Mobilaris and PI Integration

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Agenda

- About Barrick Gold
- Background - Mobilaris
- How the PI System was Applied
- Implementation Details
- How Individual Product Capabilities Solved Your Business Challenge
- Results Obtained and Business Impact
- Conclusion

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BARRICK

- Gold mining business with operations and projects in 15 countries.
- Barrick Nevada is an integrated gold mining operation that combines the Cortez and Goldstrike properties in Nevada, employing a total of 3,000 employees and 800 contractors.

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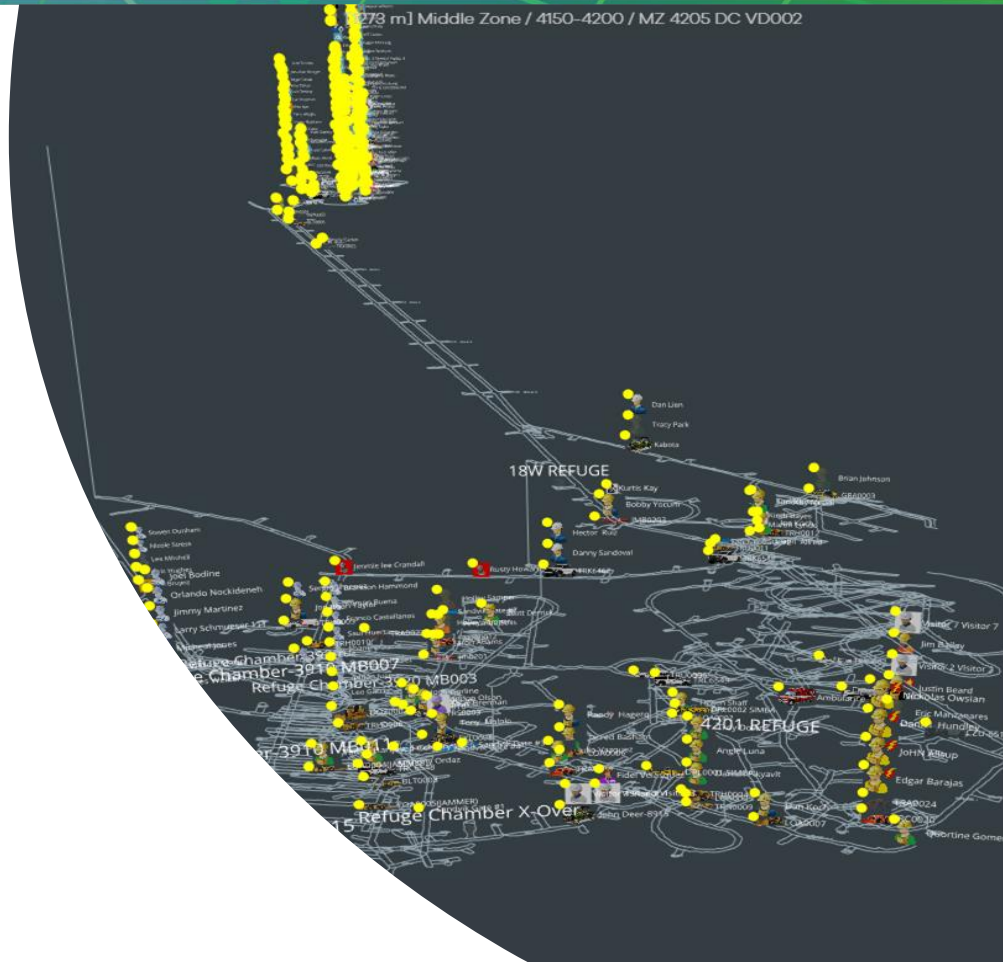
Mobilaris

- So, what is Mobilaris?
- Mobilaris Mining Intelligence provides a 3D real-time information model that includes the position of machines, vehicles and personnel as well as the capability of integrating many other information sources from shift planning data to machine and production data.



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Background

- Installations in three UG mines in US and one UG in Canada
- Cortez Underground Mining and Mobilaris
  - Real-Time Visualization of the Underground Mine
  - True Digitalization of the Data
  - Real-Time Monitoring
  - Real-Time Localization

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How It Works

- Runs on a PC or a tablet through a web browser such as Chrome and Firefox.
- Integrates with the mine's wireless WiFi network.
- Equipment that lacks their own power source can be positioned with mass-localization.

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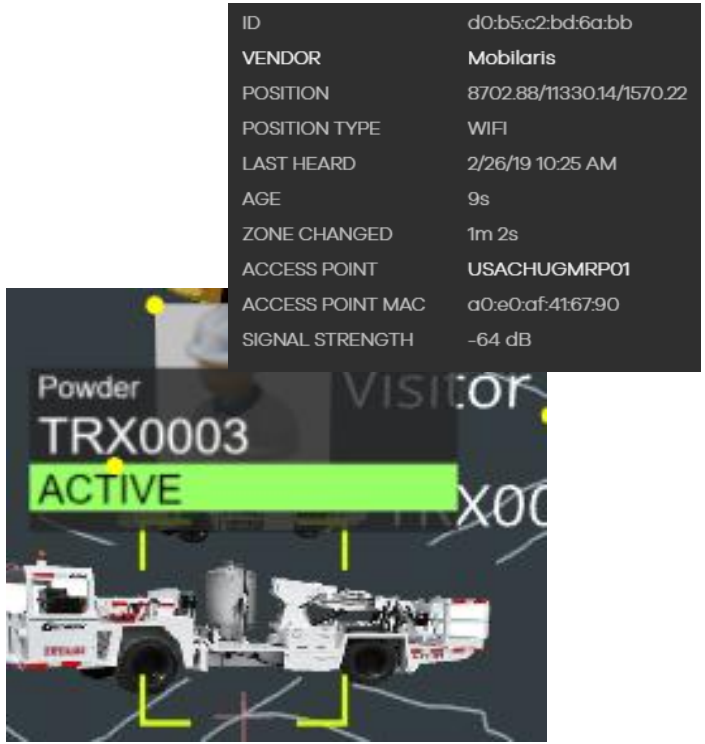
Mass Localization

The Mobilaris Mass Localization allows cost-efficient tracking of masses of equipment.

By attaching tags (RFID tags are roughly 1 – 10 USD each) on these objects and then mounting an active RFID antenna on few of the vehicles that passes most tunnels in the mine regularly or using site's WIFI, we can indirectly get the position of these objects as the vehicle passes the tagged objects.



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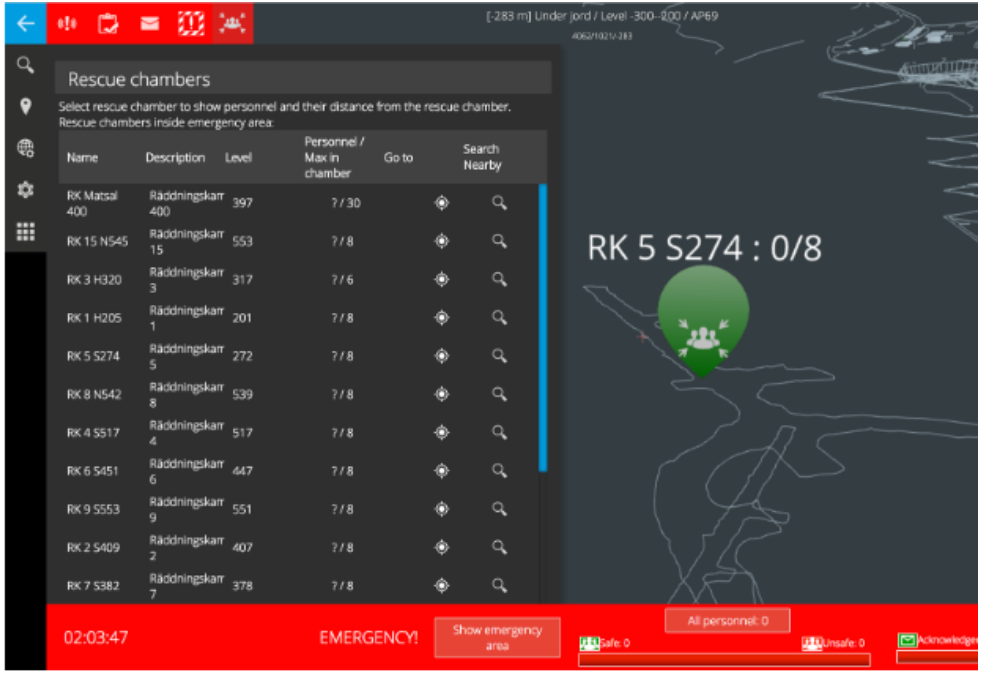
Emergency Support

- Allows the user to make proper decisions during emergency situations or evacuation.
- Sending initial emergency message
- Locating unsafe personnel
- Checking the status of the rescue chambers



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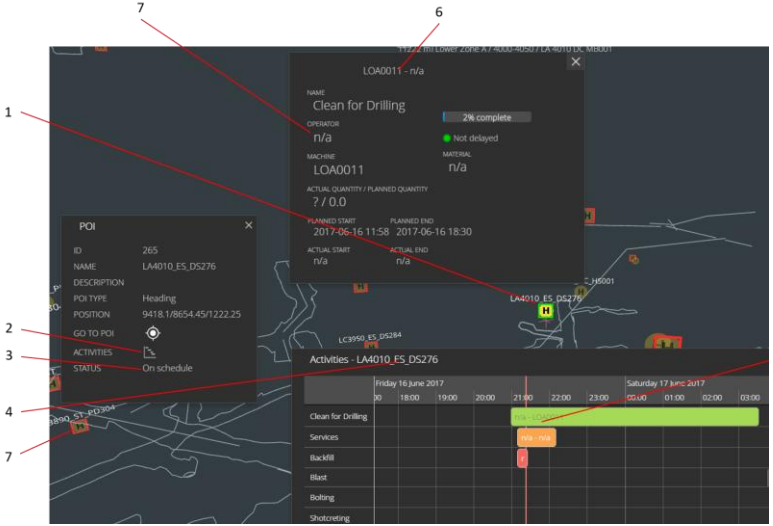
Visualization of Shift Activities

Supports different functions to monitor and track the production and operations scheduling.

- See which headings that currently have activities
- See the activity schedule for an active heading
- See which headings that are ‘off-track’ in terms of operations scheduling



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Our Challenge

- Improve on Ore Stockpile Management (Quantity and Quality)
- Access to All the Historic Data
- Create Custom Reports and Analytics
- Create Custom Events
- Create Custom Notifications
- Provide Connectivity Functionalities
- Provide Increased Reliability of the Data (data availability & quality)
- Ore/Waste Segregation Tracking

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Implementation

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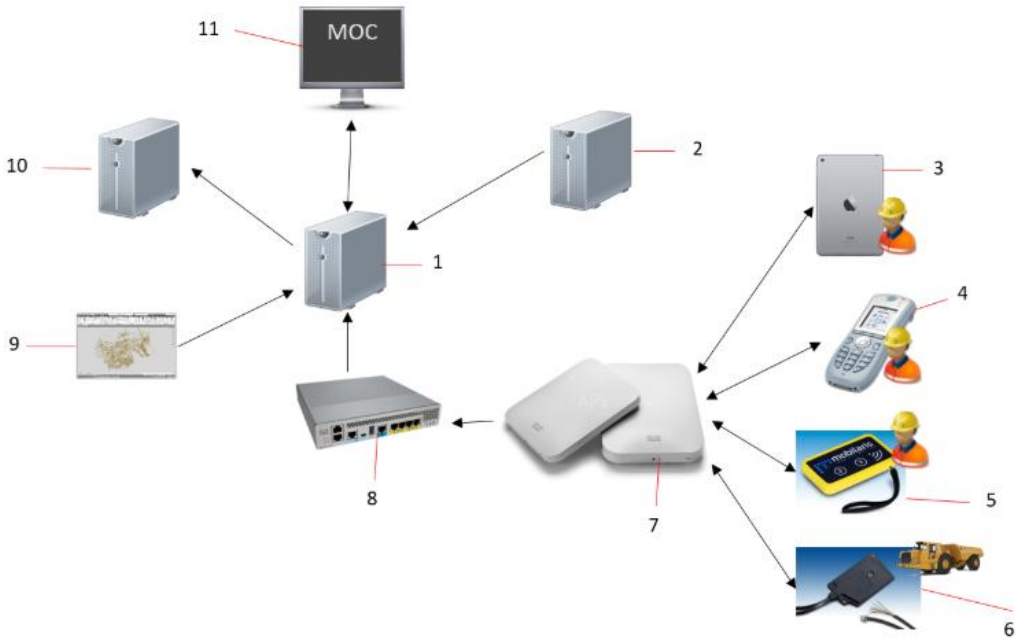
System Implementation



1. Mining Intelligence™
2. Deswik
3. OPSTablet
4. ASCOM IP Phone
5. Person positioning tag
6. Vehicle positioning tag
7. Cisco Wi-fi AP
8. Cisco WLC
9. CAD application
10. Other application
11. Mining Operation Center (MOC)

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PI Data Integration

- Connecting both systems via the PI Connector for UFL (REST Client), we capture the positioning data in real-time and efficiently store all historical data.
- Using Asset Framework, we added context ; using Asset Analytics, we generated actionable events for idle or down equipment.

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PI Connector for UFL

- REST Client functionality
- JsonGetValue function allows for easy data parsing/mapping

```
[MSG]
MSG(1).NAME="Data"

[Data]
Data.FILTER=C1=="*"

FOREACH (JsonGetItem(__MESSAGE, "[]")) DO

    assetid = JsonGetValue(__ITEM, "assetId")
    TimestampMilliseconds = JsonGetValue(__ITEM, "timestamp")

    TimestampSeconds = ToString(TimestampMilliseconds / 1000)

    Timestamp = TimestampSeconds

    'COMMENT' PRINT(CONCAT(TimestampSeconds + "," + ToString(Timestamp)))

    PosX = JsonGetValue(__ITEM, "posX")
    StoreEvent( CONCAT("[redacted]", assetid,"_PosX"), , Timestamp, PosX )

    PosY = JsonGetValue(__ITEM, "posY")
    StoreEvent( CONCAT("[redacted]", assetid,"_PosY"), , Timestamp, PosY )

    PosZ = JsonGetValue(__ITEM, "posZ")
    StoreEvent( CONCAT("[redacted]", assetid,"_PosZ"), , Timestamp, PosZ )

    apMacAddr = JsonGetValue(__ITEM, "apMacAddr")
    StoreEvent( CONCAT("[redacted]", assetid,"_apMacAddr"), , Timestamp, apMacAddr )

ENDFOR
```


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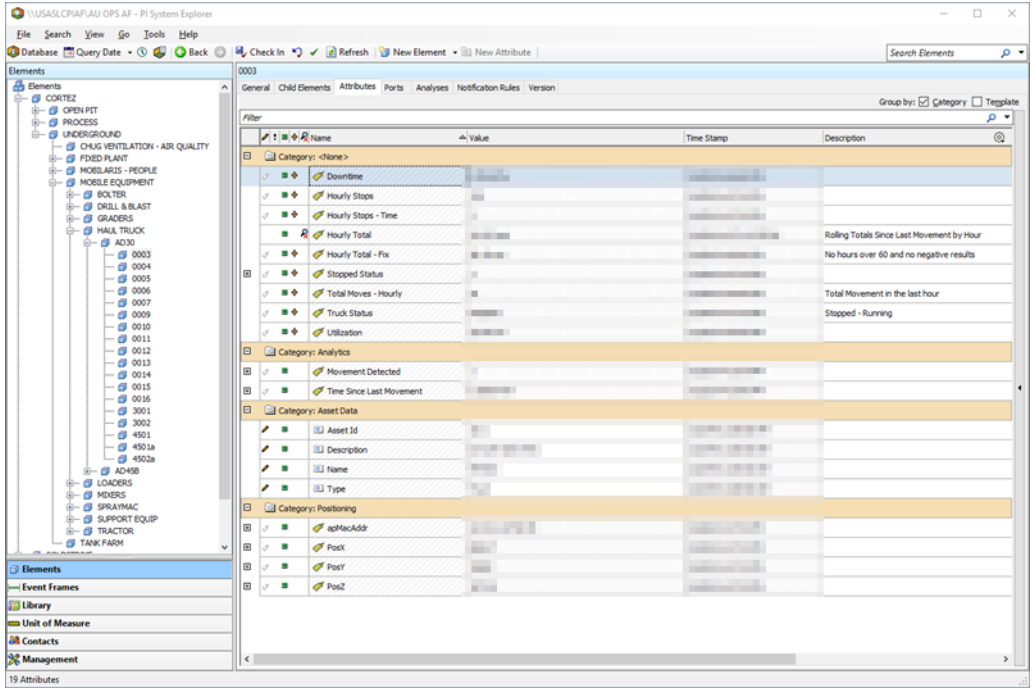
Asset Framework



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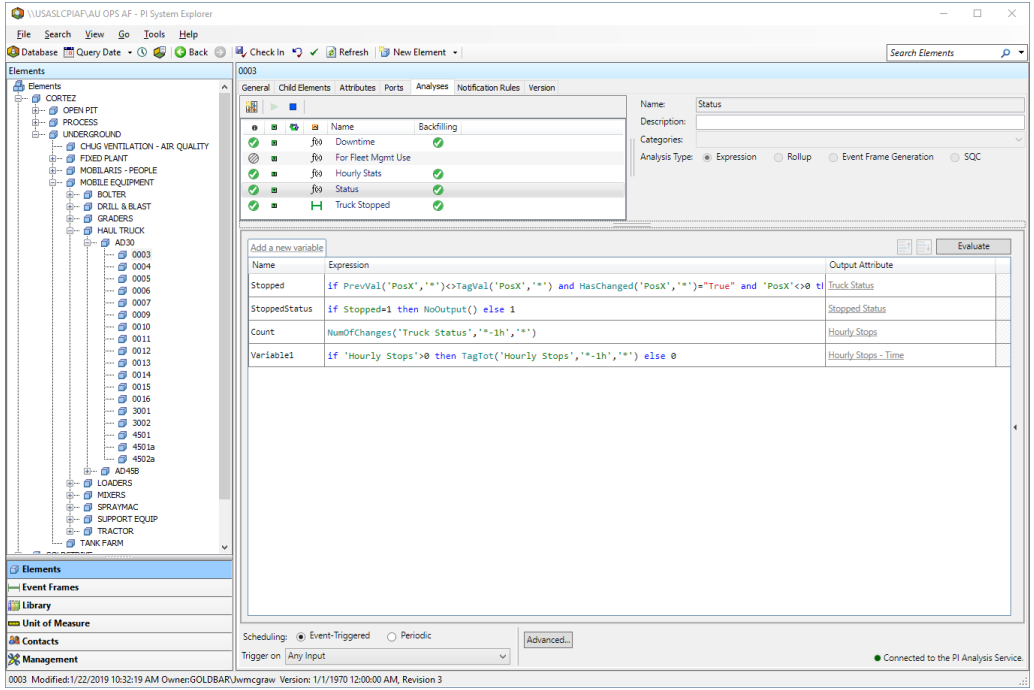
Asset Analytics



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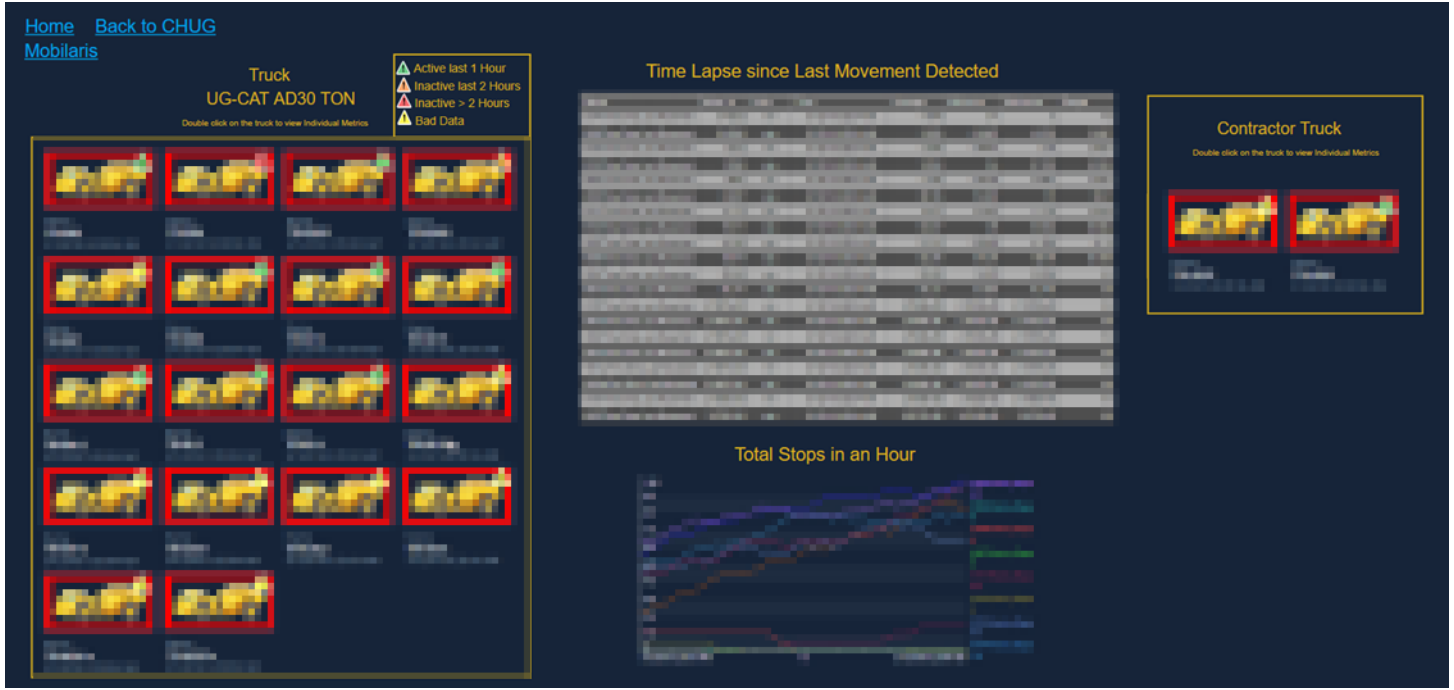
PI Vision



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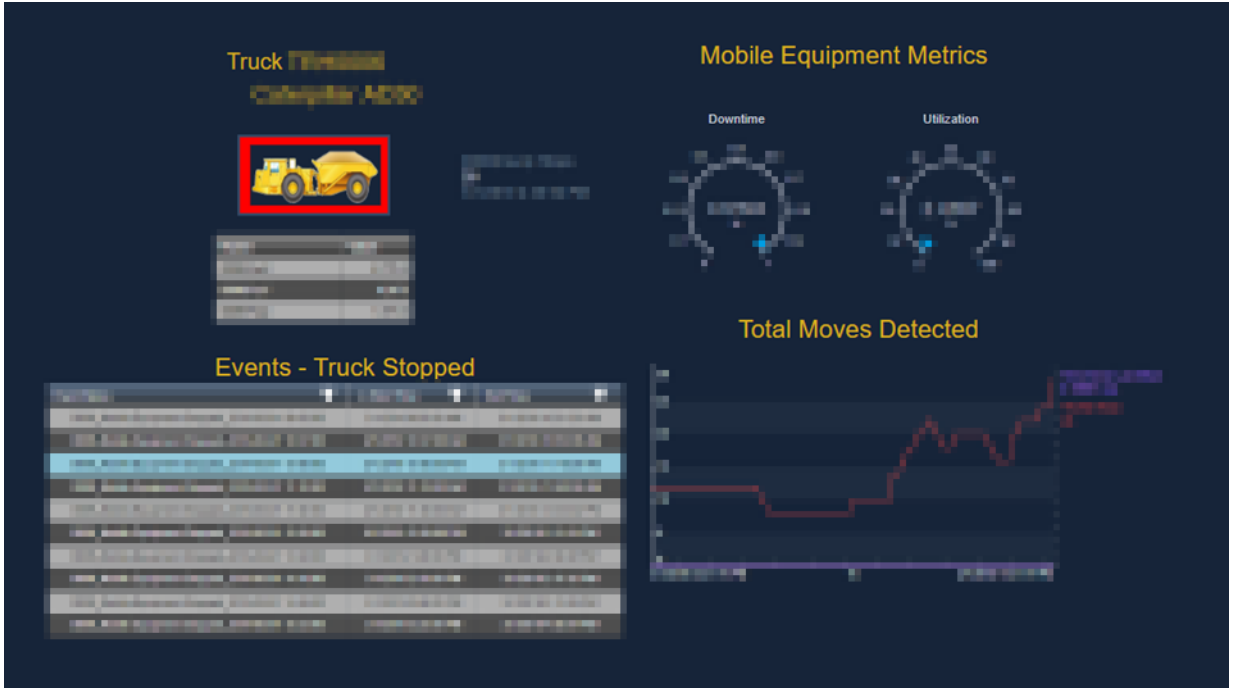
PI Vision



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Power BI

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Results

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Benefits

Efficiency

- Real-Time Visualization - With Mobilaris in an Underground Mine, you see everything because you are connected to everything and everyone. Together with the knowledge of the shift plan, the operations' personnel can take the right decisions faster than before and keep up the face utilization.

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Benefits

Efficiency

- Emergency Support - Allows the user to make proper decisions during emergency situations or evacuation.
- Integration of Shift Activities – Ability to monitor and track the production and operations scheduling in real-time.

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Benefits

Efficiency

- Localization of assets (equipment and personnel) in real-time.
- Blasting Support - Maintains count of all personnel and marks as safe or unsafe depending on their location.

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Benefits

Availability of the Data –
PI Integration

- Ability for custom reporting, event triggering, notifications, and analytics.
- Increased Accessibility of the data going as far back in the historian as needed by the operations.

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Benefits

Availability of the Data – PI Integration

- Ability to monitor connection status and trigger alarms as needed
- Ability to generate and provide historical reports of Asset Movement
- Ability to acquire positioning data for all assets

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Benefits

Availability of the Data –

PI Integration

- Ability to assist in Accident or Incident Investigations
- Provides connectivity functionalities by allowing to join and/or blend data from other source systems (geology, planning, asset work order management, etc.) into a common reporting tool

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Conclusions

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Barrick

Mobilaris and PI Integration

CHALLENGE

Create Custom Analytics and Reports using the data Mobilaris was generating

- Using existing technologies, massive amounts of equipment can be tracked in a cost-efficient way
- Data must be available, accessible, and reliable at all time
- Data must have no historian limit

SOLUTION

Integrate Mobilaris with PI

- Connecting both systems via PI Connector for UFL
- Using Power BI for visual analytics
- PI Vision for Real-Time reporting and Custom Visuals

RESULTS

Efficiency
Availability of the Data

- Ability to make the right decisions faster
- Ability to access the data from any device, at any time, and create as many custom reports as needed
- Time saving underground emergency evacuation
- Shift Operations' Visualization
- Mass Localization

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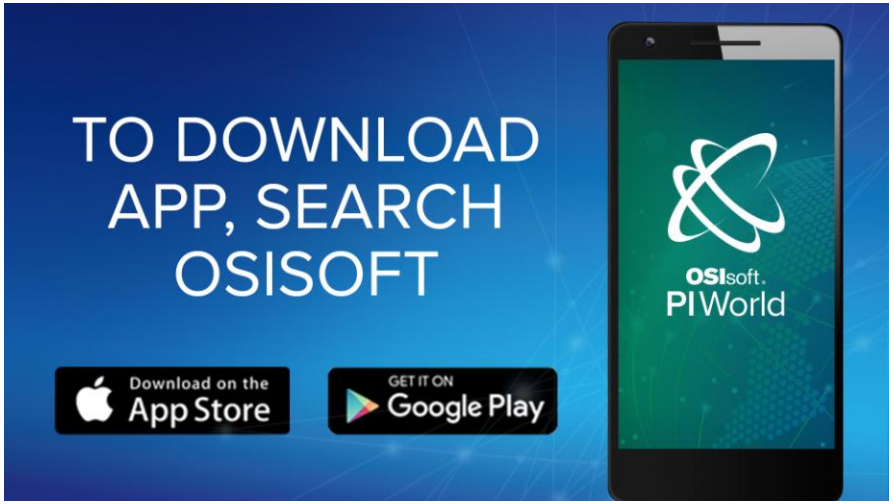
Questions?

Please wait for the **microphone**

State your **name & company**

Please remember



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