Community of Practice

Augmented Reality in the DC

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Business Idea Brief

Problem:

- Data centers are fast moving environments with high demanding reliability and availability requirements. The way we resolve incidents in the DC has a huge impact in SLAs and operations for large and complex companies. We cannot wait on the next available expert to work on the issue without incurring in penalties.

Solution Scenario:

The application will be able to provide directions within the DC to the area having problems and then overlay a graphic, highlighting the device in question. Showing out a 3D scheme, we are now able to easily identify the device that will be displayed in red. After scanning a QR code in the server, you will receive real-time notifications/alarms.

Personas/Roles:

- Field Engineers
- Data Center Managers
- Engineers

Unique Value Proposition:

- Avoid human errors in the DC.
- Automate the way we troubleshoot and resolve incidents.
- Save costs by reducing SLA resolution and minimizing the expertise in the DC.

Oracle's Advantage:

- This application will be part of Oracle's Cloud internal Infrastructure Management platform.
- Service can be released and sold for large Telco/Enterprise companies
- It's the foundation for embedding the application into Robots to provide Level1 support.

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Why Augmented Reality?

- Can be used by anyone. No need of expertise in the Data center.
- Reduces human errors
- Helps reducing costs. Forget about SLA penalties.
- Increases operation speed. Fast time-to-market of new services with zero downtime.
- AR system is highly interactive.
- AR offers improved and precise information. Receive real-time notifications during the process and update systems accordingly.

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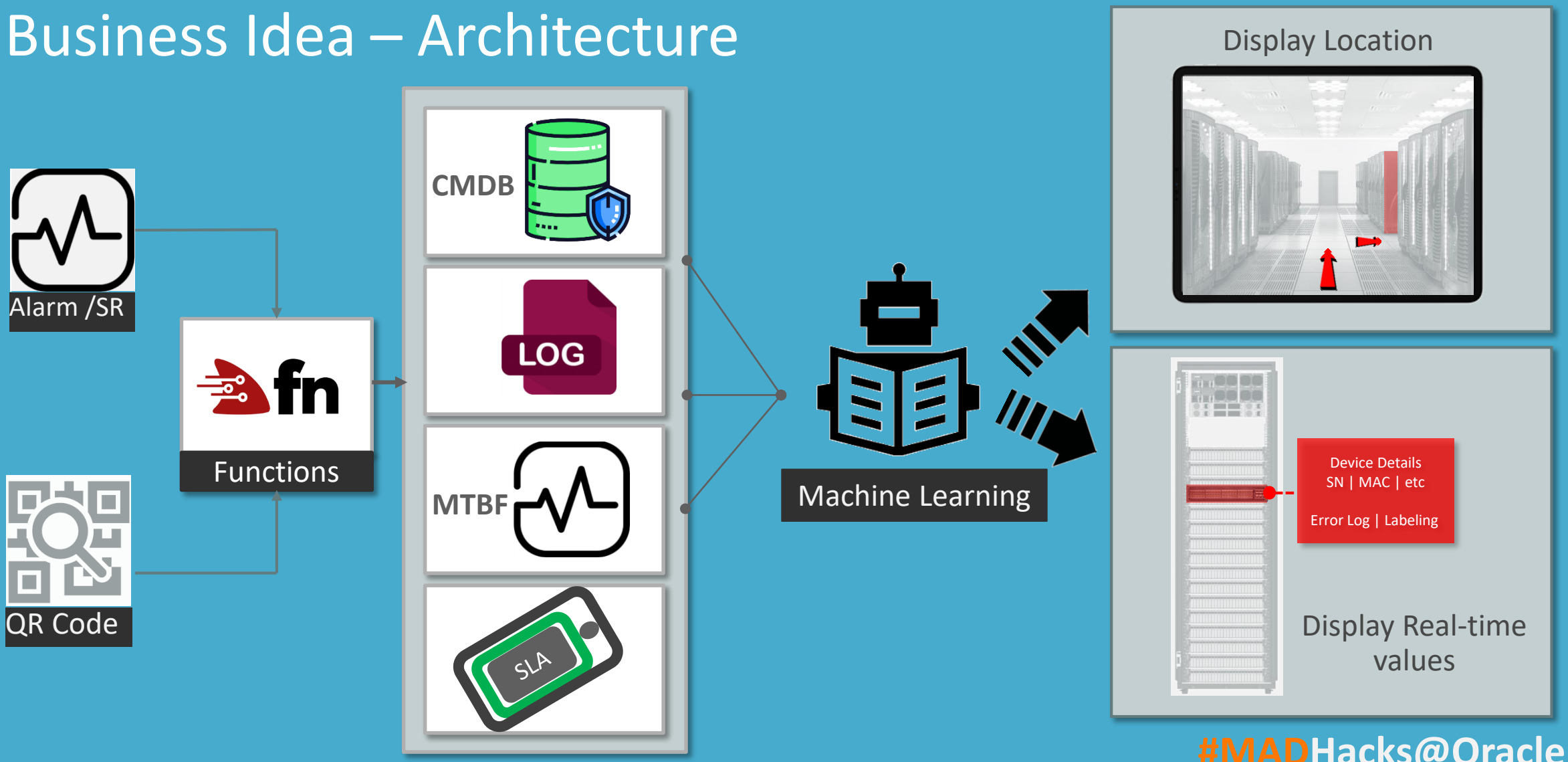
Business Idea – Architecture



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Additional Info

How this solution would work

- When an Alert is detected, the application will be able to provide directions to the Field Engineers within the DC and will overlay a 3D graphic, highlighting the location of the rack and the server that is facing problems. The field engineer can then scan the QR code of the device to display in red and see real time key data about the are he is troubleshooting.
- Alerts will trigger our serverless service that will capture information from different systems (CMDB, logging, monitoring and SLA). Engineer will receive real-time notifications during the whole process and will have visibility of the remaining time to meet the SLA.
- Only authorized devices are set to work with the application. An API protected library is installed to protect from unathorized devices.

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Application Layout

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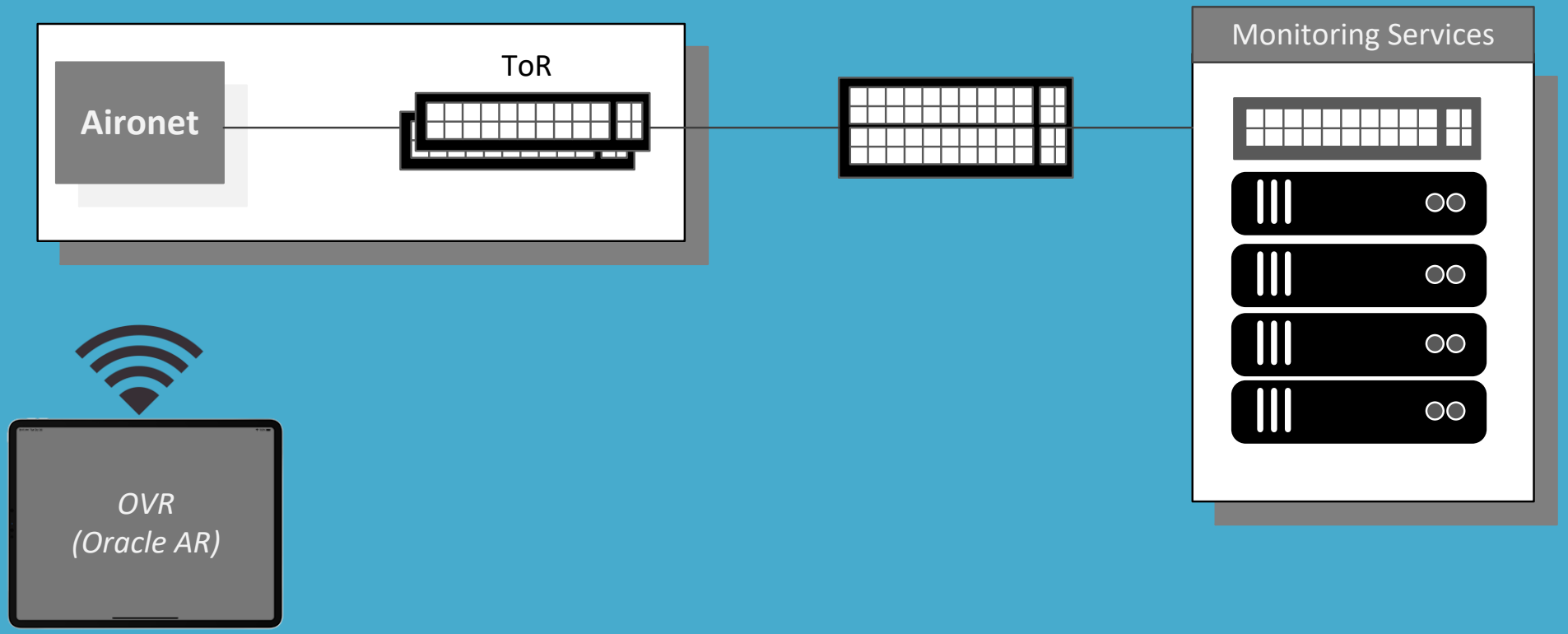
Connectivity High Level Overview



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Component High Level Overview

Each DC device is comprised of:

- API Protect Library Installed
- Augmented Reality DC App

- API library will guarantee that only authorized devices can Access Oracle Monitoring Systems

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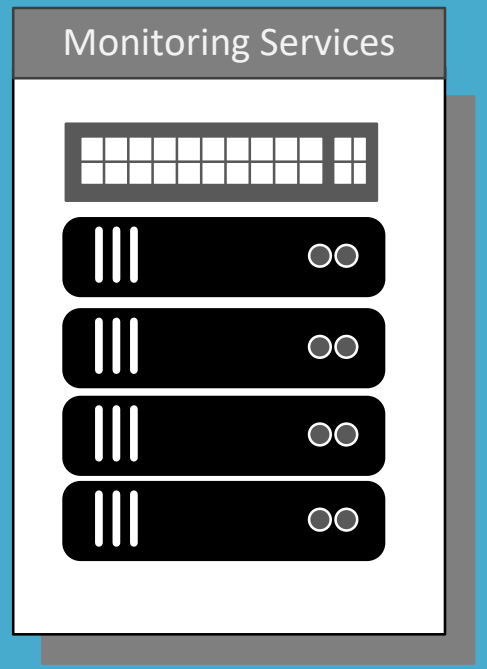
Component High Level Overview

Monitoring Services

- CMDB
- Logging Systems
- Monitoring Service
- SLA
- MTBF



- Machine Learning and Analytics applied to above components
- Output: Proactive prediction / Provide real time info during maintenance or troubleshooting.

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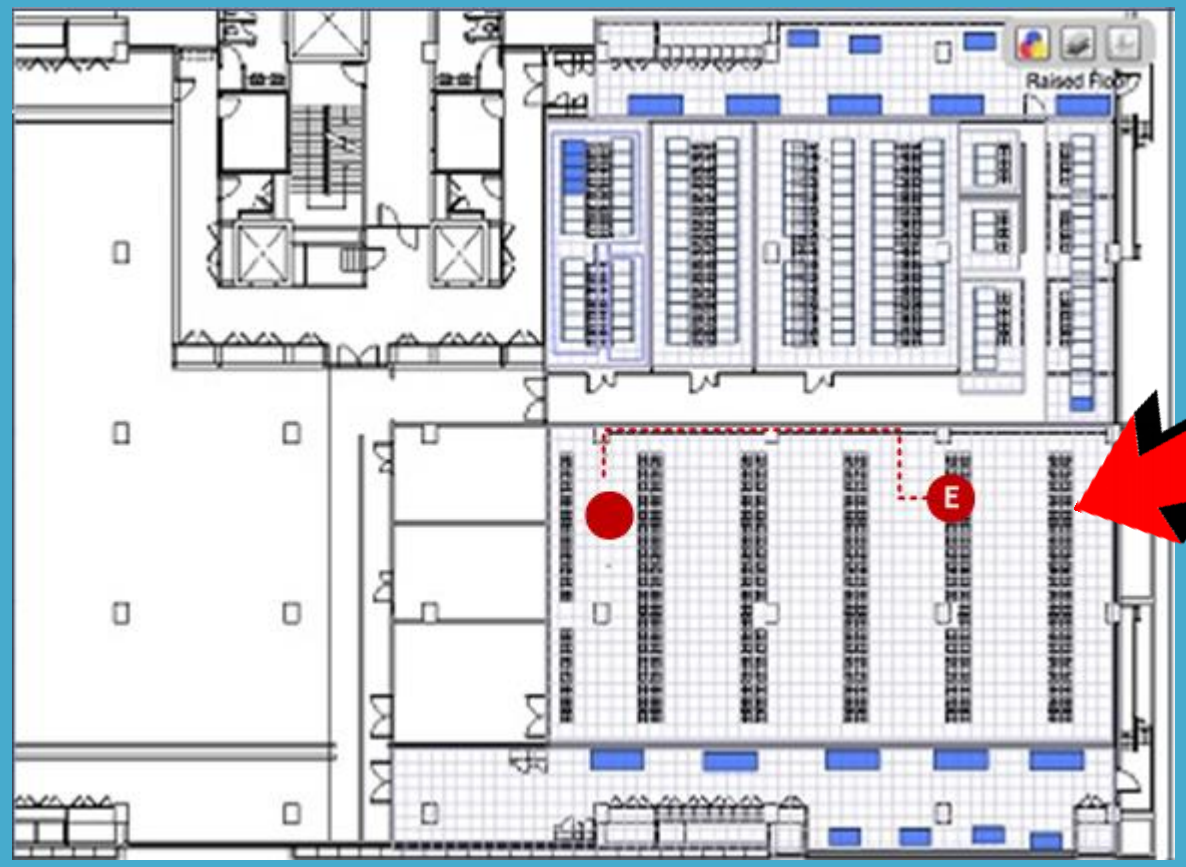
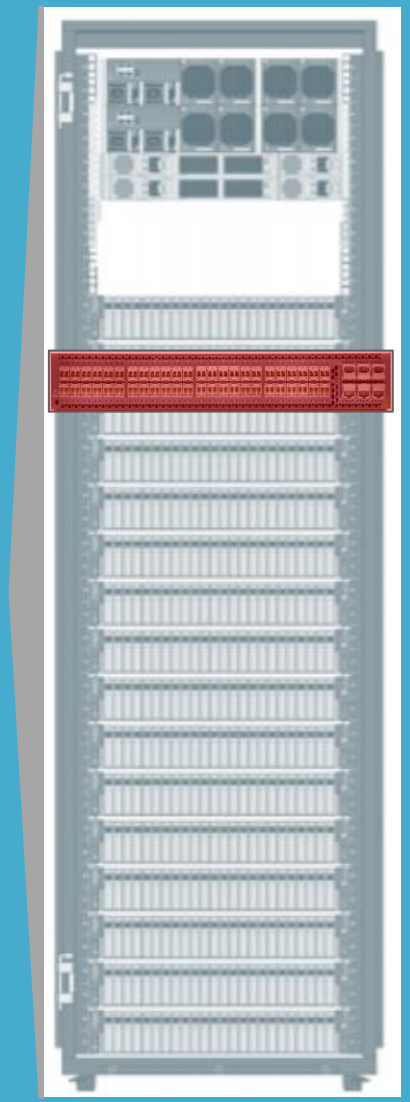
Application interaction





Device Details
SN | MAC | etc

Error Log | Labeling

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Tools

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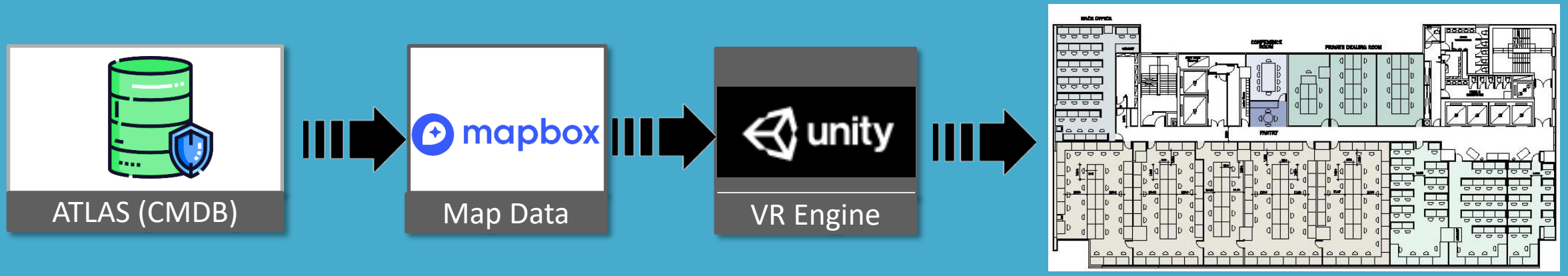
Datacenter Grid



Define dataset with custom properties desgined to be consumed by Unity

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Summary Tools

- **Unity:** Rendering tool
- **ARToolkit** (package for Unity): Open-source computer tracking library for creation of AR apps that overlay virtual imagery on real world
- **NavMesh** (Unity package): abstract data structure used in apps to aid agents pathfinding through complicated spaces.
- **ARKit** SDK for Indoor navigation (alternative to NavMesh)
- **Mapbox**, Maps for Unity. https://www.mapbox.com/unity/

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Pilot

Goal: Set indoor navigation, have the capability to locate row / rack / server and provide real-time notifications

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Pilot

 # Phase 1: Create Datacenter Layout

- Import indoor map data to Mapbox*

 # Phase2: Consume data in Unity

- Rendered a 3D map in Unity
- Scale and position 1:1 racks, aisles, etc. with real-world space.

 # Phase3: Position and track

- Align the position of map w/reality and track with the real floor layout.

 # Phase4: ML and Algorithms

- Develop algorithms to merge information from different systems and provide real-time notifications

DC LAYOUT

3D render

Position & Track

ML /Algorithms

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Pilot Tips

 # Phase 1: Create Datacenter Layout

- Digitized Racks using points. Each point feature requires assigned properties to help with identifying and navigating to the corresponding row/rack.

DC LAYOUT

 # Phase2: Consume data in Unity

Might need to use several techniques, such as:

- **Sync Points**: Define one per row. Associate location data with these point.
- **Destination Point**: register destination points
- **NavMesh:** navigation path

2D/3D render

 # Phase3: Position and track

We will position several Waypoint in the DC room with IDs for our data sets. We can use a set of parameters (ID, type, heading, location) to identify each one of those.

Position & Track

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Considerations

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Considerations

 # Security and Identification

Using API library to authorize only specific devices.

 # Access to the different monitoring services (logs, ATLAS, Monitoring etc.)

API is the path to go.

 # How to trigger position within the DC

Establish reference points within the Datacenter

 # How to read device information within the rack

QR code

 # How to calculate paths between Field Engineer position and required device

e.g. Use of Waypoints + NavMesh

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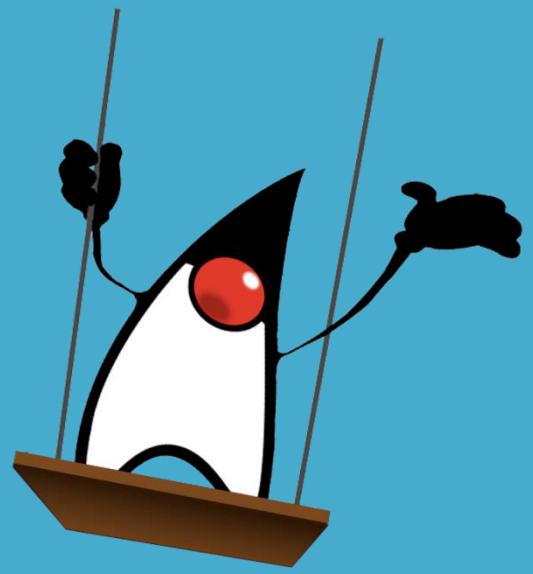
What's Next?



- Bluetooth beacons for navigation (seamless transition between internal & external navigation. Use case: Logistics).
- Installation Guides / Checklist system
- Integrate ***Service Request*** system
- ***RMA*** integration
- ***Escalation*** process integration
- Update app with Datacenter maintenance Schedule
- Forecast predictions (faulty components, network failure)

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Future Application Layout

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