

The background of the slide is a blue-tinted photograph of a conference. In the foreground, several men are engaged in conversation. One man on the right is smiling and looking towards the left. In the background, a large presentation screen displays the text "DevOps & Test Automation" and "SAP S/4".

# Enabling Real-Time Insights Into Sustainability In Today's NFL Stadium

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SAPinsider  
Las Vegas

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**2023**

**SAP**insider



## Historic franchise NFL team seeks to delight fans throughout their game-day journey with an **intelligent venue.**

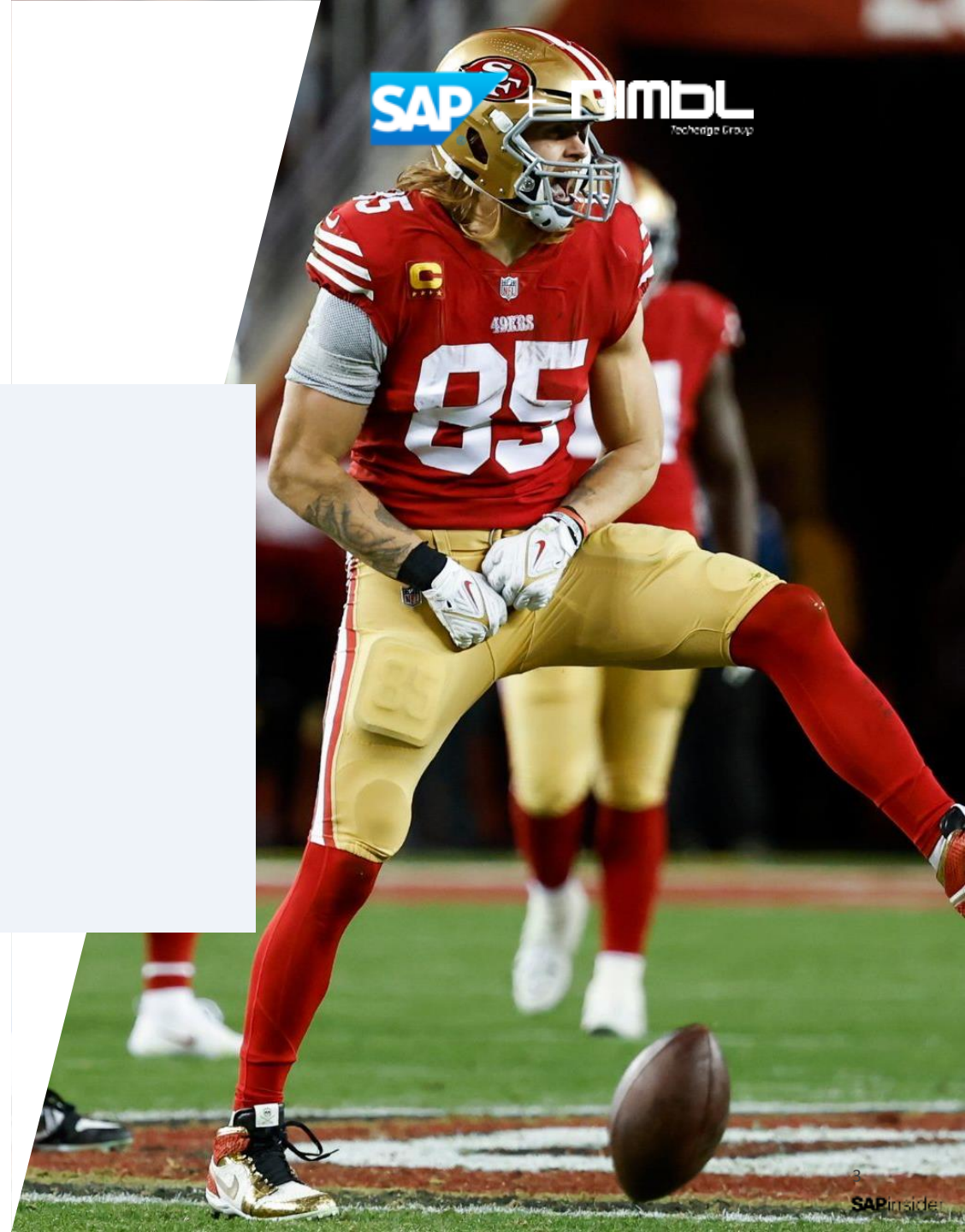
- San Francisco 49ers
- Operating in Levi's® Stadium
- 70+ years in business
- Multiple Super Bowl championships
- Hosting 68,500 fans on game day



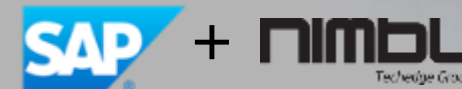


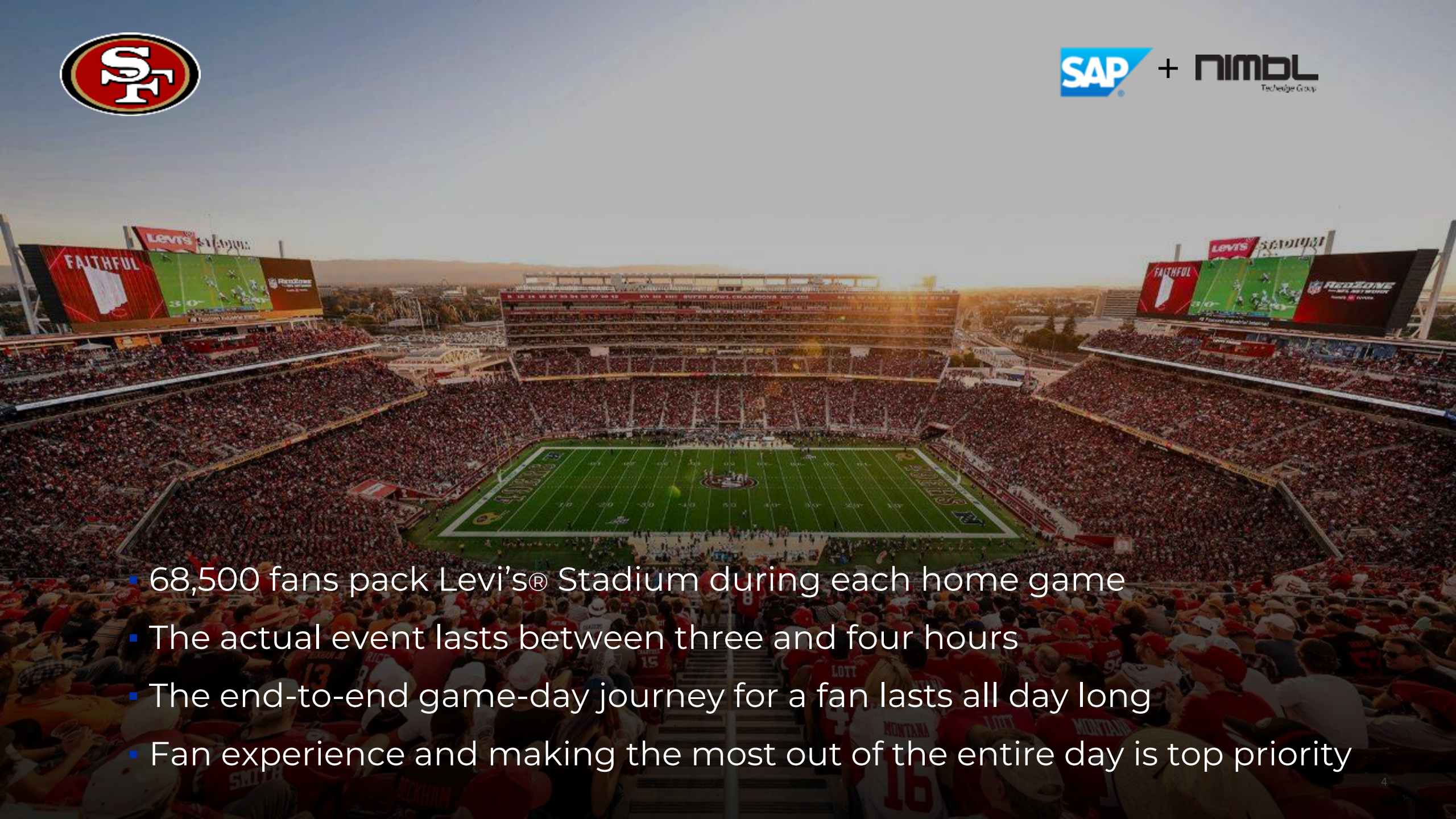
## What We'll Cover

- Inception of The Executive Huddle
- Data Acquisition & Dashboards
- Sustainability Innovation Project
- Our Journey
- Wrap-Up







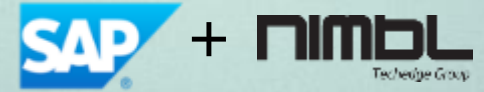
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- An aerial view of Levi's Stadium during a game, showing the green field, the large crowd in the stands, and the stadium's architecture. The sun is setting in the background, creating a warm glow. Large billboards for 'FAITHFUL' and 'RED ZONE' are visible on the stadium's exterior.
- 68,500 fans pack Levi's® Stadium during each home game
  - The actual event lasts between three and four hours
  - The end-to-end game-day journey for a fan lasts all day long
  - Fan experience and making the most out of the entire day is top priority





The 49ers had no consolidated insights until **three days after an event.**

With only 10 home games per season, it was incredibly difficult to **iterate and improve** in a way that was impactful to fan experience





## Life Before SAP BTP

- An existing consolidated data warehouse - Amazon Redshift
- HappyOrNot Terminals throughout the stadium
- Fan surveys issued and analyzed post game day
- No real-time integration or connectivity

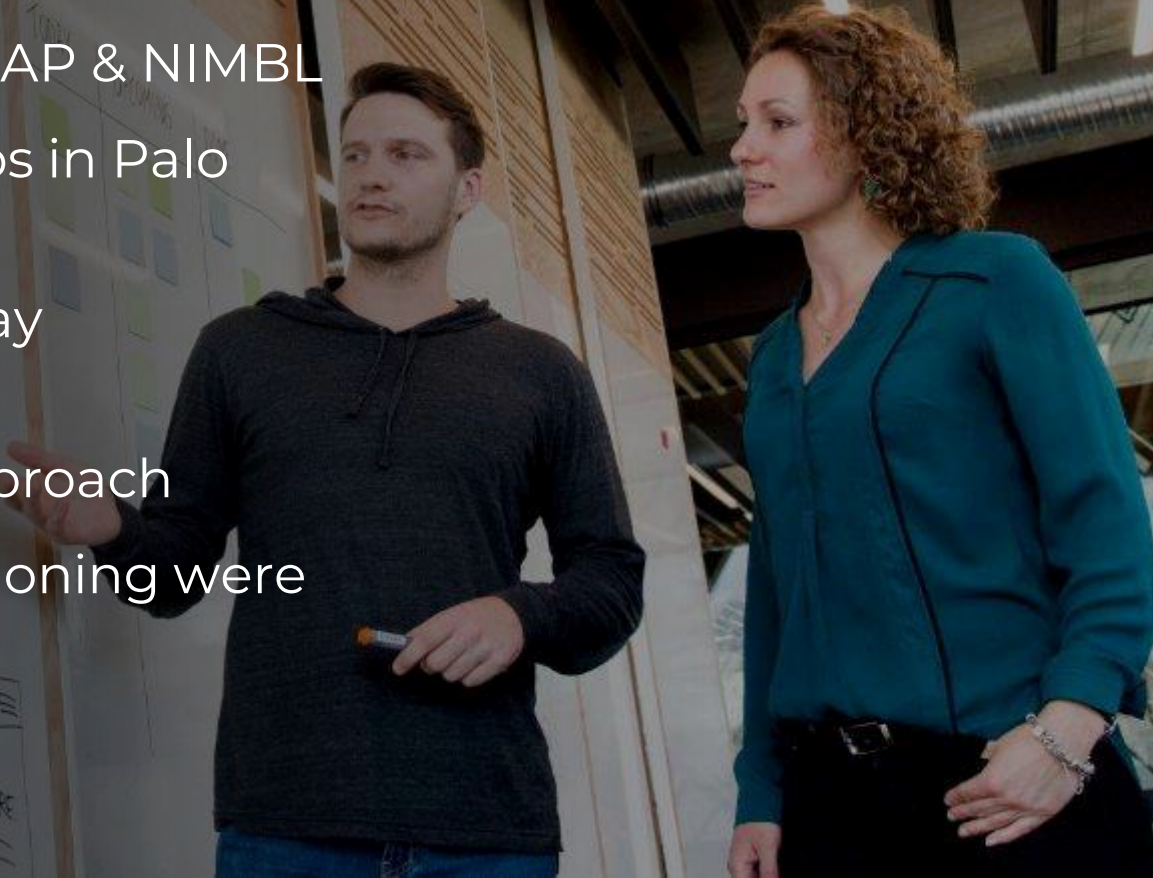






## Action Plan:

- Found a great partner team – SAP & NIMBL
- Headed up the road to SAP Labs in Palo Alto
- Discussed end-to-end game-day opportunities
- “Art-of-the-possible” design approach
- Limitations and technical solutioning were not discussed





## From Idea to Implementation:

- **The Executive Huddle** was born
- Determined SAP Integration Suite could pull source data
- Confirmed SAP HANA could persist data in real time
- Addressed cross-database replication with SAP HANA smart data integration (SDI)
- Began design of dashboards and visualizations



EXECUTIVE  
HUDDLE

Presented by







ticketmaster®

#### Attendance

Reference Event (1)  
22GWAS

Comparison Event (1)  
22GKC

#### Attendance Scans

TM Event (Ref)1 (1)  
22GWAS

TM Event (Comp)1 (1)  
22GKC

#### Pre Paid Parking

TM Event (Ref) (1)  
22PKWAS

TM Event (Comp) (1)  
22PKKC

## Data Acquisition:

- The 49ers do not own any venue-related data
- Acquiring the data was a key component of the Executive Huddle
- Multiple data sources presented unique challenges
- API complexity and data delivery induced creative, **out-of-the-box solutioning**

parkhub

#### Transactions

Event (Reference) (1)  
22PKWAS

Event (Comparison) (1)  
22PKKC



#### Transactions

Event MIM (Ref) (1)  
22GWAS

Event MIM (Comp) (1)  
22GKC

HAPPY OR NOT®

#### Responses

Event HON (Ref) (1)  
22GWAS

Event HON (Comp) (1)  
22GKC



#### Transactions

Event Fan (REF) (1)  
22GWAS

Event Fan (COMP) (1)  
22GKC



#### Readings

/x Event WAT (Ref) (1)  
22GWAS

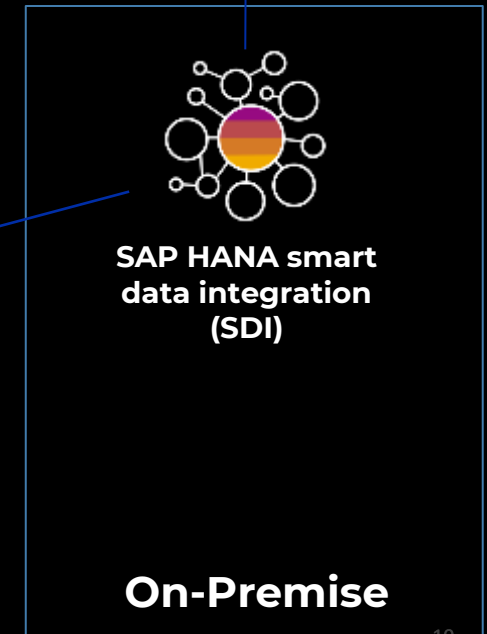
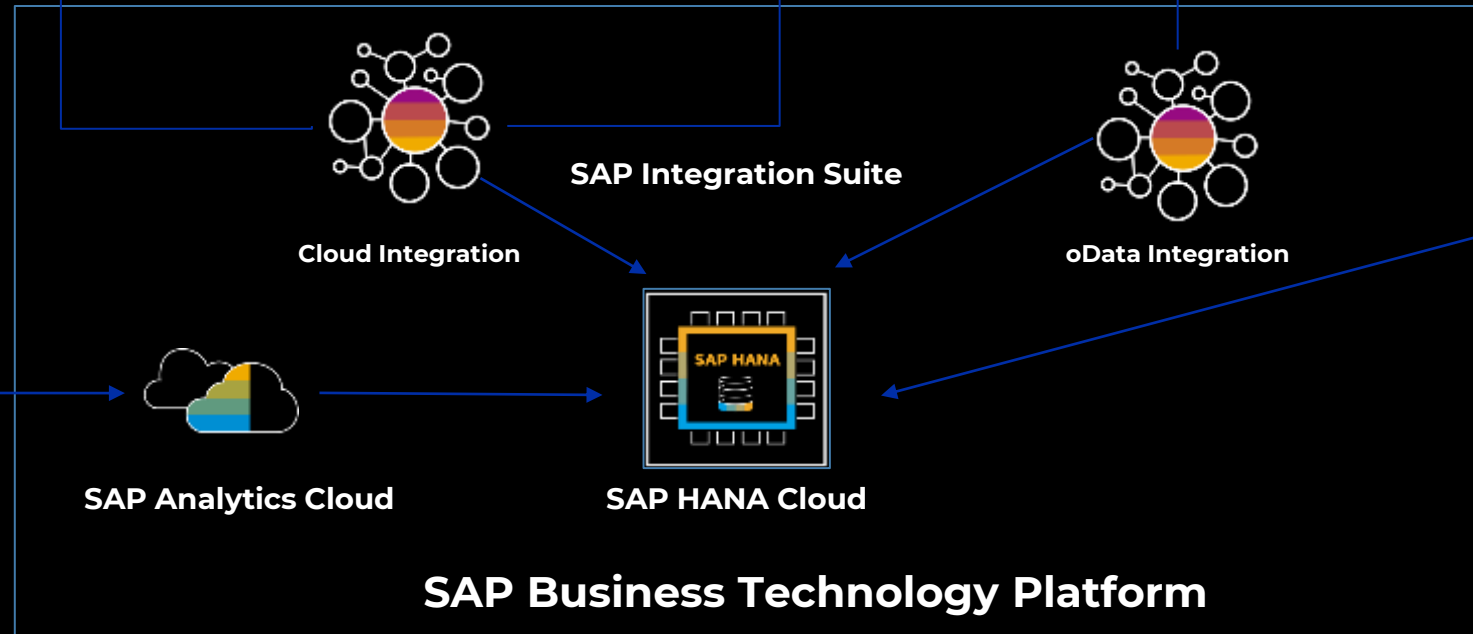
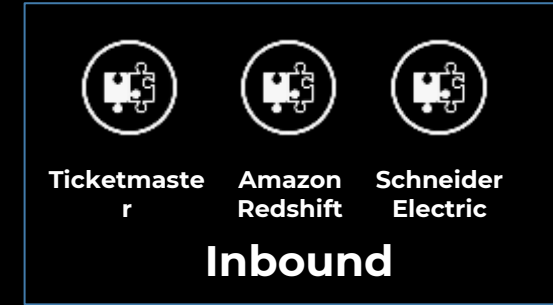
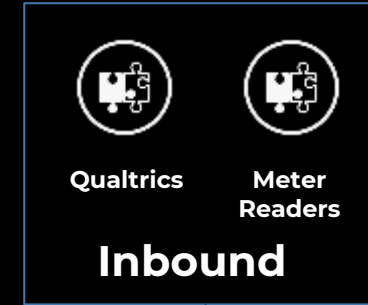
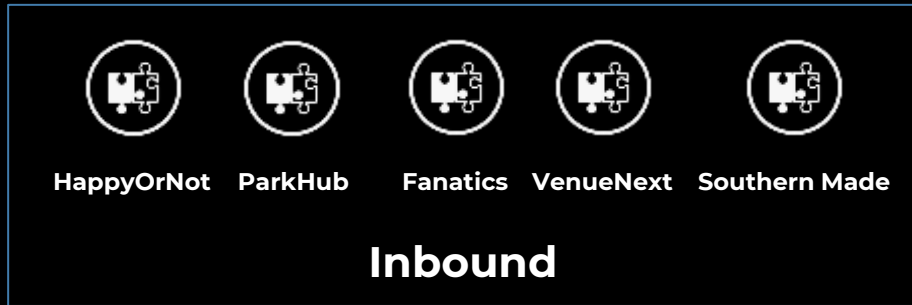
/x Event WAT (Comp) (1)  
22GLAC



#### Responses

/x Event Qual (Ref) (1)  
22GTB

/x Event Qual (Comp) ...  
22GKC







## The Executive Huddle Build-Out:

- Control room layout perched above the 50-yard line in a converted suite
- A 65" touchscreen, large format interactive monitor + three separate overhanging 55" displays
- SAP Analytics Cloud storyboards on auto-refreshed ceiling mounted monitors
- Parking, attendance, merchandise, concessions, and fan feedback **all displayed live**



## The Executive Huddle: Areas of Focus



Ticket scan by location



Parking scans and capacity



Food and Beverage



Retail and Team Store



HappyOrNot real-time feedback



Notify account reps of arriving VIPs



Mobile ticketing and security



Weather data to predict fan needs



Concessions receipt survey real-time qualitative feedback

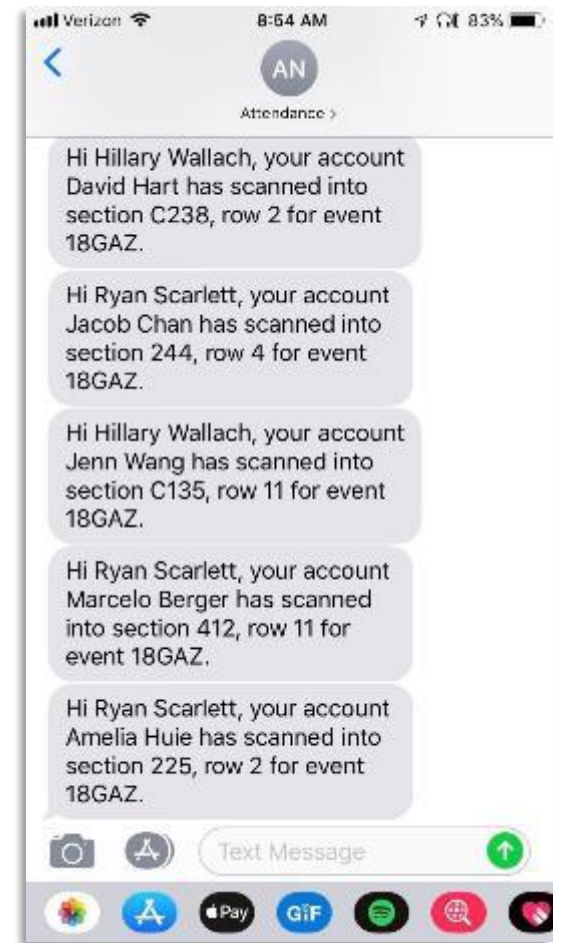


Sustainability efforts monitoring water, gas, and electric consumption



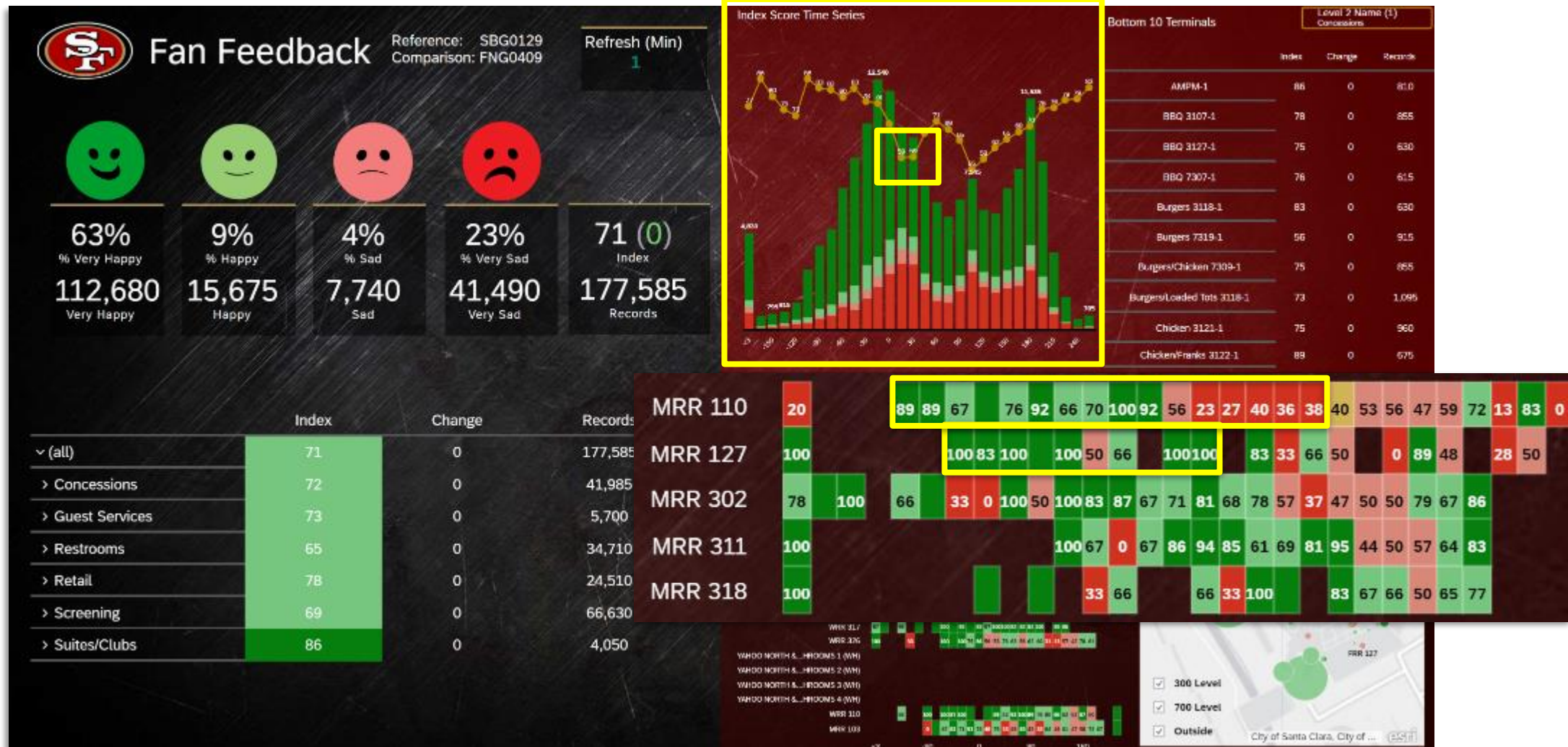


## Dashboards: Attendance





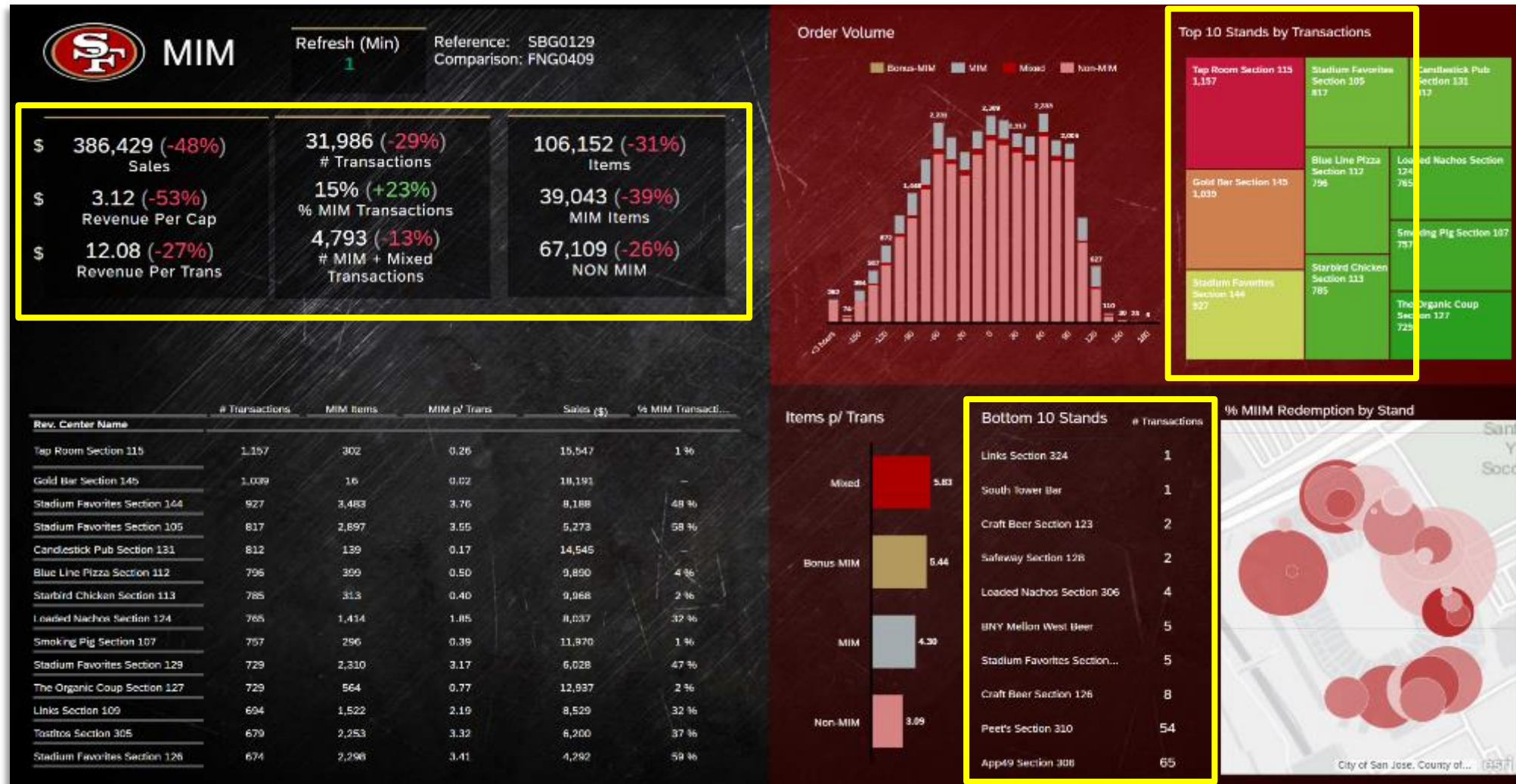
## Dashboards: Fan Feedback







# Dashboards: Concessions





## Sustainability Initiative: Context

- Water & Gas consumption needs to be monitored but real-time data is unavailable; invoices take too long to post
- Pictures of meters, both digital & analog, are captured and converted into data in HANA Cloud then visualized via SAC
- Providing real-time data for utilities allows for unique insights during gamedays & throughout season; anomalies identified & remedied sooner





## Meter Reader Solution

- 3D-printed housing on top of utility meter
- Single-board computer & camera are mounted inside & connected to Wi-Fi
- Pictures taken every few minutes and translated to HANA via Python scripts

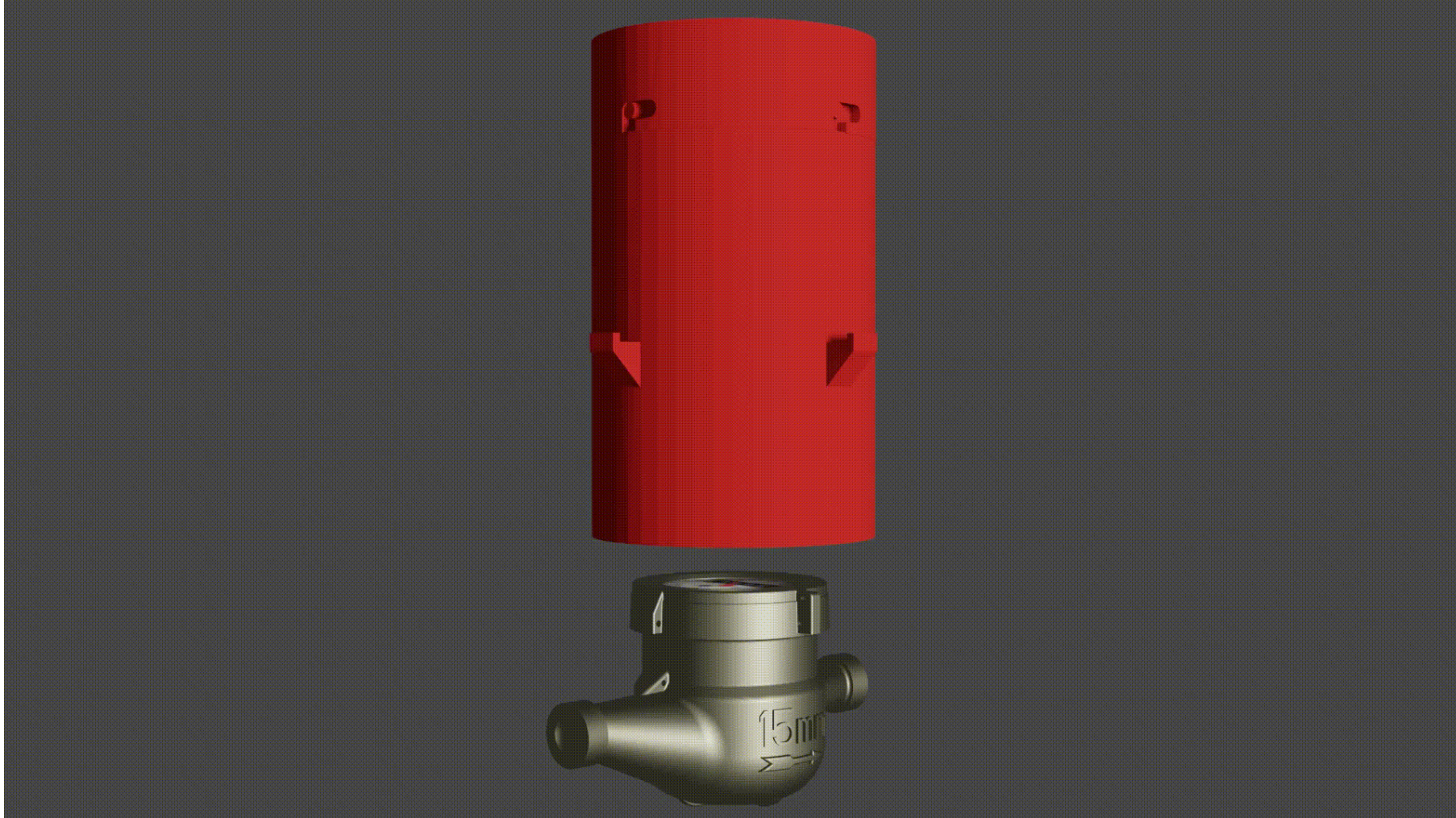


determine change from last position





## Meter Housing 3D Design







## Our Journey

- **Camera Overexposure** – switch from red filament to black filament
- **Model Update & Re-Print** – add removable lid and side rails for fastening





## Our Journey

- **Hardware Upgrade** – switch from Arduino-based controllers to Raspberry Pi, improved high quality camera with auto-focus

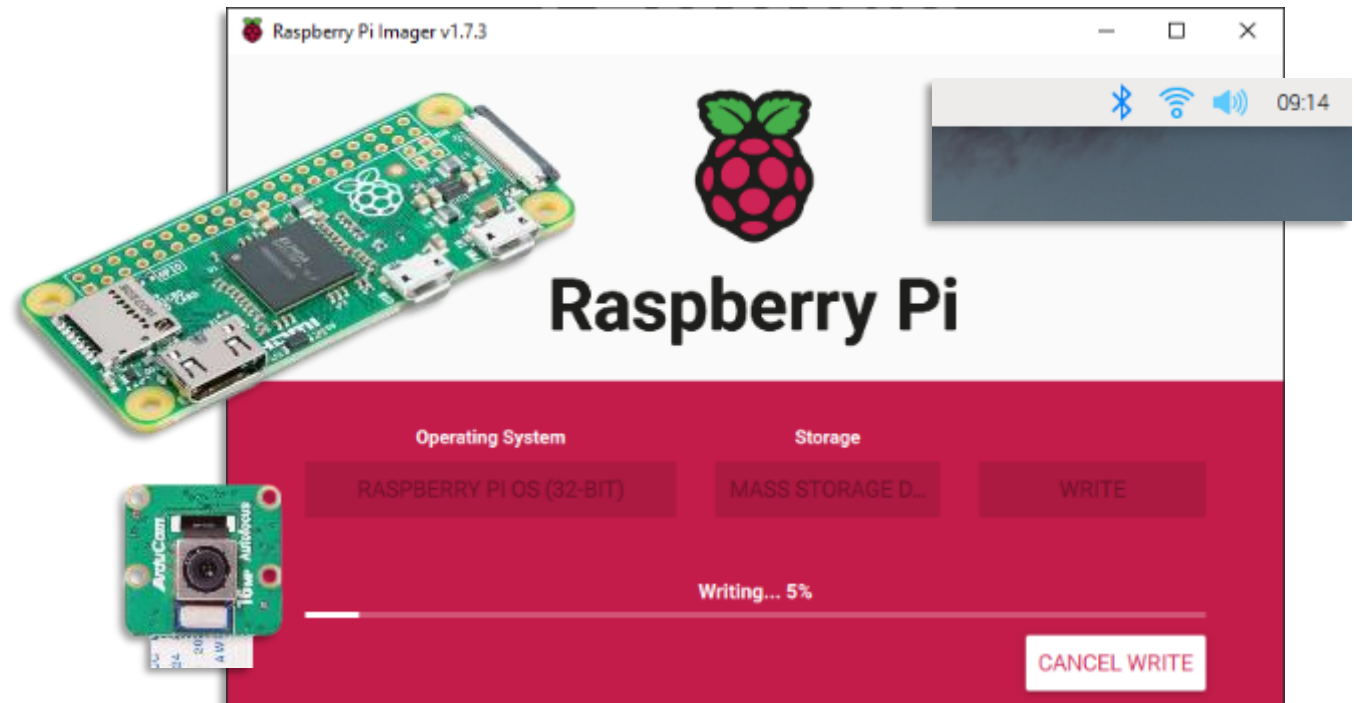






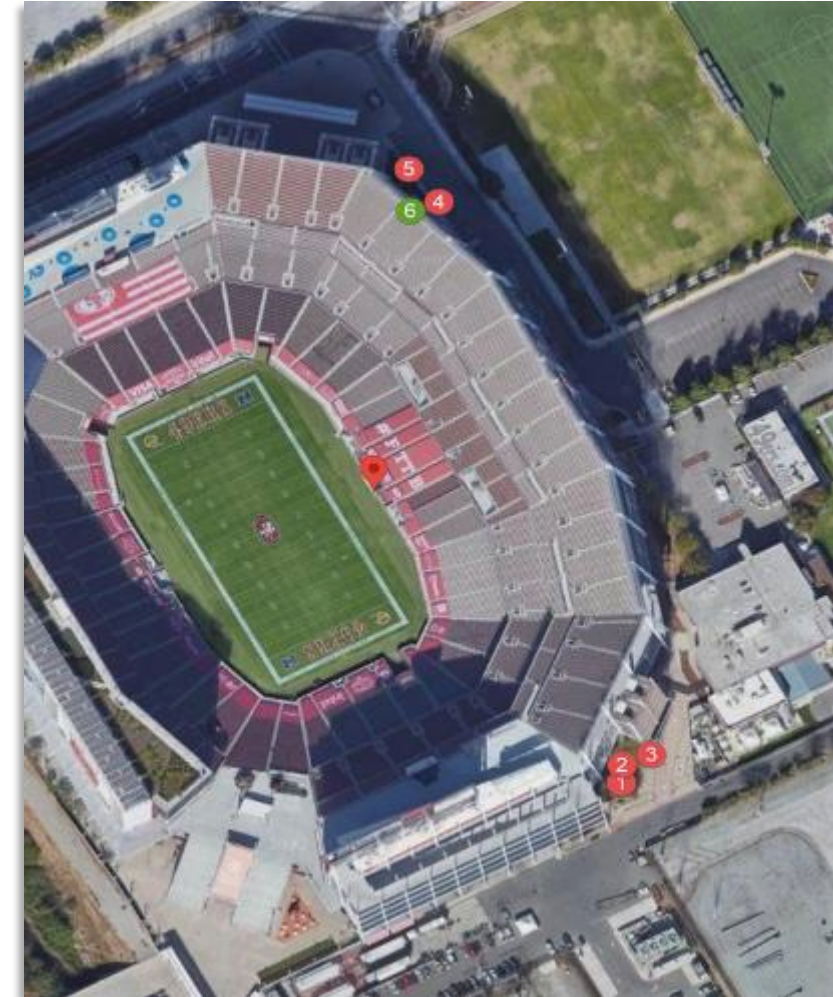
## Our Journey

- **Connectivity** – transition from USB Hotspots via Pre-Paid SIM cards to Levi's Stadium Wi-Fi





## Dashboards: Sustainability







## Sustainability: Lessons Learned

- In-depth testing requirements for weather and condensation
- Unique connectivity solution required for underground meters
- Adjustments to 3D model to allow for diffused light, fixed lid, and wire placement
- Comprehensive personnel training to minimize human error



## Sustainability: Key Takeaways

1. Understanding how SAP HANA Cloud and SAP Analytics Cloud facilitate real-time consumption monitoring
2. Understanding how SAP BTP can seamlessly integrate with other data platforms
3. Understanding how the sustainability initiative is incorporated in the Executive Huddle (Digital Boardroom)





## Wrap-Up:

- **First and only venue digital boardroom**  
45 + events supported
- **Optimized fan experience by addressing feedback in real-time**  
<10 minutes or less to solve issues
- **Uncovered opportunities across retail, concessions and stadium operations**  
200+ issues resolved
- **Obtained insights across the fan's game-day journey**  
+43% increase in fan satisfaction



SAP

+



## Key Points to Take Home

- Acquiring data is the “long pole in the tent”
- Iterative development is key
- This use case applies **beyond professional sports**
- An Intelligent Venue can be realized in as little as 3-4 months
- Unbounded potential for integrations between SAP BTP and other platforms



# Where to Find More Information

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- [49ers' Stadium Gets An Upgrade For Its System Allowing Real-Time Data Tracking Across The Venue](#) – **Forbes Magazine**
- [49ers Upgrade Game-day Analytics Capabilities](#) – **Sports Business Journal**
- [Horizon Summit: How SAP's Real-Time Data Analysis Improves the 49ers Fan Experience at Levi's Stadium](#) – **Sports Business Journal**
- [San Francisco 49ers Optimize Fan Experience Using the Executive Huddle](#) – **SAP Blogs**
- [SAP Data Analytics Software Integrates into 49ers EDU Curriculum](#) – **Inside SAP**
- [NFL's 49ers add SAP utility tracking feature to Levi's Stadium](#) – **Stadia Magazine**
- [benimbl.com](#)



# Thank you! Any Questions?

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evaluation.

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