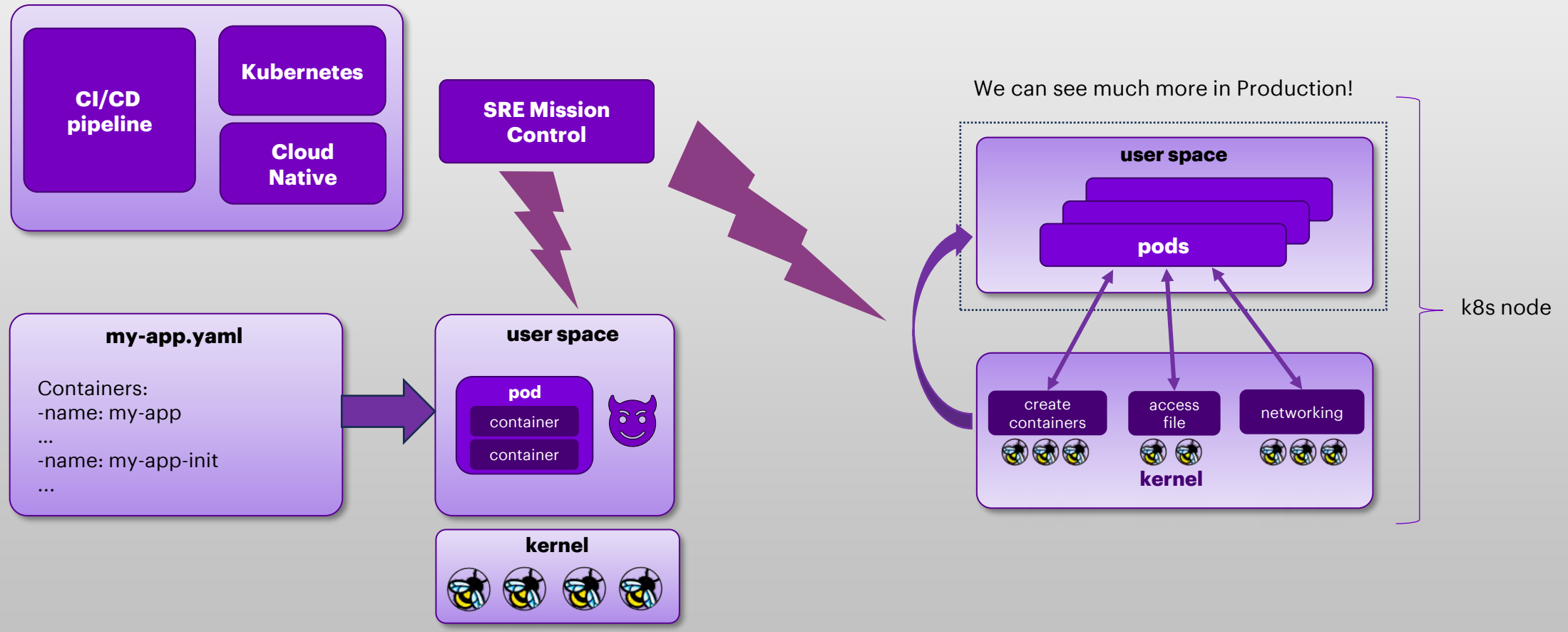




Use Case #1: Risk Assessment in Containerized Applications

Improved security context-awaraness on a more Cloud-Native level

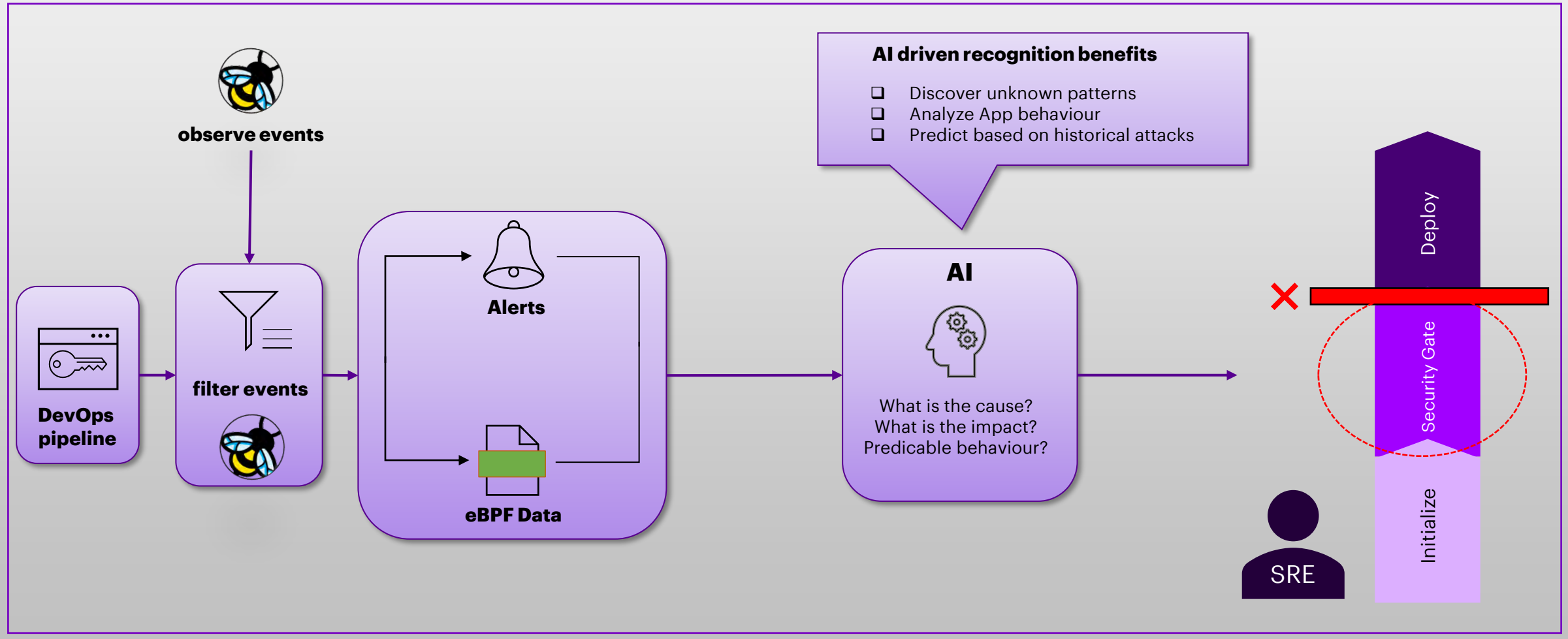
ILLUSTRATIVE



Use Case #2: Securing DevOps Pipelines

eBPF goes beyond traditional networking in enhancing the DevSecOps landscape

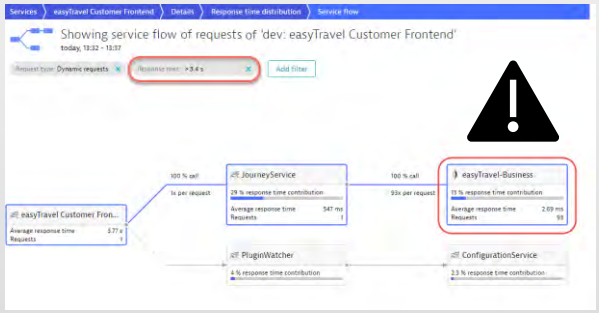
ILLUSTRATIVE



Use Case #3: SRE CoPilot Powered by GenAI

Leveraging cutting-edge technologies, such as **GenAI**, can significantly elevate and strengthen your SRE capabilities

ILLUSTRATIVE



Increased response time detected

Fail
Due to failed objectives

SLO breached, error-budget dropping

Alert proactively fired to our SRE Team

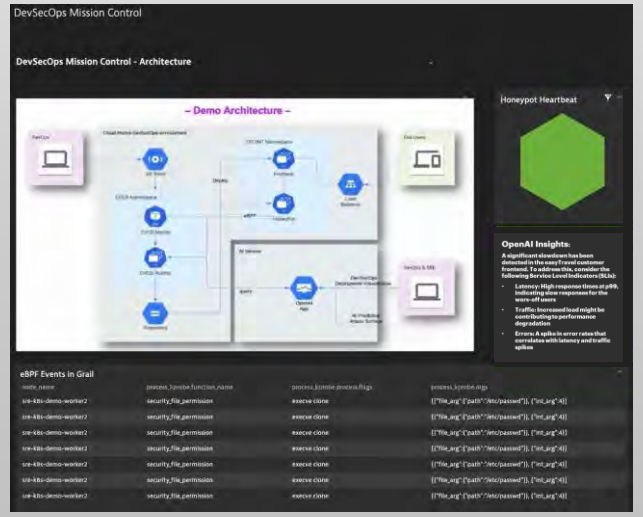
OpenAI

The responsible SRE will obtain the postmortem, including **proactive suggested actions** that can be used to resolve the issue.

SRE

The SRE checks the insights suggested by the copilot

Suggest problem remediation



SRE Mission Control

Use Case #3: SRE CoPilot Powered by GenAI

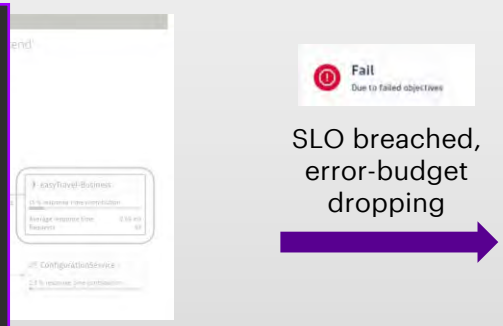
Leveraging cutting-edge technologies, such as **GenAI**, can significantly elevate and strengthen your SRE capabilities

ILLUSTRATIVE

OpenAI Insights:

A significant slowdown has been detected in the easyTravel customer frontend. To address this, consider the following Service Level Indicators (SLIs):

- **Latency: High response times at p99, indicating slow responses for the wors-off users**
- **Traffic: Increased load might be contributing to performance degradation**
- **Errors: A spike in error rates that correlates with latency and traffic spikes**



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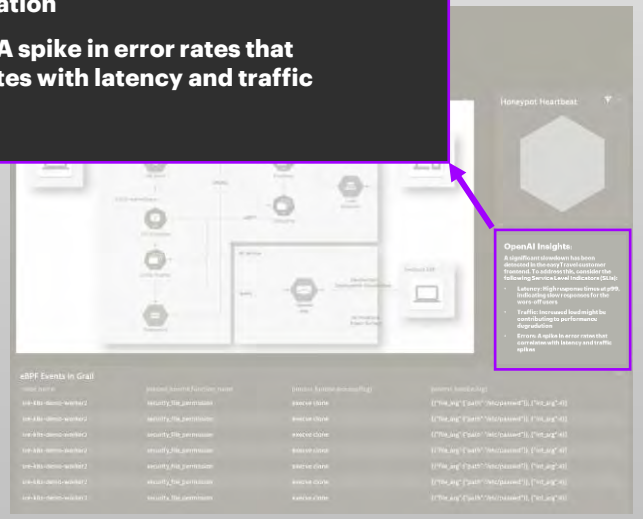


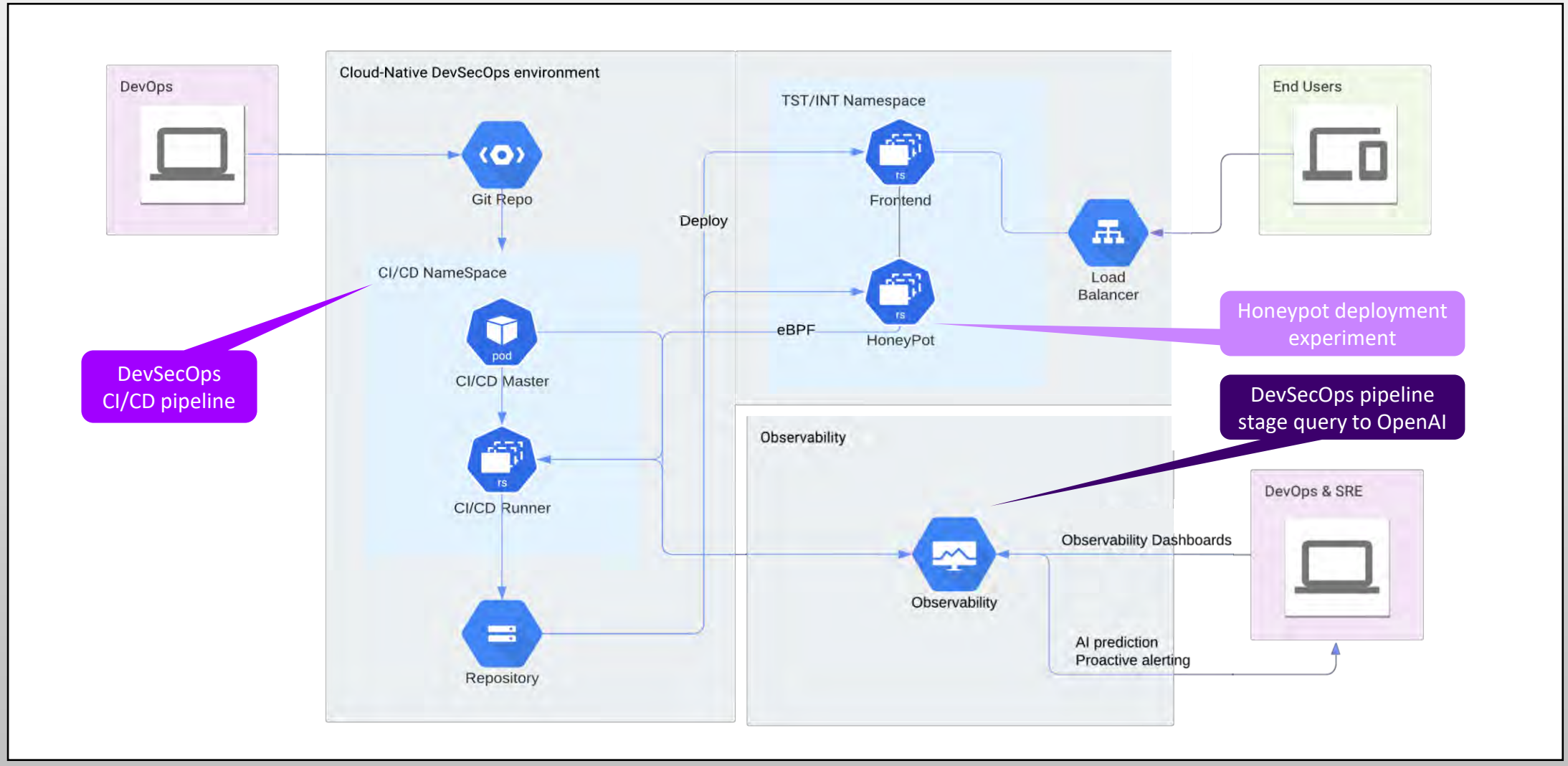
SRE Mission Control

Demo

AI-Powered End-to-End Deployment
with DevSecOps Mission Control

Demo Architecture

AI-Powered End-to-End Deployment with DevSecOps Mission Control



DEMO

Starting in 3.... 2.... 1....

Photo by Alex Kondratiev on Unsplash

Conclusion & Takeaways

Conclusion and Takeaways

- The transformational journey to AIOps mirrors the **evolving capabilities** of your ship's crew, from vigilant lookouts to **autonomous navigators**.
- Each stage enhances the ship's ability to sail through the dynamic IT landscape with **efficiency**, **resilience** and **foresight**.
- Leveraging cutting-edge technologies, such as **GenAI** and **eBPF**, can significantly elevate and strengthen your **SRE** capabilities
- Start simple and scale fast

Thank You!