ORACLE

Oracle Autonomous Database – under the hood of a Modern Data Platform

Live Webinar Session

Hosted by Marcos Arancibia

Autonomous Database Product Management

AUTONOMOUS DATABASE

LEARNING LOUNGE

Agenda

Debasis Sinha

A look under the hood of Autonomous Database and all its capabilities:

- Real-time monitoring to continuously track various database metrics.
- Early detection of anomalies and performance issues.
- AI-powered diagnostics of anomalies, identifying root causes and providing insights to take corrective actions through self-healing.
- Automated adjustments of configurations for optimizing performance.

Q&A

- Product Managers will answer any questions

Before we begin...

This session is for you !!!

Ask your questions using **Q&A**

Product Managers are monitoring your questions

We will share links in **Chat**

The recording will be made available in a few days at
oracle.com/goto/adb-learning-lounge

Important links to bookmark

Links to get you started and to keep up to date with Autonomous Database

1 Get Started with ADB:
oracle.com/autonomous-database/get-started/

2 Join us: LinkedIn bit.ly/adb-linkedin-grp

X @AutonomousDW

Bluesky
autonomousdb.bsky.social

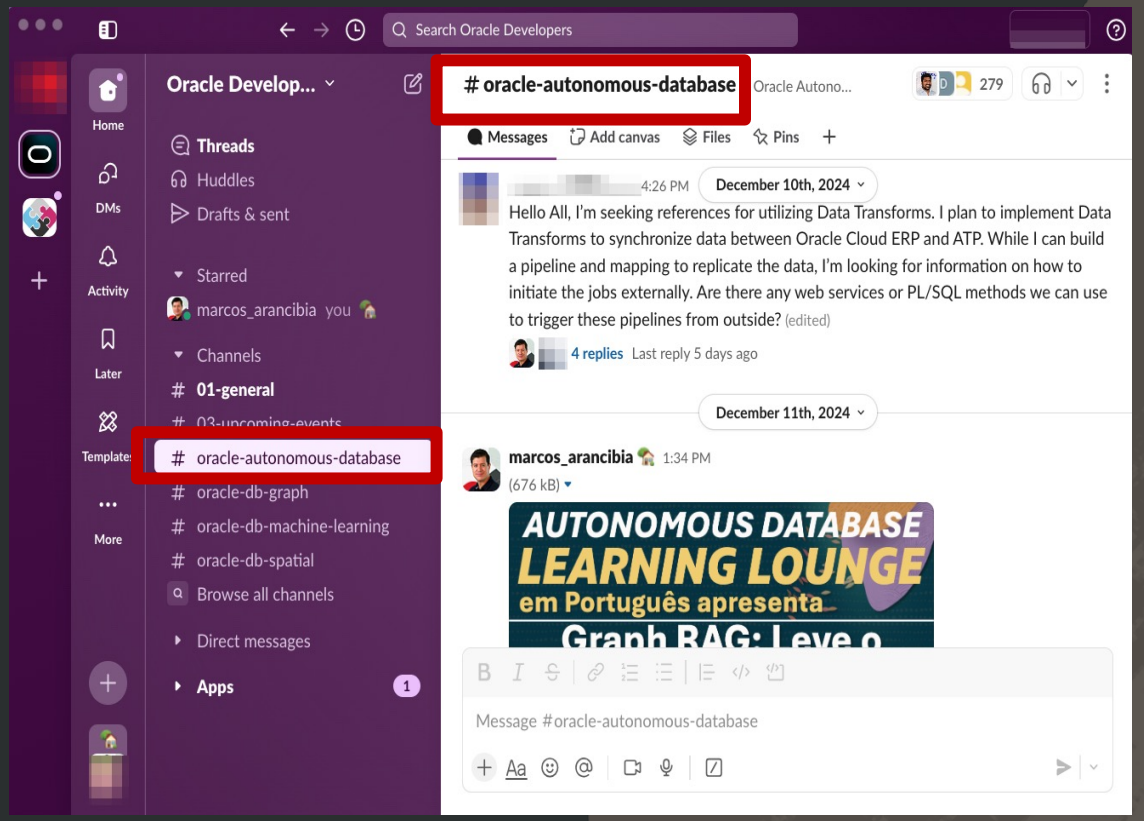
3 Got a question?
We are on stackoverflow
bit.ly/adb-stackoverflow

Join us on Developers Slack
(search #oracle-autonomous-database)
bit.ly/odevrel_slack

Join our External Slack

STEP 1: Join our Slack workspace at:
bit.ly/odevrel_slack

STEP 2: search for #oracle-autonomous-database at the top and click on the Channel



Speaker

Debasis Sinha

Vice President,

Sustaining Engineering

ORACLE

Autonomous Database : Under the hood!

Deliver better solutions faster

Debasis Sinha

September 2025

Maximize your opportunity using Autonomous Database

Reduce cost & risk

Lower IT costs, improve security and eliminate human error with automation

Simplify your work

Increase productivity with an end-to-end cloud data ecosystem

Accelerate success

Start today: modernize on-prem databases, create new apps and integrate across all your clouds

Autonomous Database

Reduce costs & risks

Autonomous Database lowers IT costs by automating the entire lifecycle of database administration and always-on security.

Simple, cost-effective licensing bundles all required tools and services, per-second billing etc.

End-to-end automation lowers IT costs and helps ensure the highest availability and reliability for mission critical apps

Reduce risk – global certifications, always on-security, fully compliant

Lower costs and reduced risk through automation

Top autonomous capabilities that drive benefit

1 Auto-Provisioning
Automatically deploys mission-critical databases (RAC on Exadata infrastructure) which are fault-tolerant and highly available. Enables seamless scale-out, protection in case of a server failure and allows updates to be applied in a rolling fashion, while apps continue to run.

2 Auto-Configuration
Automatically configures the database to optimize for specific workloads. Everything from the memory configuration, the data formats, and access structures are optimized to improve performance. Customers can simply load data and go.

3 Auto-Backups
Automatic daily backup of database or on-demand. Restore or recover a database to any point-in-time you specify in the last 60 days.

4 Auto-Scaling
Automatically scales compute resources when needed by workload. All scaling occurs online, while the application continuously runs. Enables true pay per use.

5 Auto-Indexing
Automatically monitors workload and detects missing indexes that could accelerate applications. It validates each index to ensure its benefit, before implementing it and uses machine learning to learn from its own mistakes.

6 Automated Security
Automatic encryption for the entire database, backups and all network connections. No access to OS or admin privileges prevents phishing attacks. Protects the system from both cloud operations and any malicious internal users.

7 Automatic Failover
Automatic failover with zero-data loss to standby. It's completely transparent to end-user applications. Provides 99.995% SLA.

8 Automated Detection and Resolution
Using pattern recognition, hardware failures are automatically predicted without long timeouts. IOs are immediately redirected around unhealthy devices to avoid database hangs. Continuous monitoring for each database automatically generates service requests for any deviation.

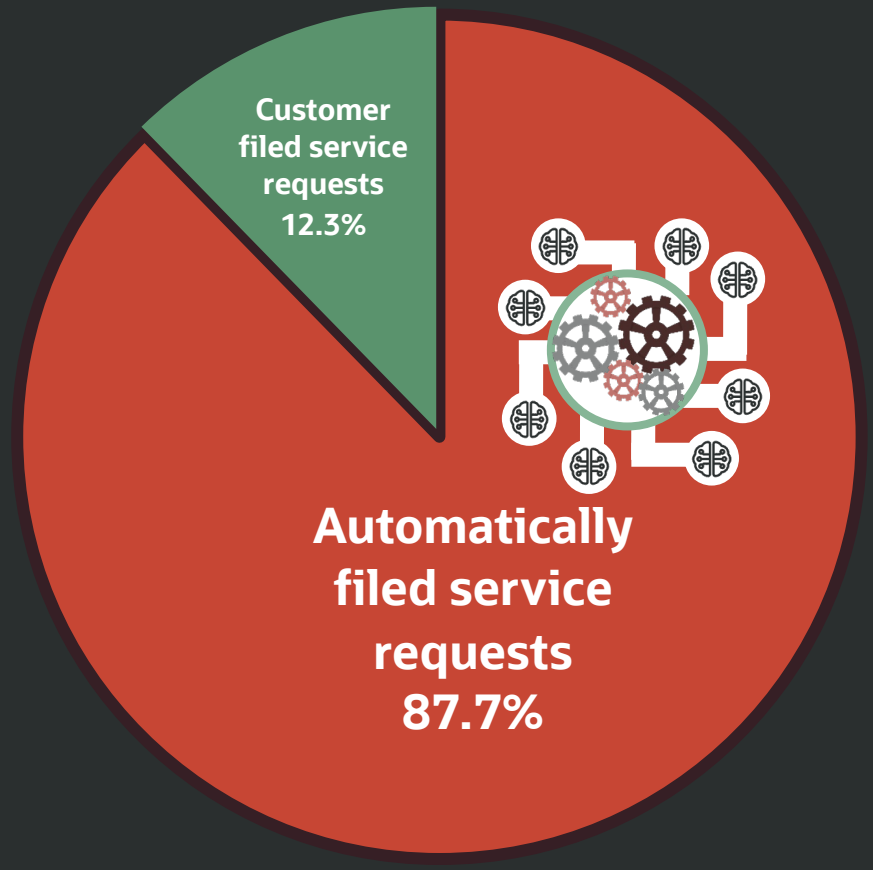
9 Automated Hardware and Software Upgrades
Hardware upgrades occur automatically and transparently. Major database upgrades are automated and scheduled by the customer.

10 Auto-Patching
Automatically patch or upgrade with zero downtime. Applications continue to run as patching occurs in a round-robin fashion across RAC nodes or servers.

Maximizing reliability with proactive monitoring

Quantifying the benefits

- **Detects 87.7% of issues automatically** with **zero** customer action required
- **Resolves service requests 4x** faster than on-prem
- Keeps environment **more secure** since known vulnerabilities patched quickly
- Applies fixes almost continuously – **updates every week**



7 out of every 8 issues are automatically resolved with zero customer actions required

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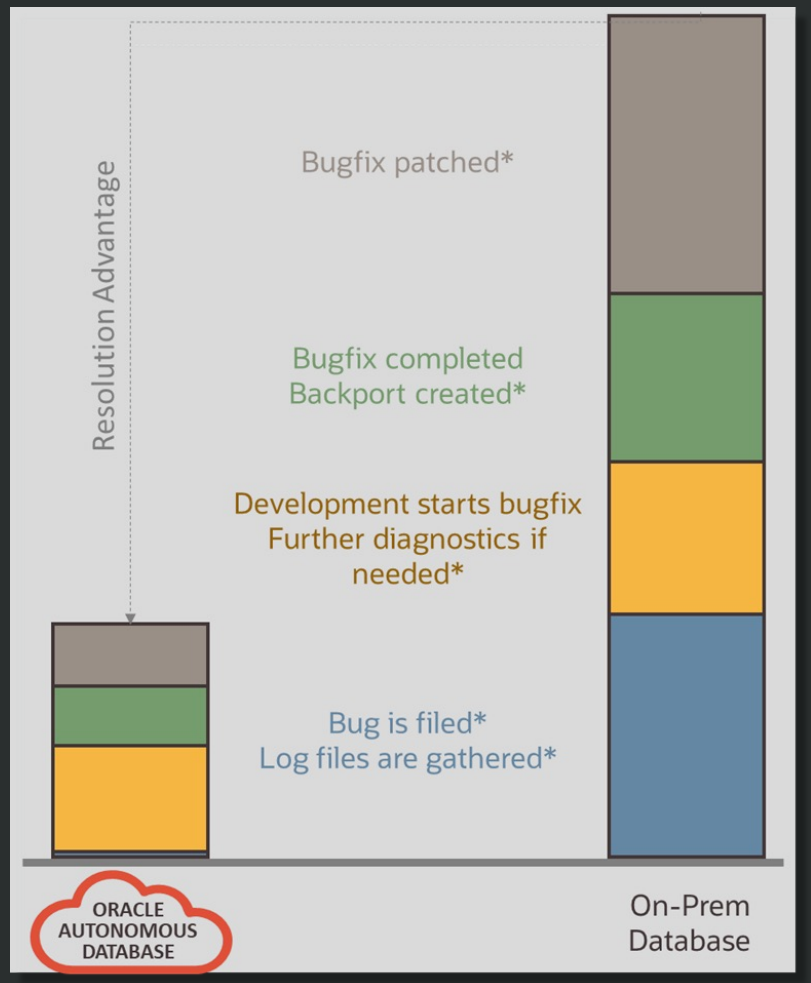


7 out of every 8 issues are automatically resolved with zero customer actions required

Maximizing reliability with automated proactive monitoring

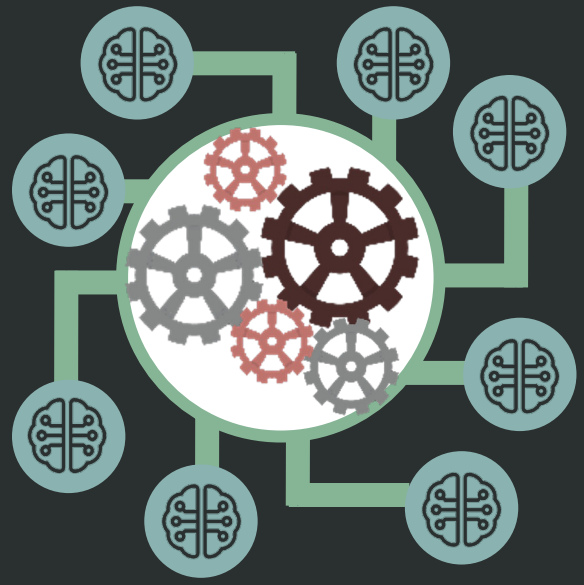
Autonomous Database finds the problems before you do

Oracle Cloud Operations uses continuous monitoring for each database:
8000+ metrics and 1500+ alarms

- Much broader than any on-premises customer
- Consolidated monitoring of entire stack: infrastructure, load balancer, connection manager, database, ORDS, APEX, OML

Automatic service requests are generated for each deviation

- Immediate investigation and resolution by cloud ops
- Root cause analysis for every issue
- Zero customer actions required



Autonomous Database operating at scale

Pushing the Boundaries

37,000

New databases created each month

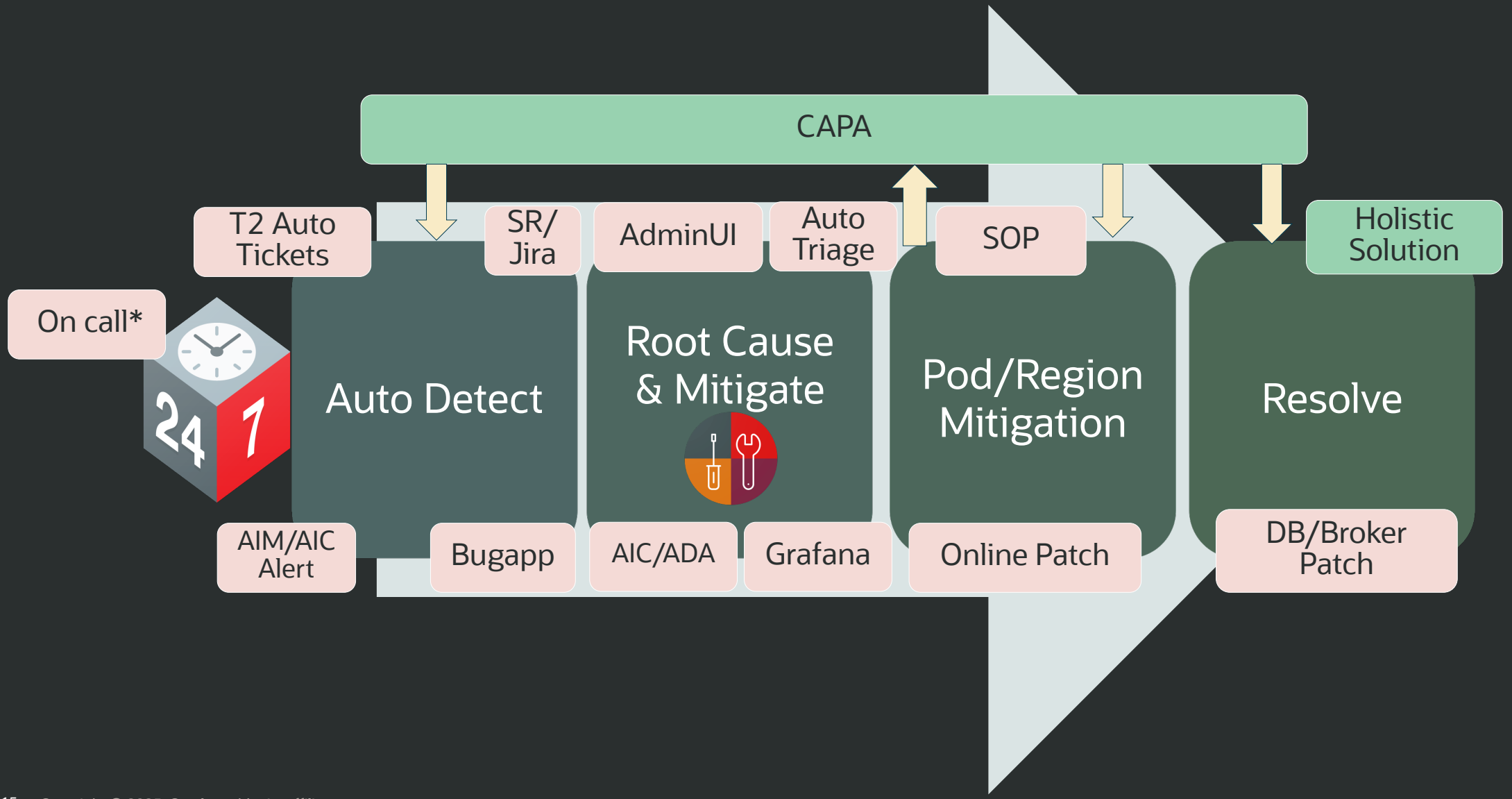
Typical provisioning time: 2-3 minutes

42+ billion

Queries per hour running globally across all data centers in average over the last 7 days (as of September 9, 2025)

oracle.com/autonomous-database/availability-metrics/

ADB-S: Operating Model



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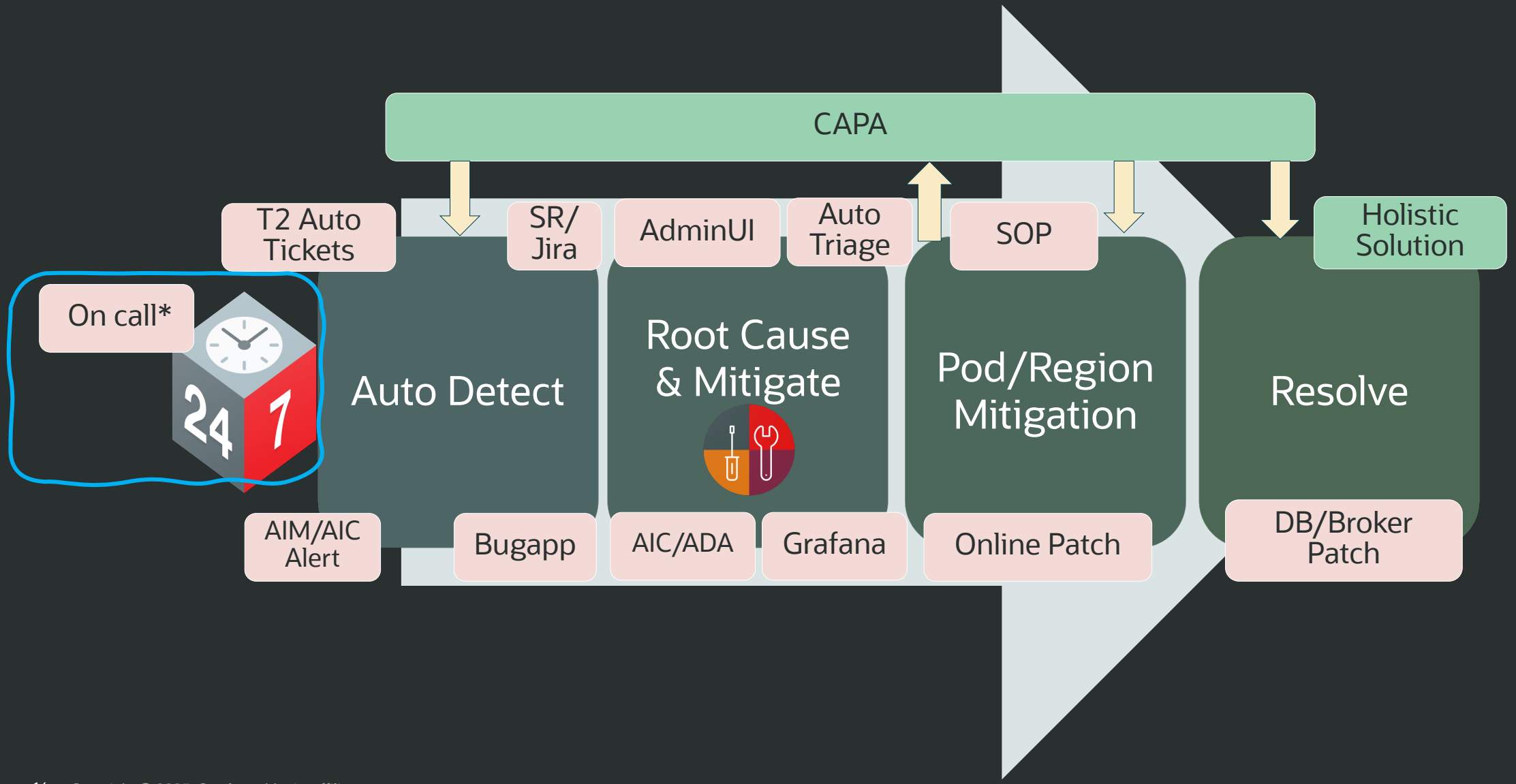

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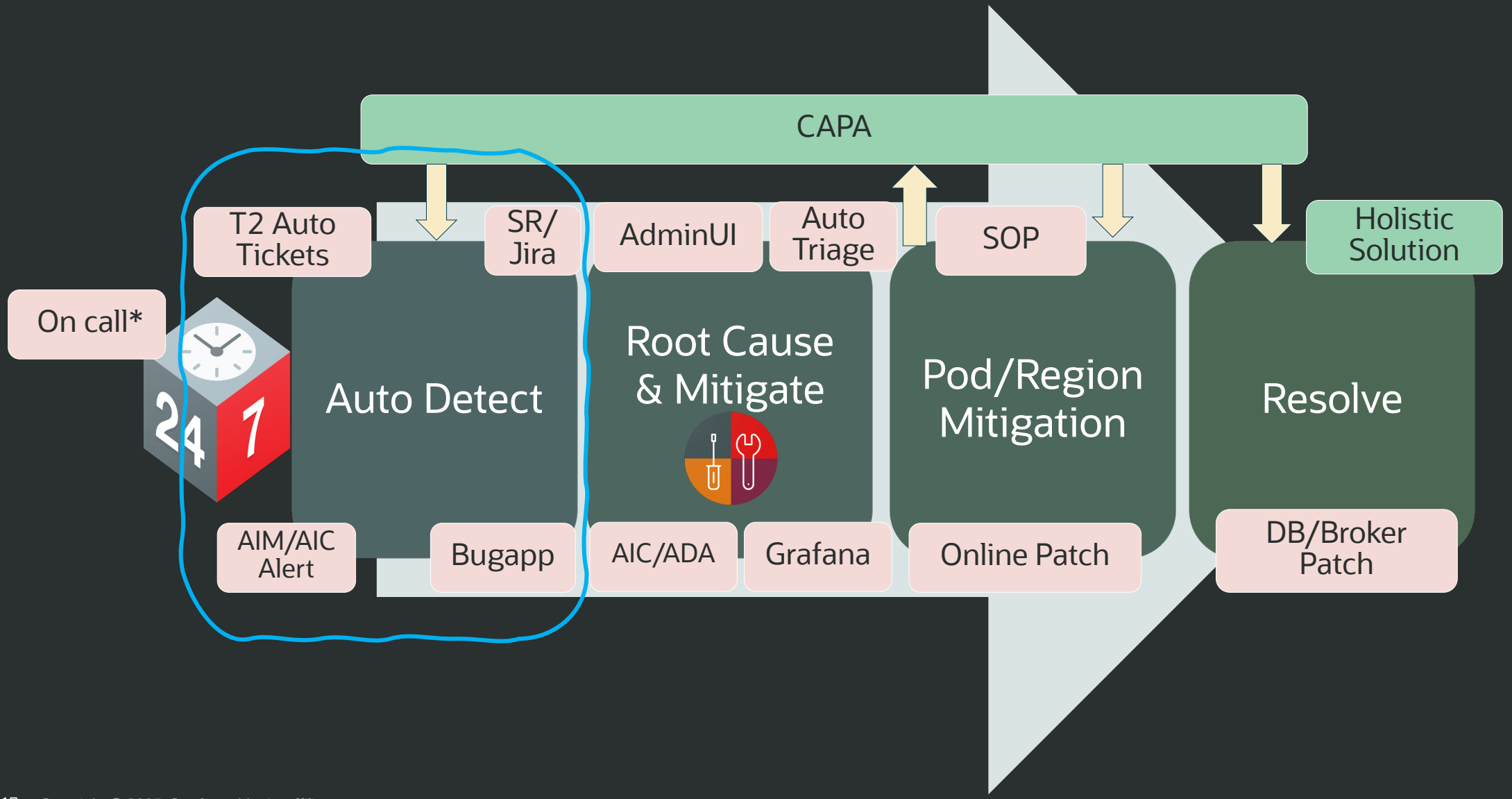
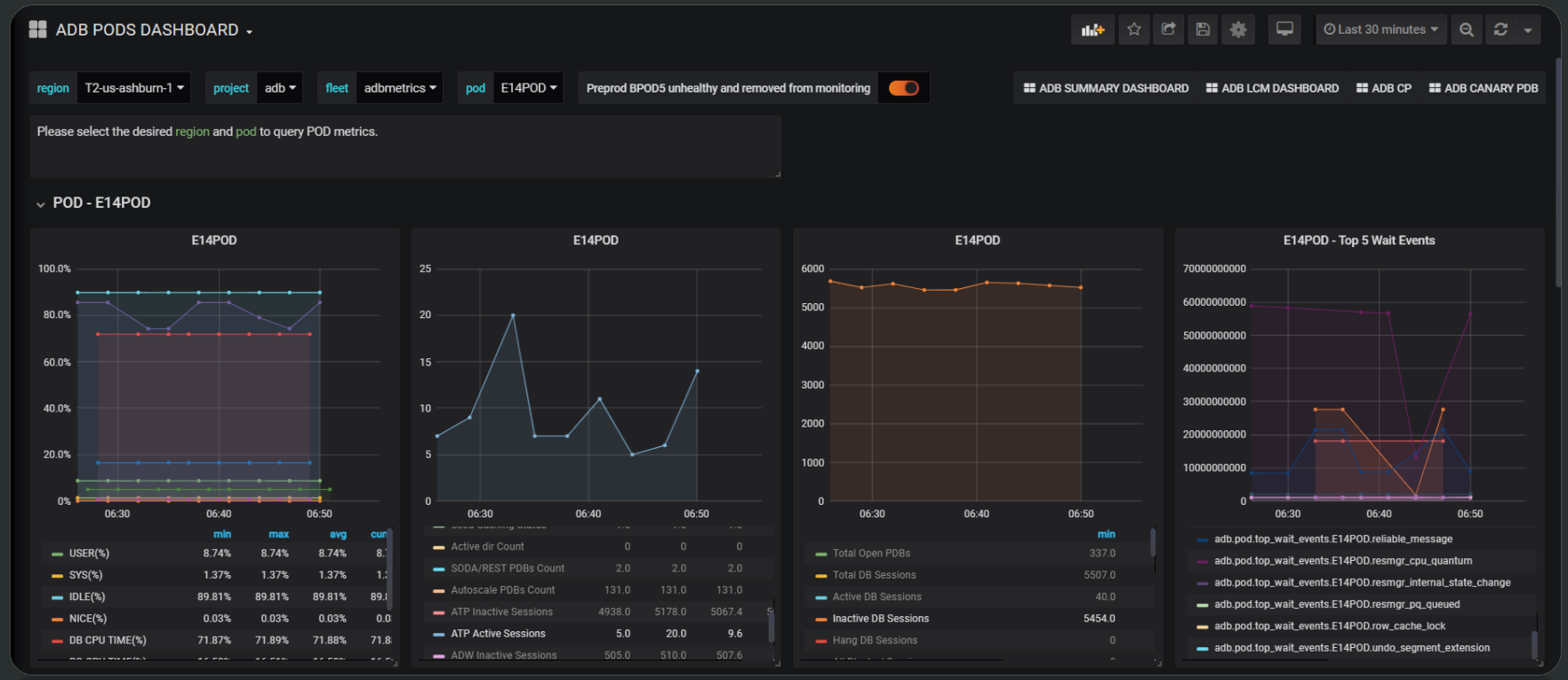


Maximizing reliability and availability via automated proactive monitoring

24*7 monitoring of:

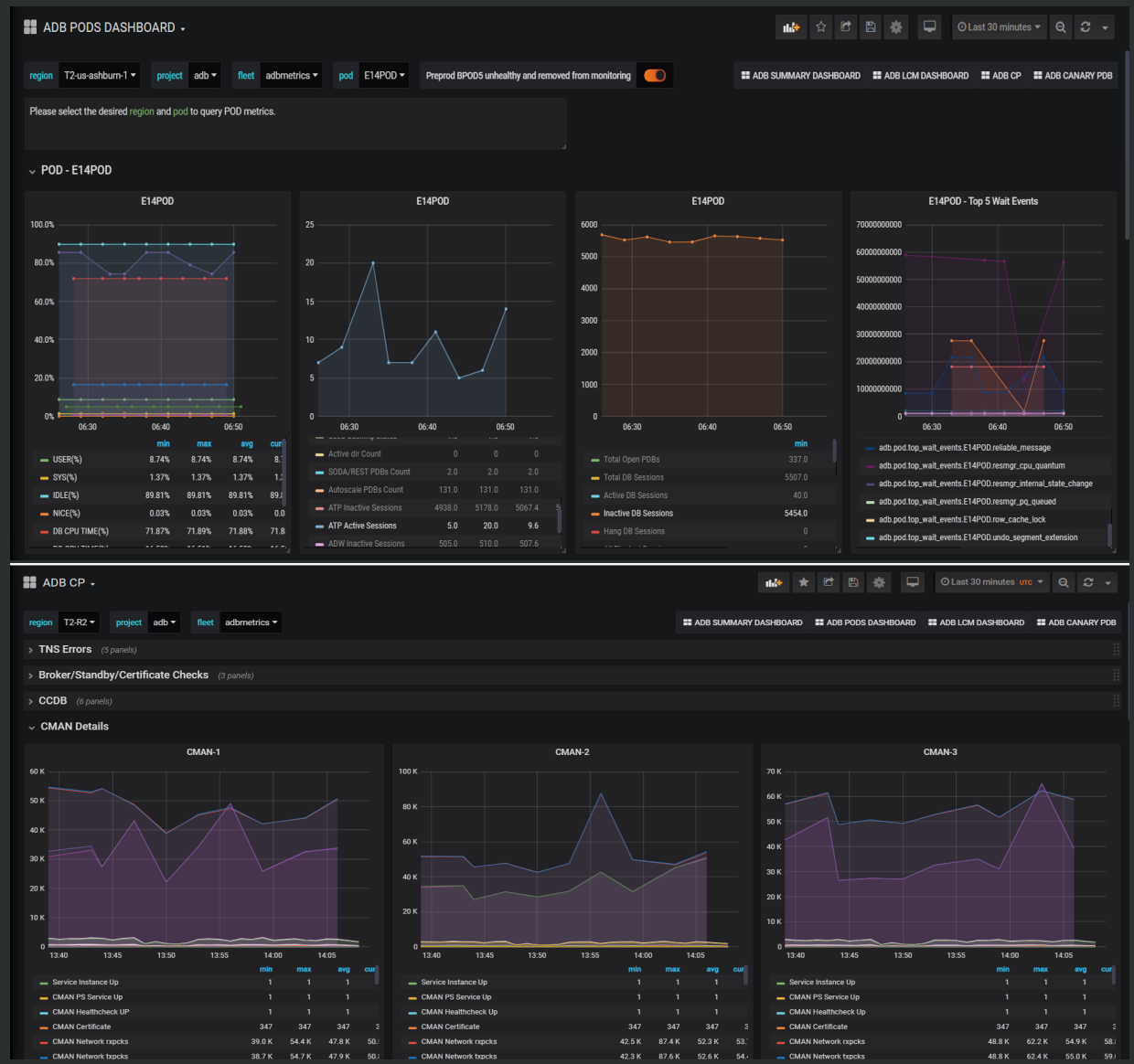
- Availability
- Connectivity
- Service Gateway
- SQL connections
- Ping times
- Latency
- Anomalies
- Capacity
- Timeouts
- Telemetry
- Host



Auto Detection

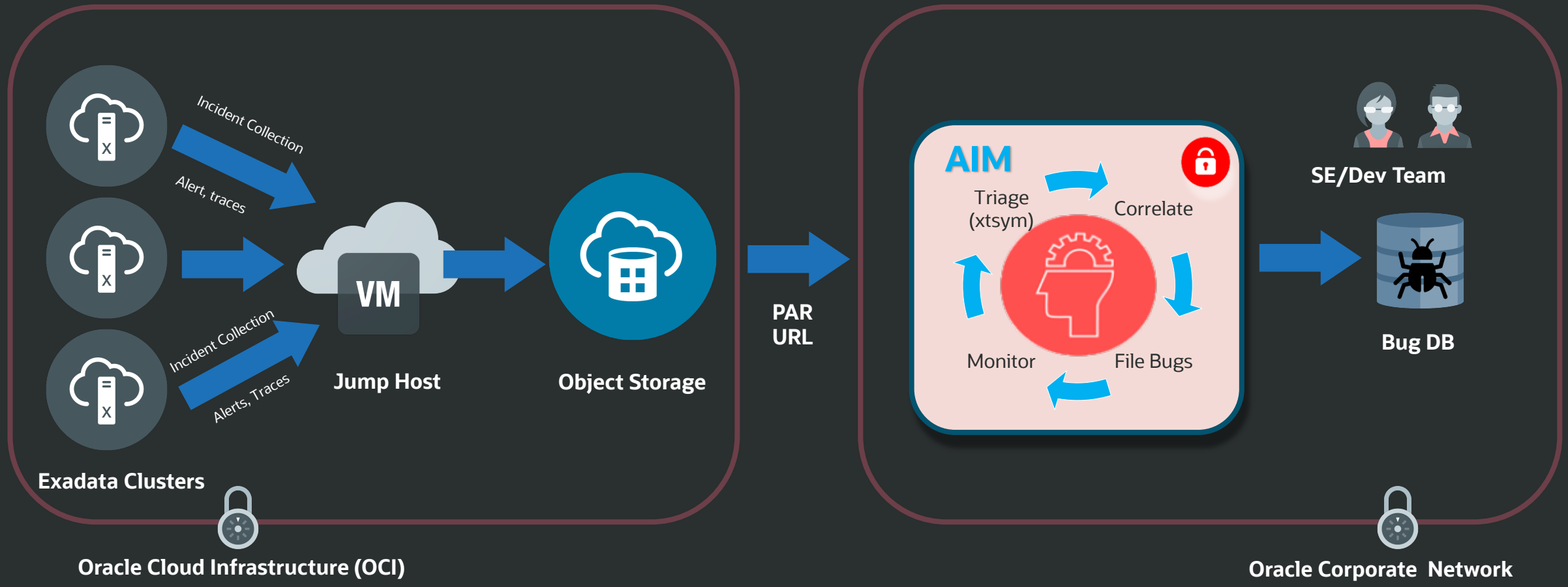
Telemetry T2 & Grafana

- **1500+ Alarms**
  - LCM Operations
  - Availability
  - Canary
  - Load Balancer
  - CMANs
  - ORDS
  - Apex
  - OML
  - Backup
  - Capacity
- **8000+ Metrics**
  - PDB Metrics
  - CDB Metrics
  - Host Metrics
  - Infra Metrics



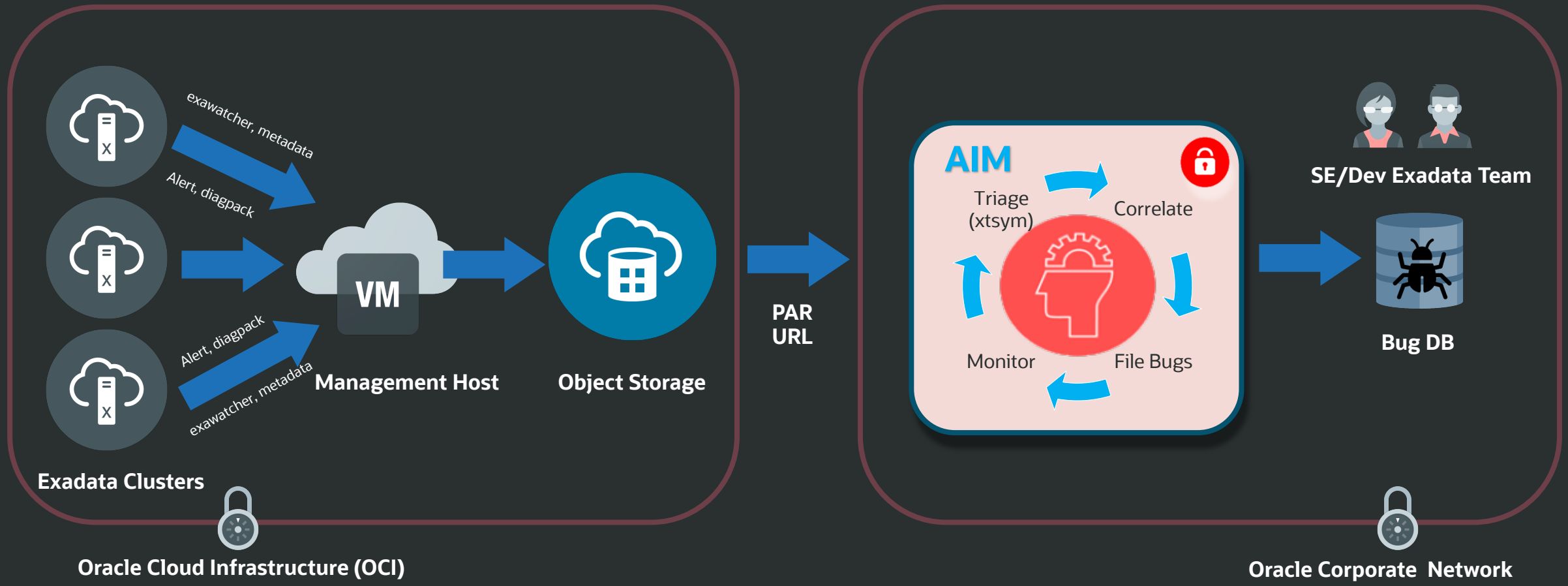
Auto Detection

AIM: Autonomous Incident Monitoring for Database Incidents



Auto Detection

AIM4Exa: Autonomous Incident Monitoring for Exadata Infra Incidents



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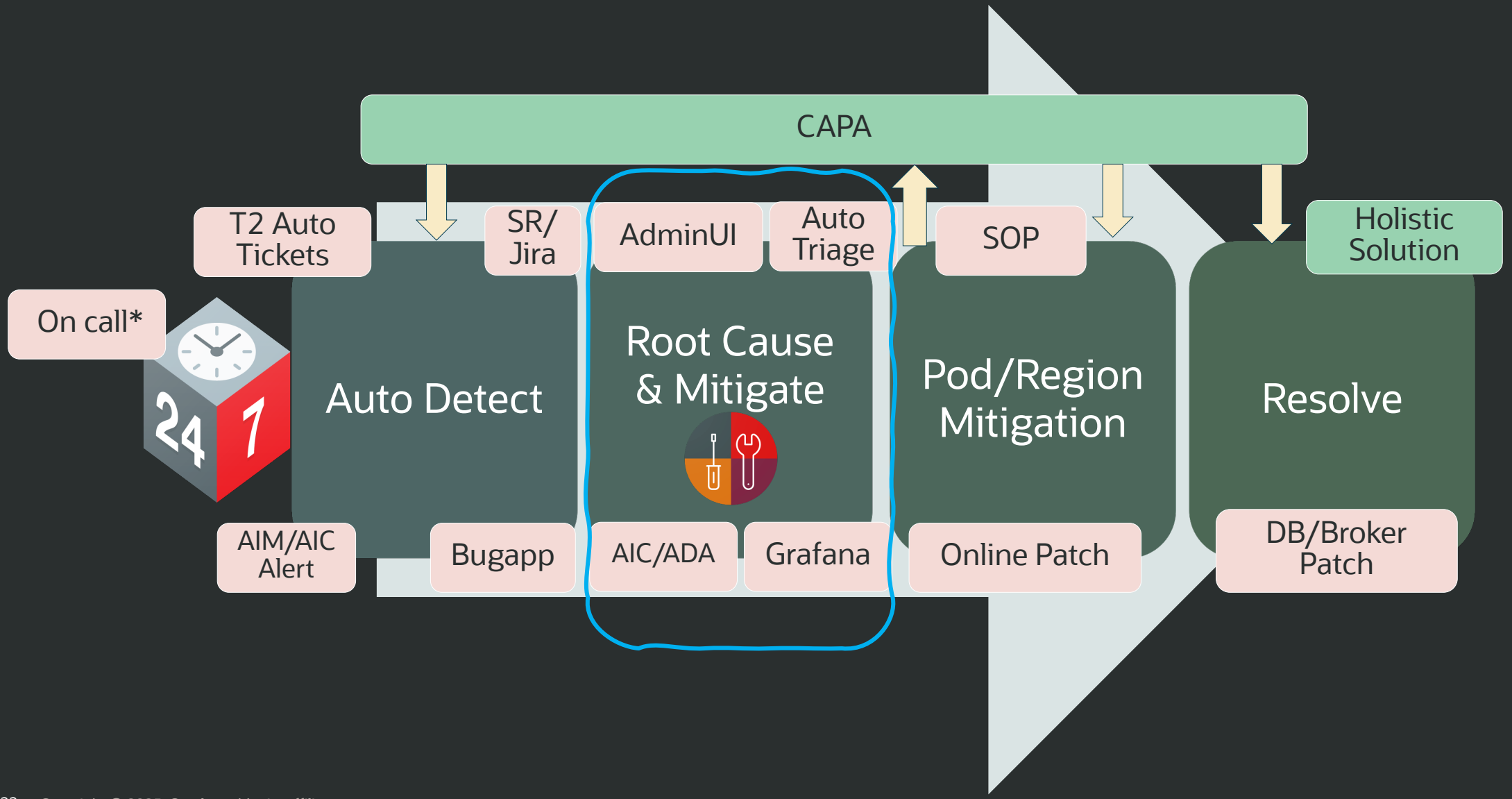
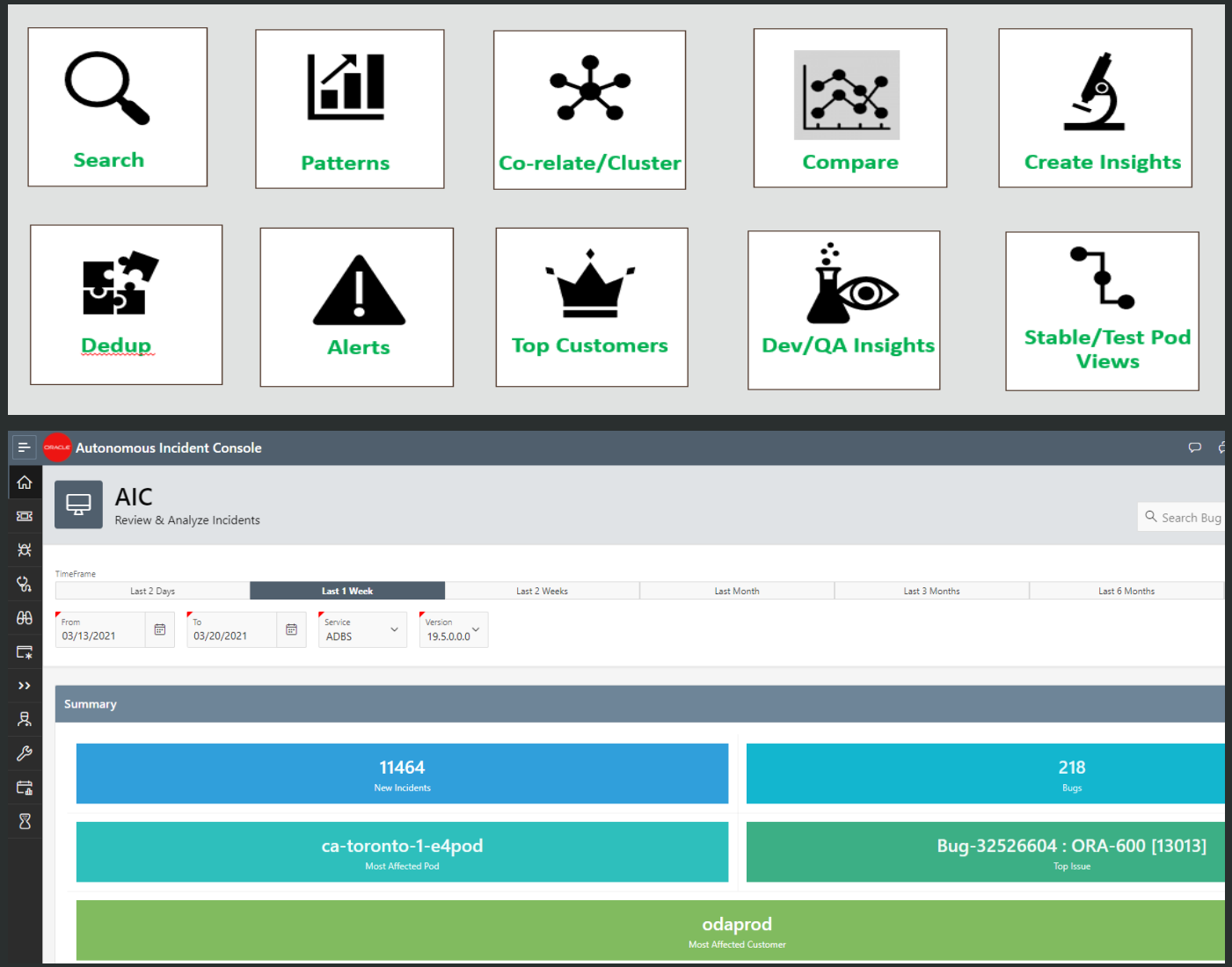


Root Cause & Mitigation

AIC : Autonomous Incident Console

- **One Stop Console**
  - Data for ADB Incidents
  - AIM & AIM4Exa bugs
  - Change/Human/Auto-Cut Jira*
- **Self-Service**
  - For Support/Developers/OPS
- **Insights**
  - Co-relation
    - Instance, node, infra
  - Anomaly Detection
  - Analysis/Drilldown for Dev/QA
- **Alerts**
  - Anomaly Detection



Insights

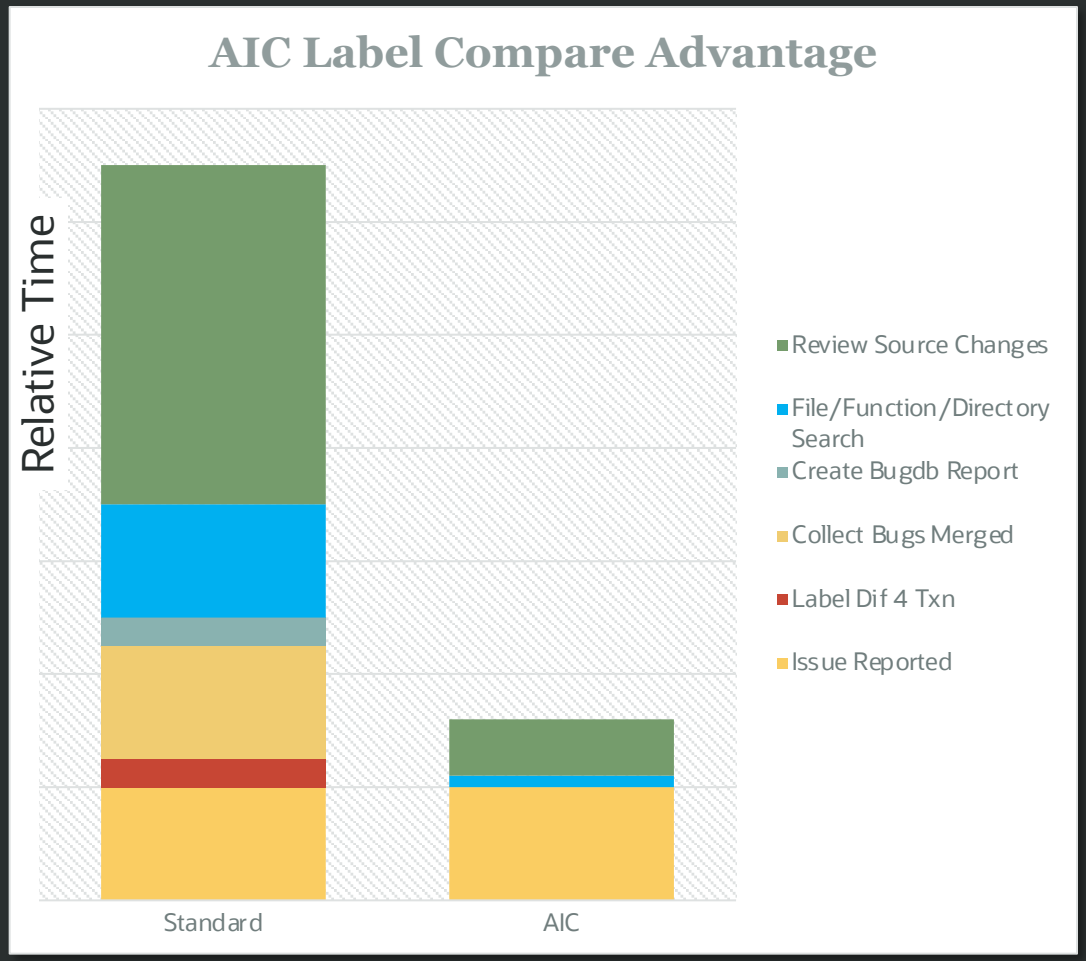
AIC: Enhanced Code Drift Analysis

Key Benefits

- Automatic Regression Detection
- Quick turn around for issues reported on Early Access to met Zero Regression SLO

Features

- AI Workflow to detect potential code Transaction based on symptom
- Compare Patches
- Categorization by areas
- Search by Function/file/directory/transaction



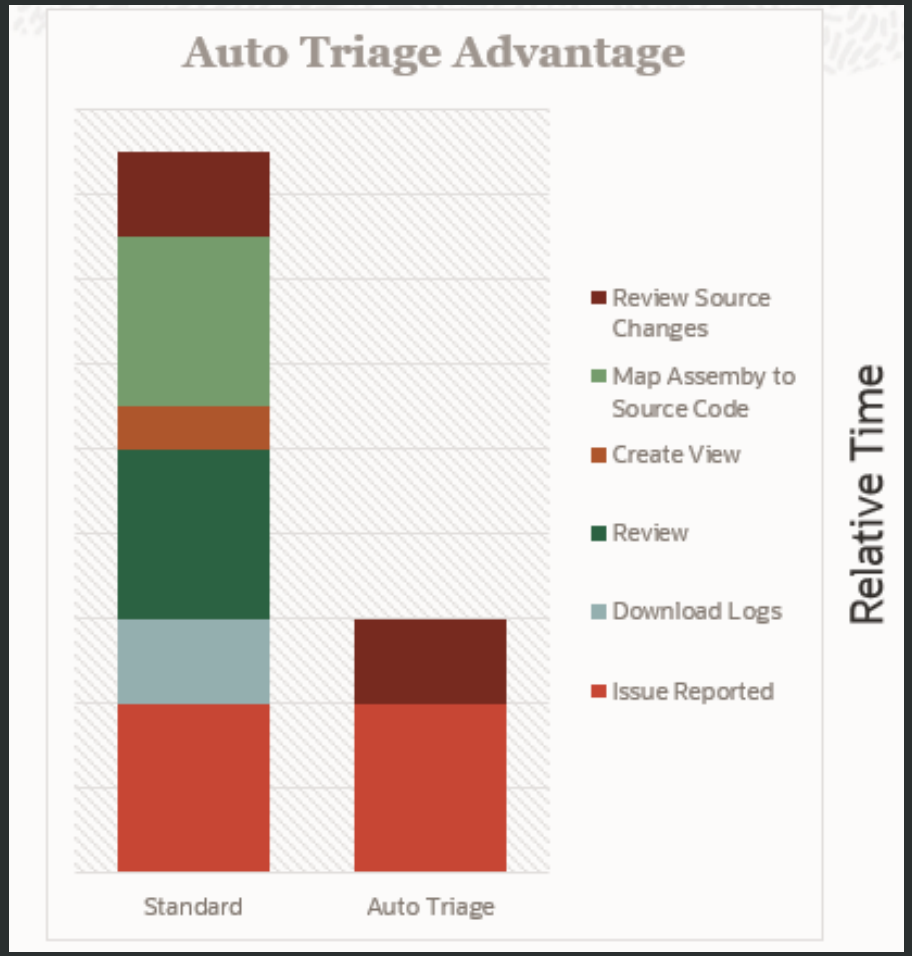
Root Cause & Mitigation

ADA: Automatic Diagnostic Access

- Fully Automated
  - no ops/support involvement
- 30+ Types of collection (more to come!)
- Fulfilled within 60 mins
- Automatic Collection based on AI Recommendation based on Issue type
- Diagnostic processed by **Auto Triage** before Developer gets to it

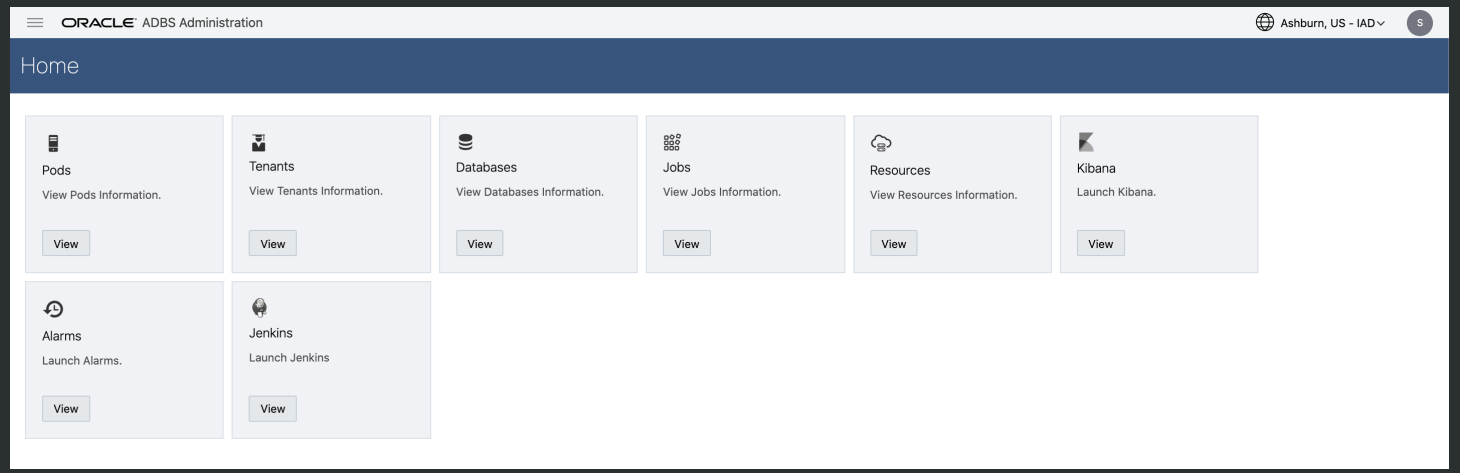
Auto Triage – Enriched Diagnostics Analysis

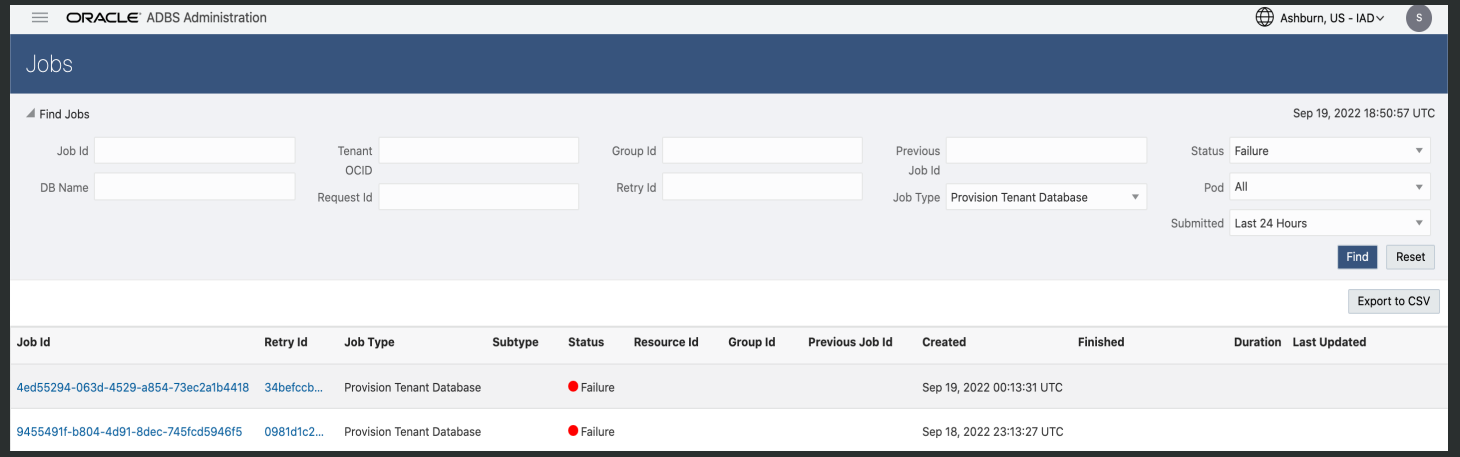
- Automate Repetitive Tasks
- Highlight key evidence specific to area + symptom(s)
  - Context Sensitive Parsers*
- Assist in accessing, interpreting & navigating bug evidence
  - Correlate commonly reviewed diagnostics
- Auto request missing key evidence
- Advise on common or significant issues seen
- Shared Diagnostic mounts
- Triage AI*



Root Cause & Mitigation
AdminUI

- Console for Administration
- Provides
  - Check db attributes
  - Check tenancy details
  - Review Jobs, logs
- Access Controlled based on role
  - Operations
  - Support
  - Development

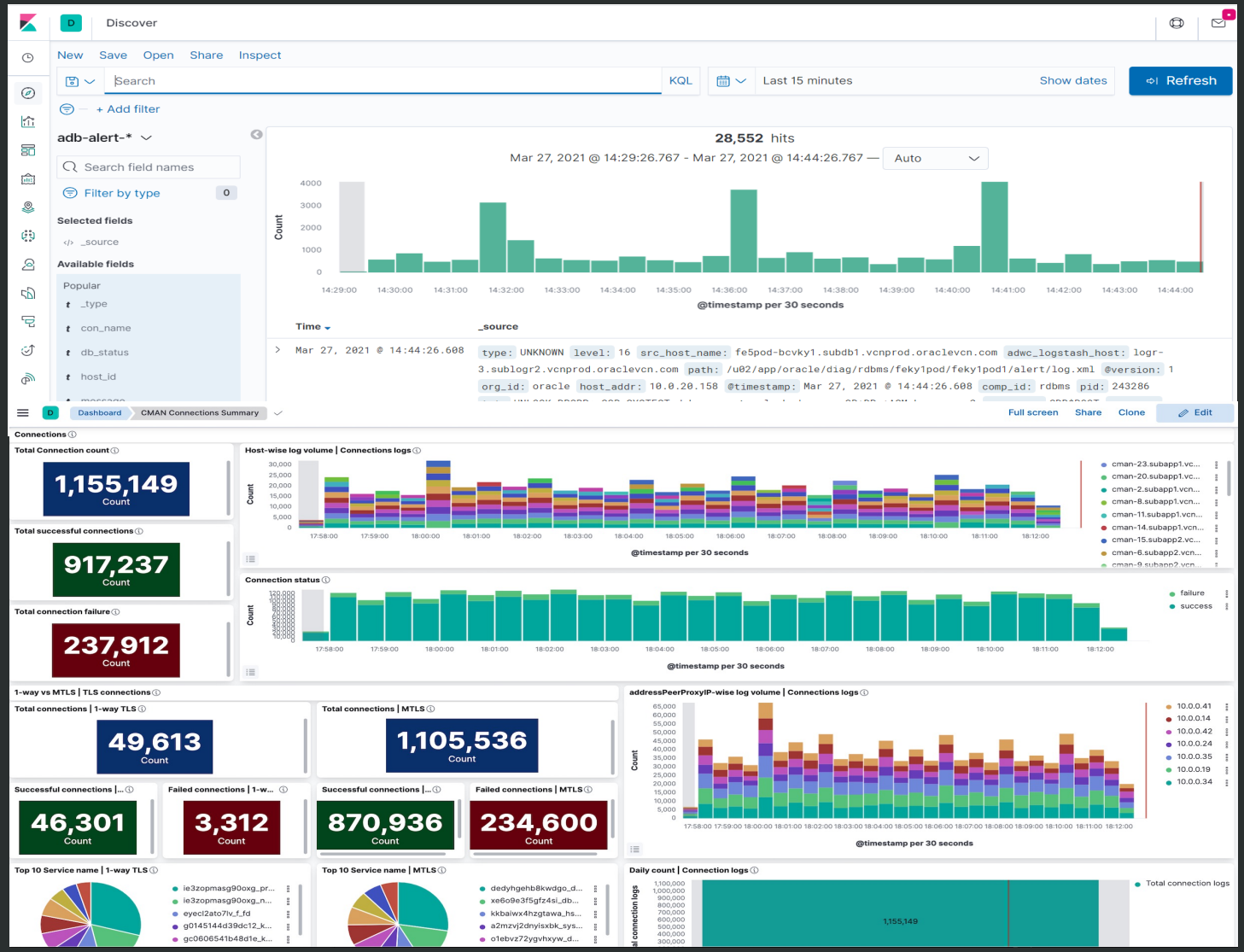




Root Cause & Mitigation

OpenSearch

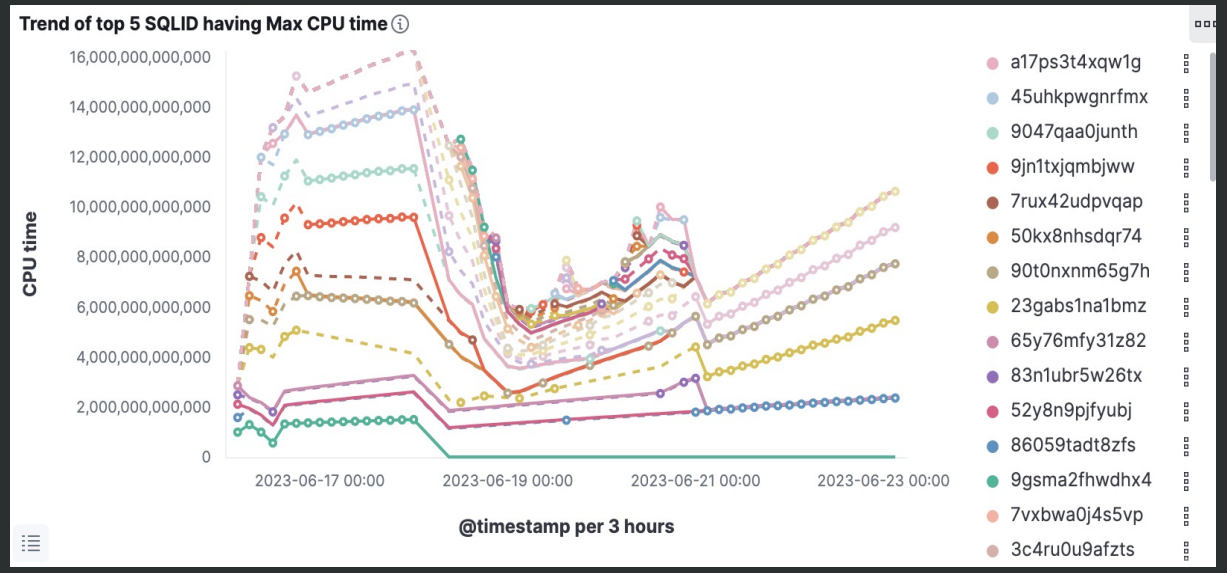
- Review Live Logs in real time
  - Alert.log
  - Cman logs
  - Listener logs
  - Broker
  - Metrics Logs
  - Ords logs
  - OML logs
  - Sys logs
- Pre-Built Dashboards
- Co-relate Incident
- Slice/Dice data

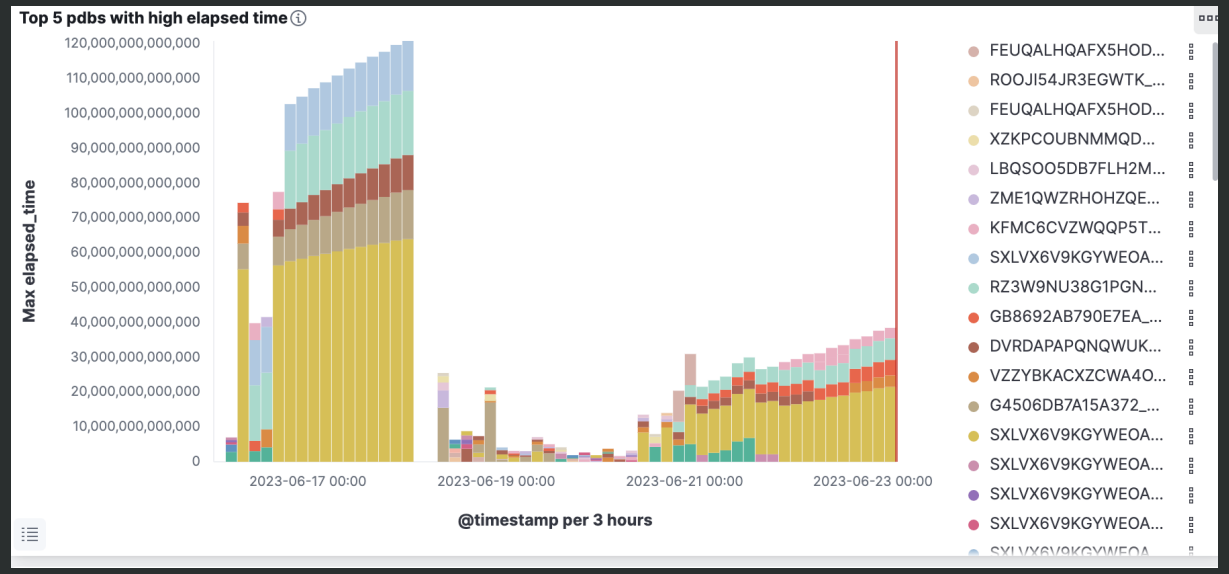


Root Cause & Mitigation

SQLStats

- All sql_ids from all PODs are being collected and pushed to ELK/Opensearch.
- Various parameters are being collected for each sql such as
  - Cpu time
  - Elapsed time
  - Disk reads
  - Number of executions
  - Full Plan hash value
  - User IO Wait time
  - Buffer gets
  - Fetches
  - Parsing Schema Name
- For triaging performance issues by trending sql_id execution data over time.
- These dashboards also support the selection of pdb and a particular sql_id to monitor.





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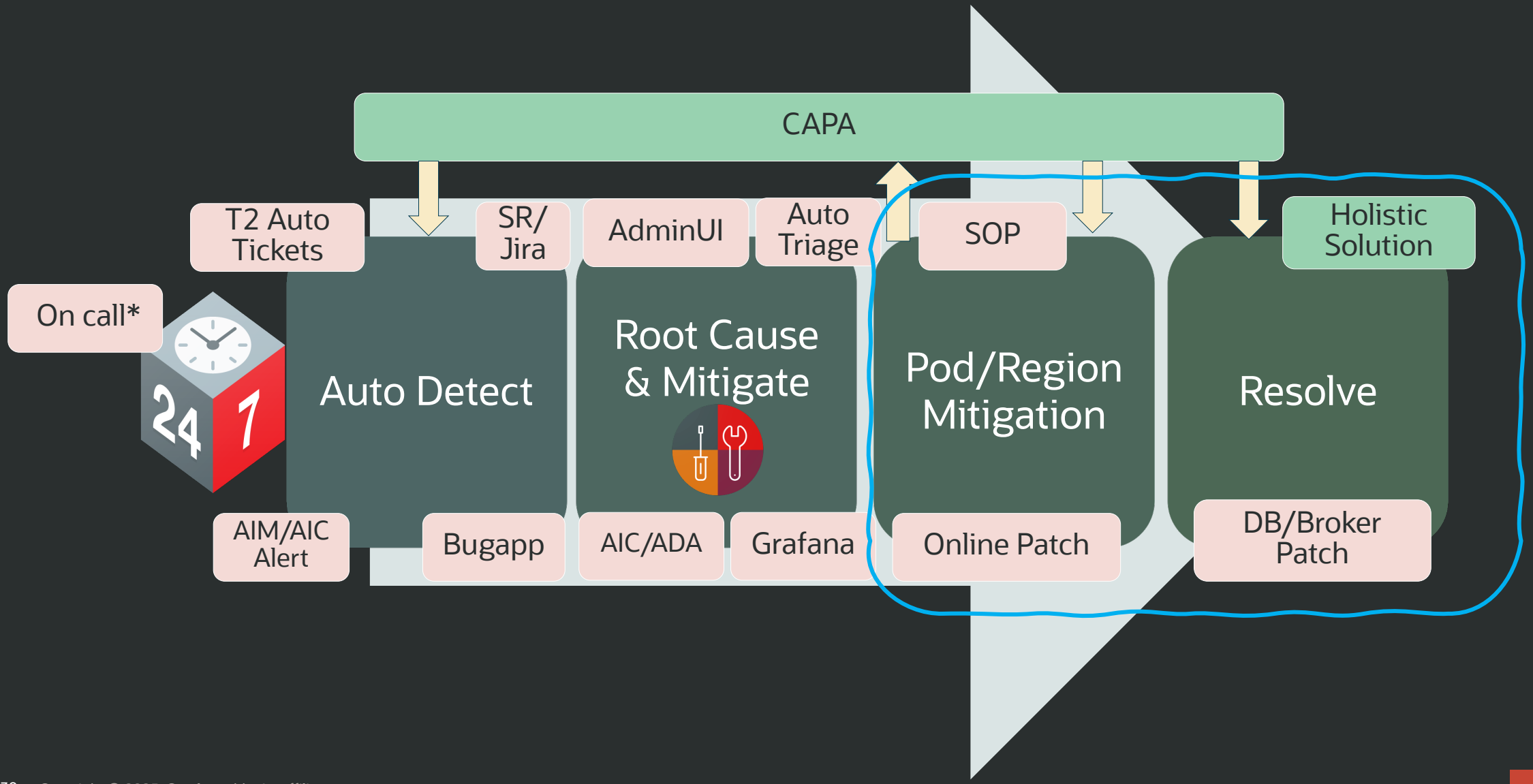
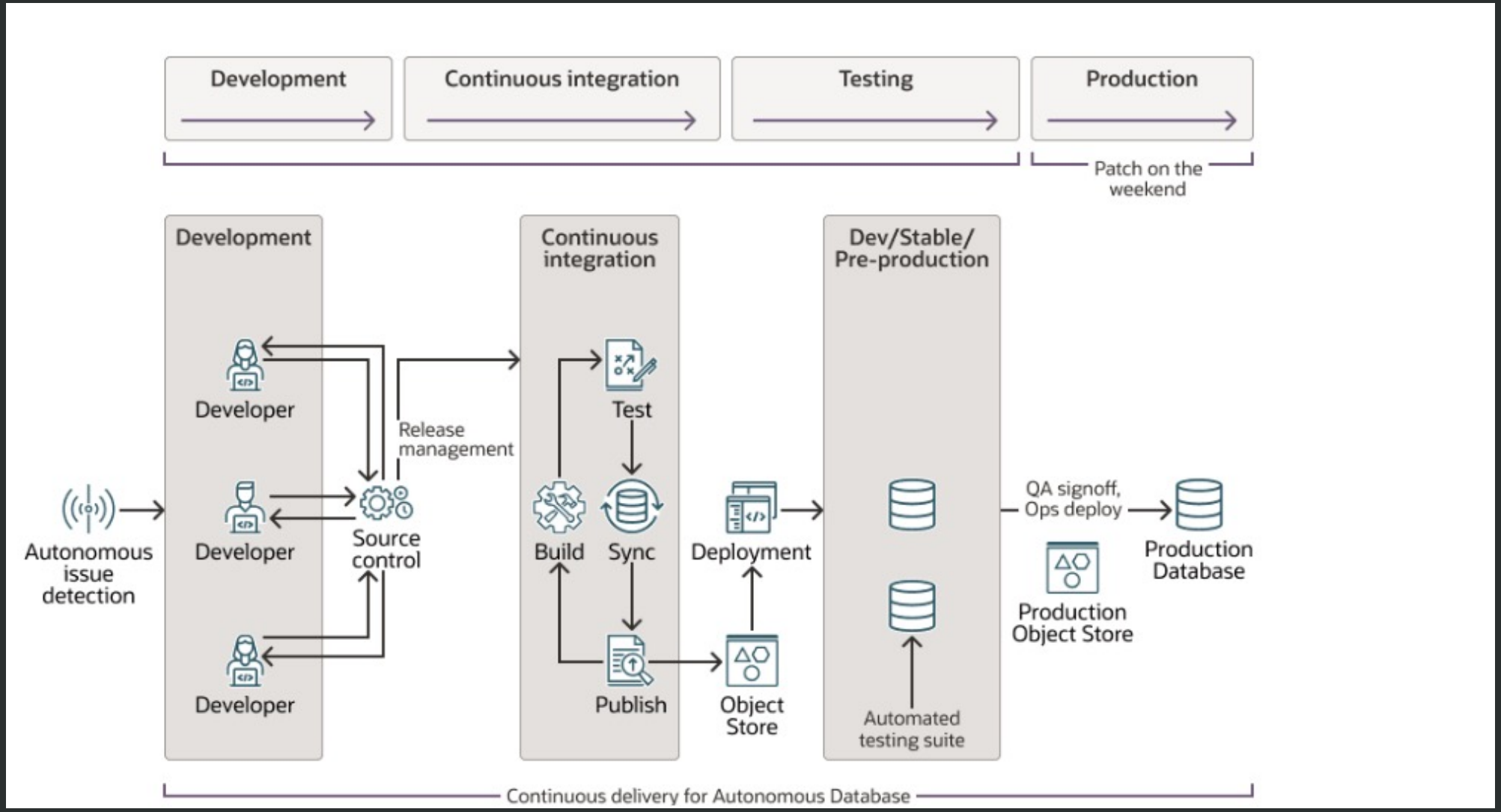


Continuous Integration – Continuous Delivery
From issue to Resolution



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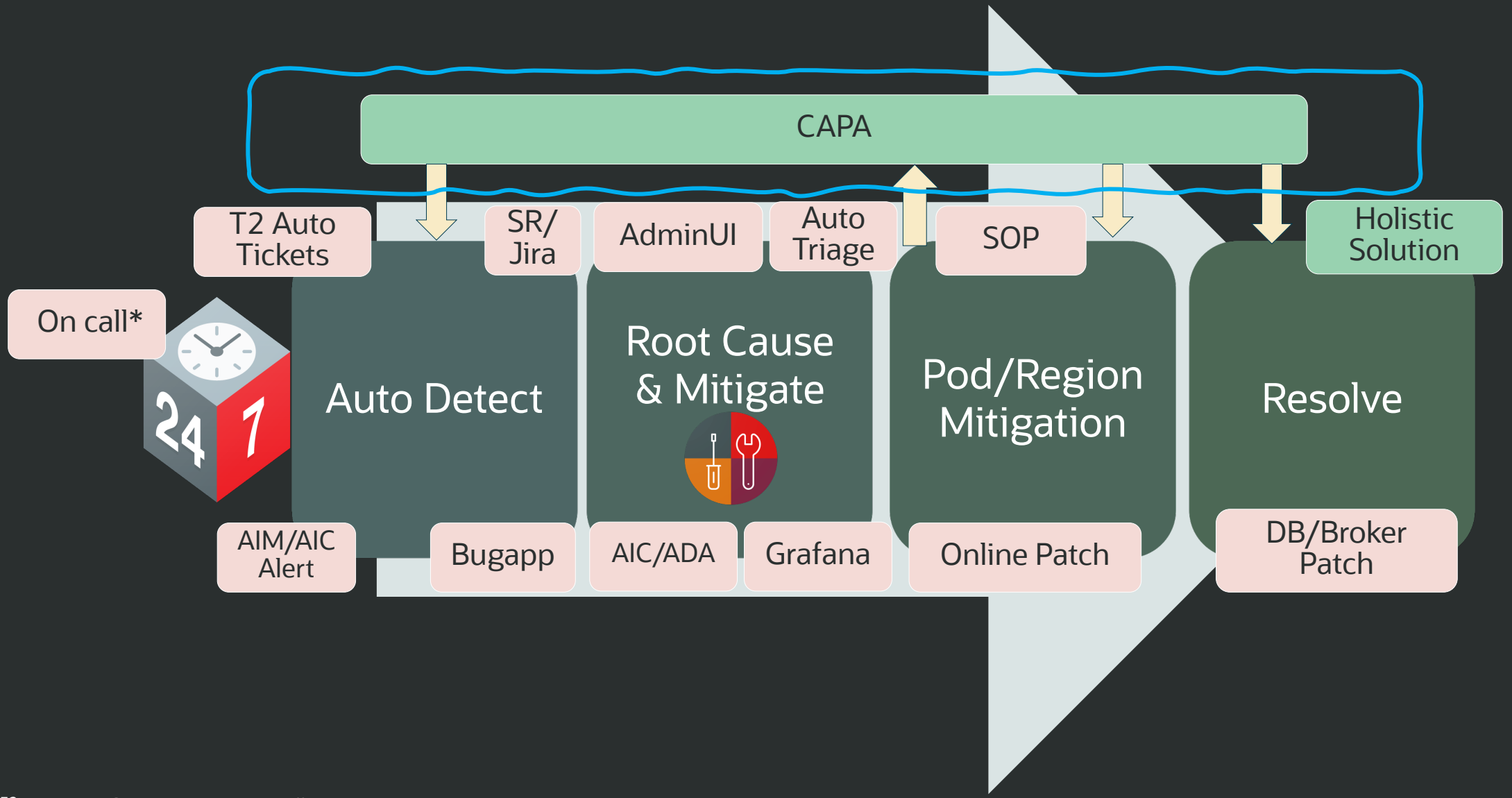


CAPA*

Major Incident

- Impact
- Blast Radius
- Mitigation Time

Blameless Postmortem => CAPA

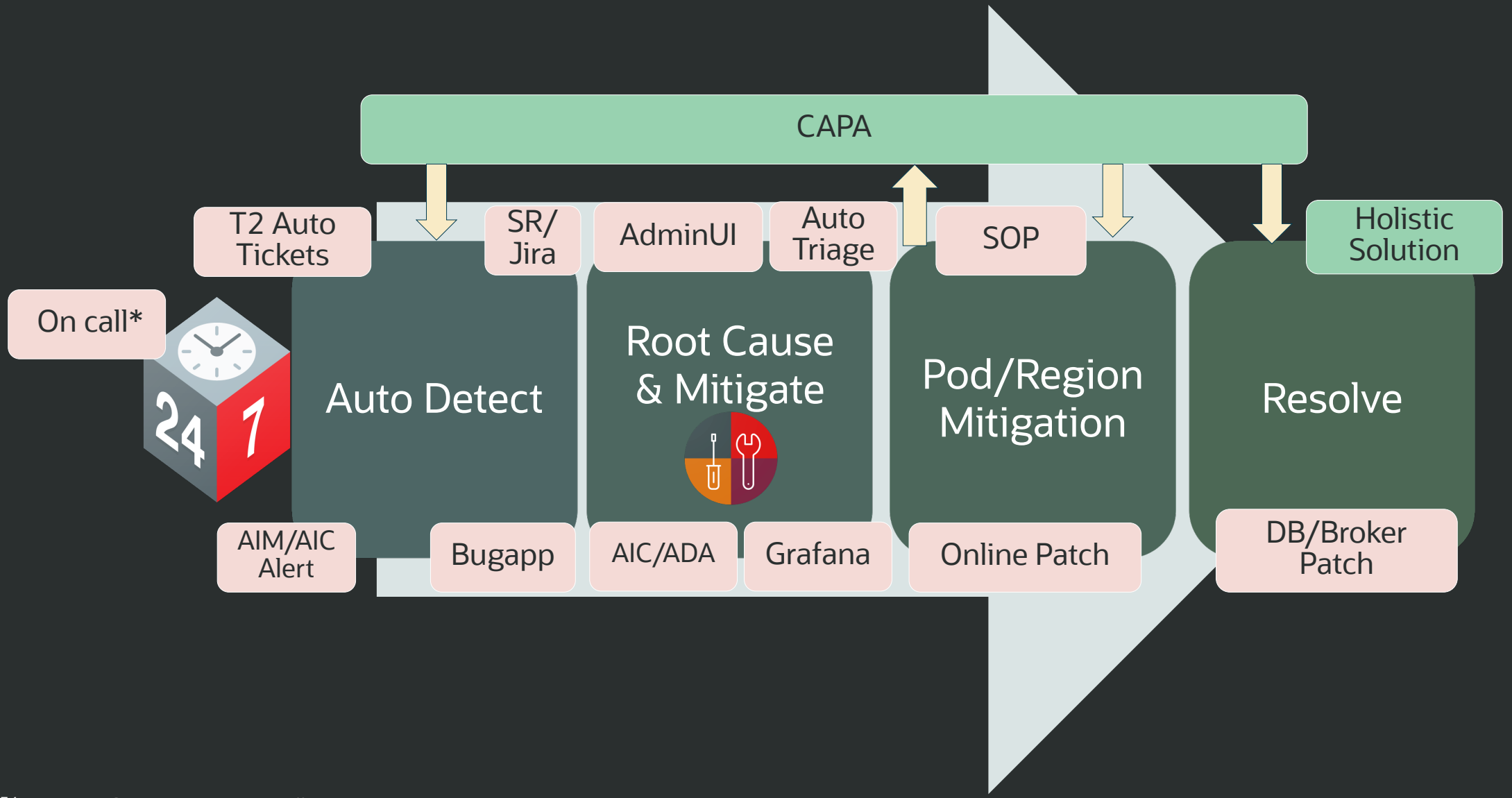
- Review gaps and opportunities using five whys
- Product/Monitoring/Diagnostics/Process Improvements

End to End Tracking of CAPA Actions

- CAPA tracked using Jira, Bugs
- Actions implemented and/or merged into code base

***CAPA**: Corrective Actions Preventive Actions

ADB-S: Operating Model



Autonomous Database Aviator Program - Leveraging Early Patch Level

Minimize risks to production environments

ORACLE Products Industries Resources Customers Partners Developers Company View Accounts

Autonomous Database Aviator Program

A unique program run by Database Development team to guide customers and partners through the process of provisioning new environments and modifying existing environments to receive early access to the automated patches that are part of the regular maintenace process.

Overview of Patching | Patching Best Practices | Oracle Aviator Program | How to sign-up

Autonomous Database Aviator Program - Leveraging Early Patch Level

Minimize risks to production environments

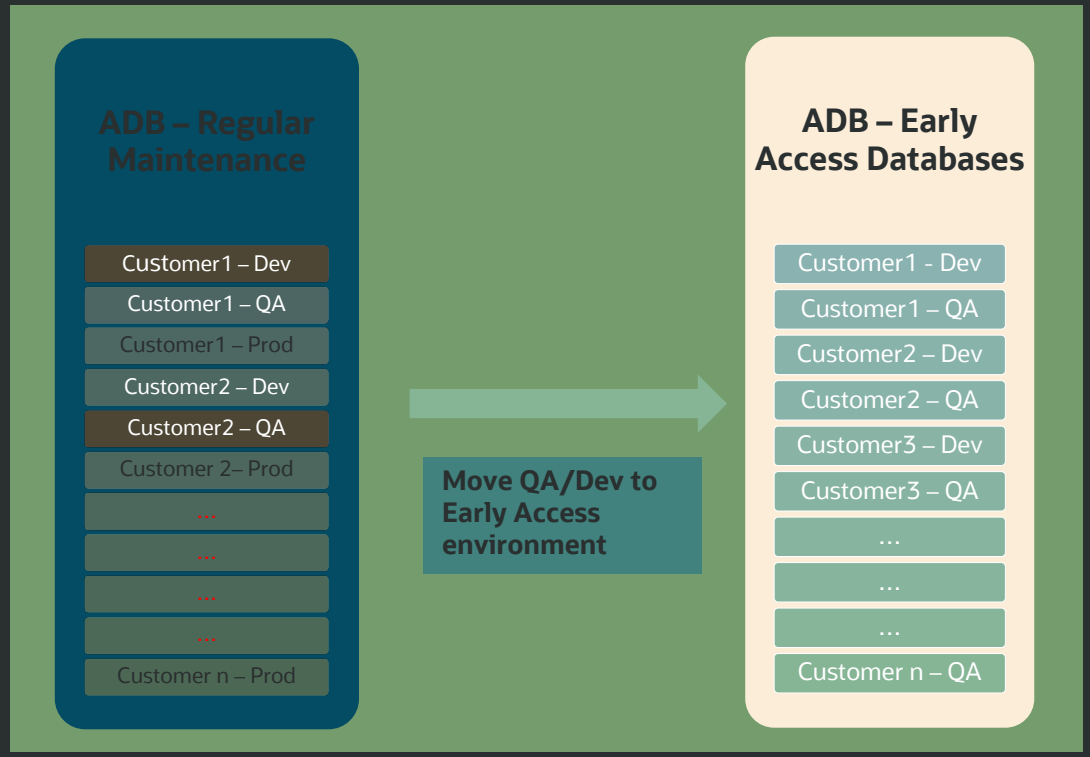
Gain early access to patches

- Designate one or more systems
- Test patches against application(s)
- SLO for zero regressions

Get enhanced support from the Aviator team

- Best practice guidance
- Onboarding assistance
- Automatic Monitoring resolves 60% of issues
- Accelerated handling of SRs

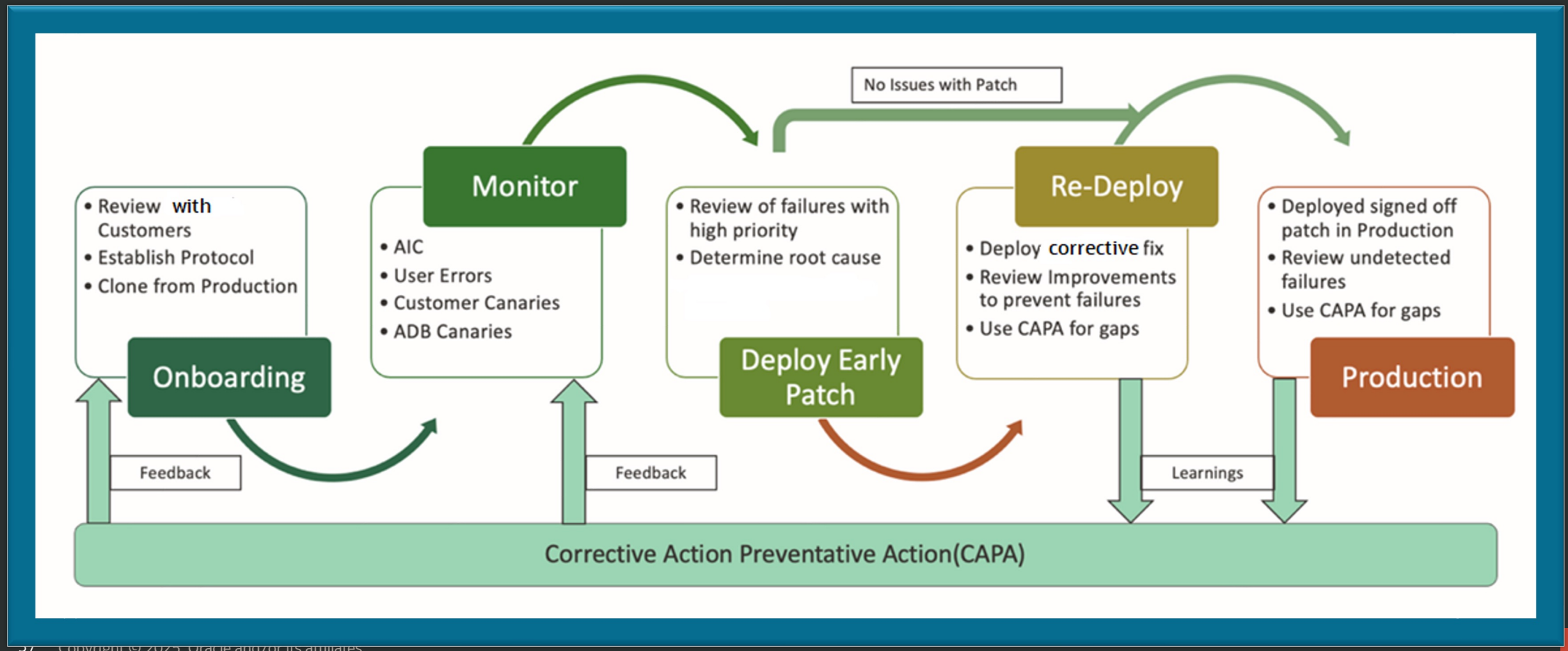
When your production systems are patched you can be much more confident that there will be no unexpected issues..



Autonomous Database Aviator Program - Leveraging Early Patch Level

Minimize risks to production environments

- Early Access environments provide a platform to test and detect issues before production deployment
- Increase stability and availability by avoiding disruptions in production
- Leverage your existing QA/UAT environments by converting from regular to early patch (***at no additional cost***)
- Reduce impact to your most mission critical workloads



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Q&A is open

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Links to get you started and to keep up to date with Autonomous Database

1 **Get Started with ADB:**
oracle.com/autonomous-database/get-started/

2 **Join us:** bit.ly/adb-linkedin-grp

@AutonomousDW

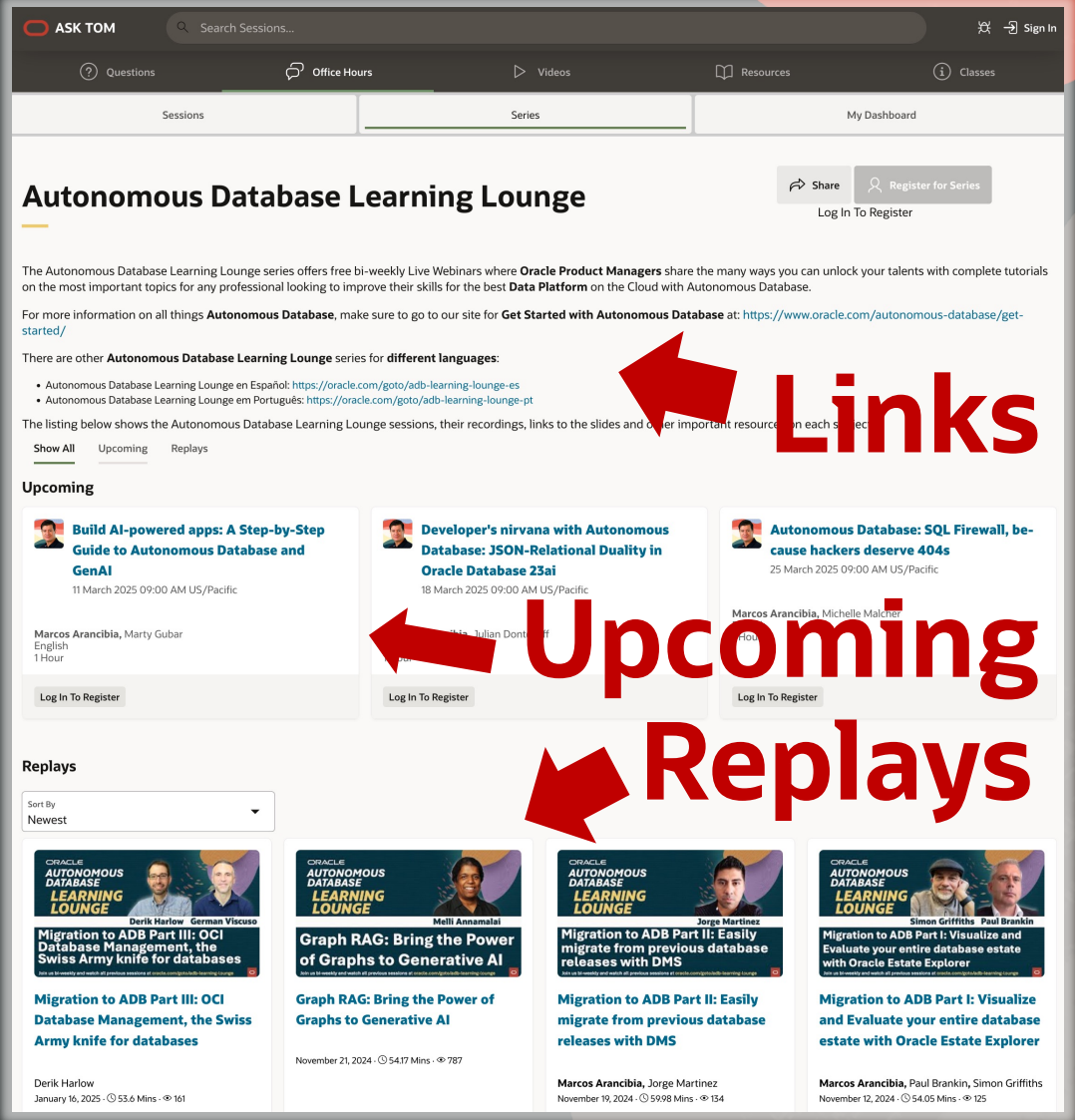
Bluesky
autonomousdb.bsky.social

3 **Got a question?**
We are on stackoverflow
bit.ly/adb-stackoverflow

Join us on Developers Slack
(search #oracle-autonomous-database)
bit.ly/odevrel_slack

Final Thoughts

oracle.com/goto/adb-learning-lounge



Thank you for joining !!!

AUTONOMOUS DATABASE

LEARNING LOUNGE