



Sustainability in Sports: Using Technology to Monitor Real-Time Utility Data

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San Francisco 49ers



What We'll Cover

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

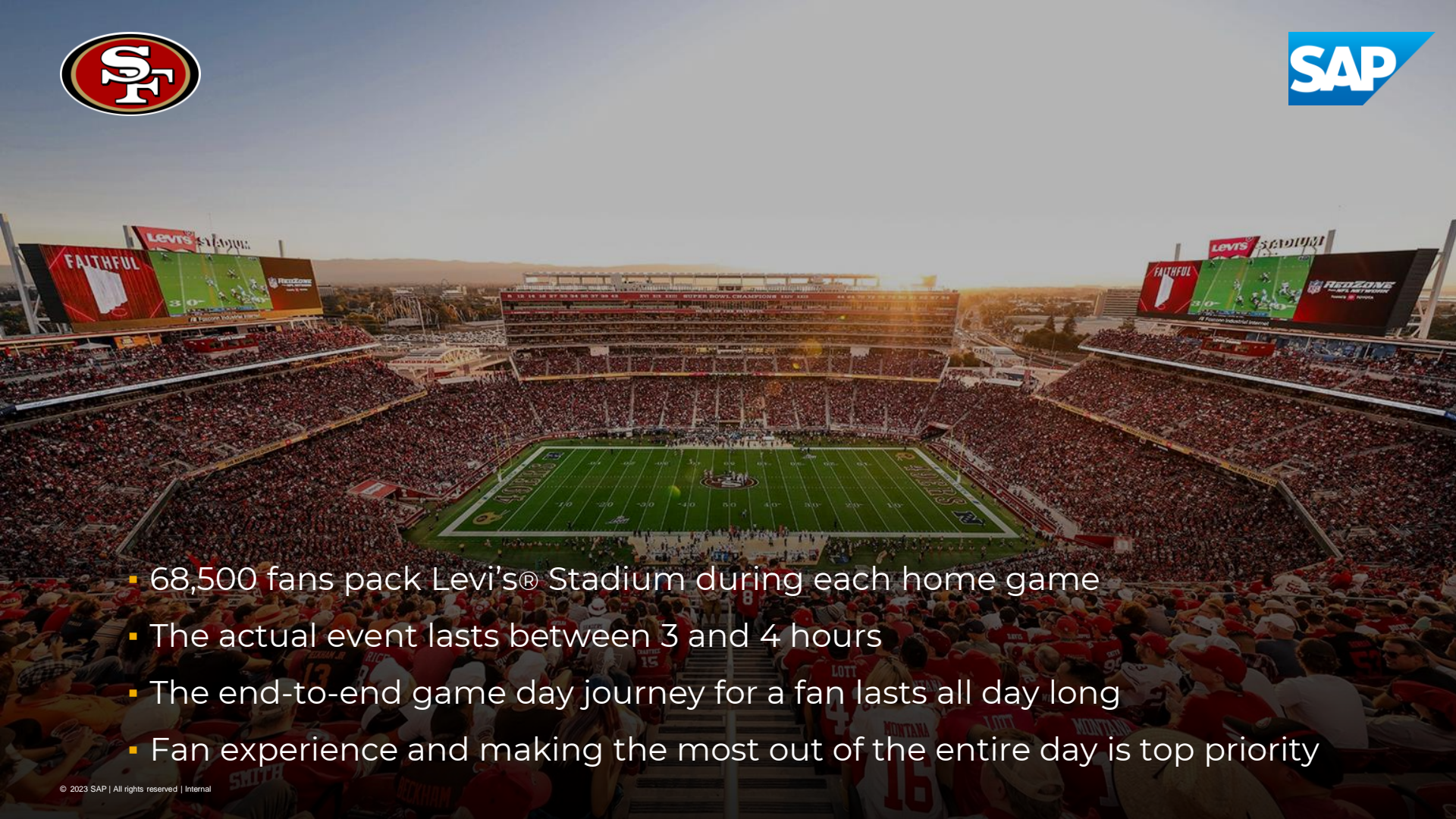




Historic franchise NFL team seeks to delight fans throughout their game-day journey with an **intelligent venue.**

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



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- An aerial view of Levi's Stadium during a game, showing the field, the stands filled with fans, and the large scoreboards on the sides. The stadium is packed with fans, and the field is green with white yard lines. The scoreboards on the sides display 'FAITHFUL' and 'REDZONE' advertisements.
- 68,500 fans pack Levi's® Stadium during each home game
 - The actual event lasts between 3 and 4 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 with SAP
- 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

parkhub

Transactions

Event (Reference) (1)
22PKWAS

Event (Comparison) (1)
22PKKC



VENUENEXT

Transactions

Event MIM (Ref) (1)
22GWAS

Event MIM (Comp) (1)
22GKC

HAPPYORNOT®

Responses

Event HON (Ref) (1)
22GWAS

Event HON (Comp) (1)
22GKC



Fanatics

Transactions

Event Fan (REF) (1)
22GWAS

Event Fan (COMP) (1)
22GKC



Volley Water

Readings

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



Qualtrics

Responses

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

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

Data Acquisition:

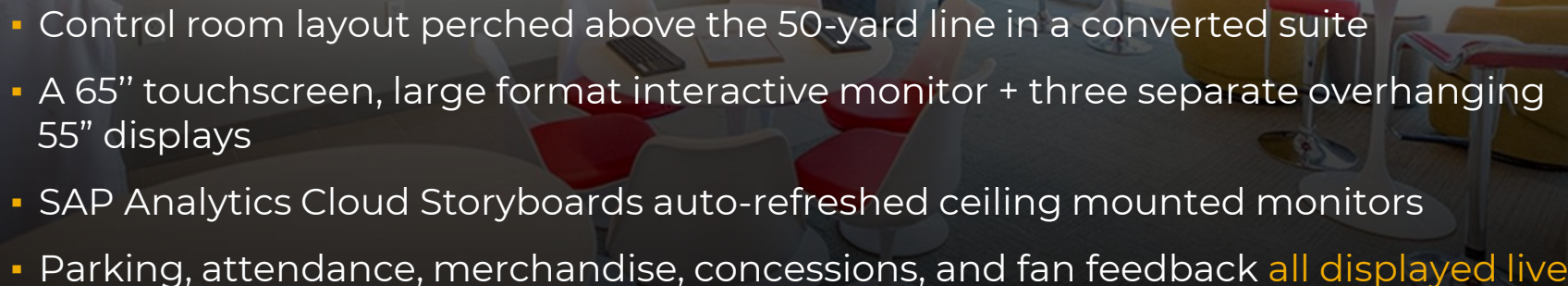
Parking to Stadium

- 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**

SAP



The Executive Huddle Build-Out:

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- A modern control room with a curved desk, multiple large monitors, and red and yellow chairs. The room is dimly lit, with the primary light source being the screens and ambient lighting. The desk is white and curved, with several large monitors mounted on it. There are also smaller monitors on the wall. The chairs are red and yellow, and the overall design is sleek and contemporary.
- 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 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 & capacity



Food & Beverage



Retail & Team Store



HappyOrNot real-time feedback



Notify account reps of arriving VIPs



Mobile ticketing & security



Weather data to predict fan needs



Concessions receipt survey real-time qualitative feedback



Sustainability efforts monitoring water, gas, and electric consumption





Sustainability at Levi's Stadium

- LEED Gold certified since 2014 and currently features a 27,000-square-foot green rooftop, more than 1,100 solar panels, and has an extensive recycled-water system.
- 100% of the wood used in the Citrix Owners Suites is reclaimed wood from a local airplane hangar at Moffett Field in Mountain View, CA.
- Uses reclaimed water for both potable and non-potable uses such as the playing field irrigation water.



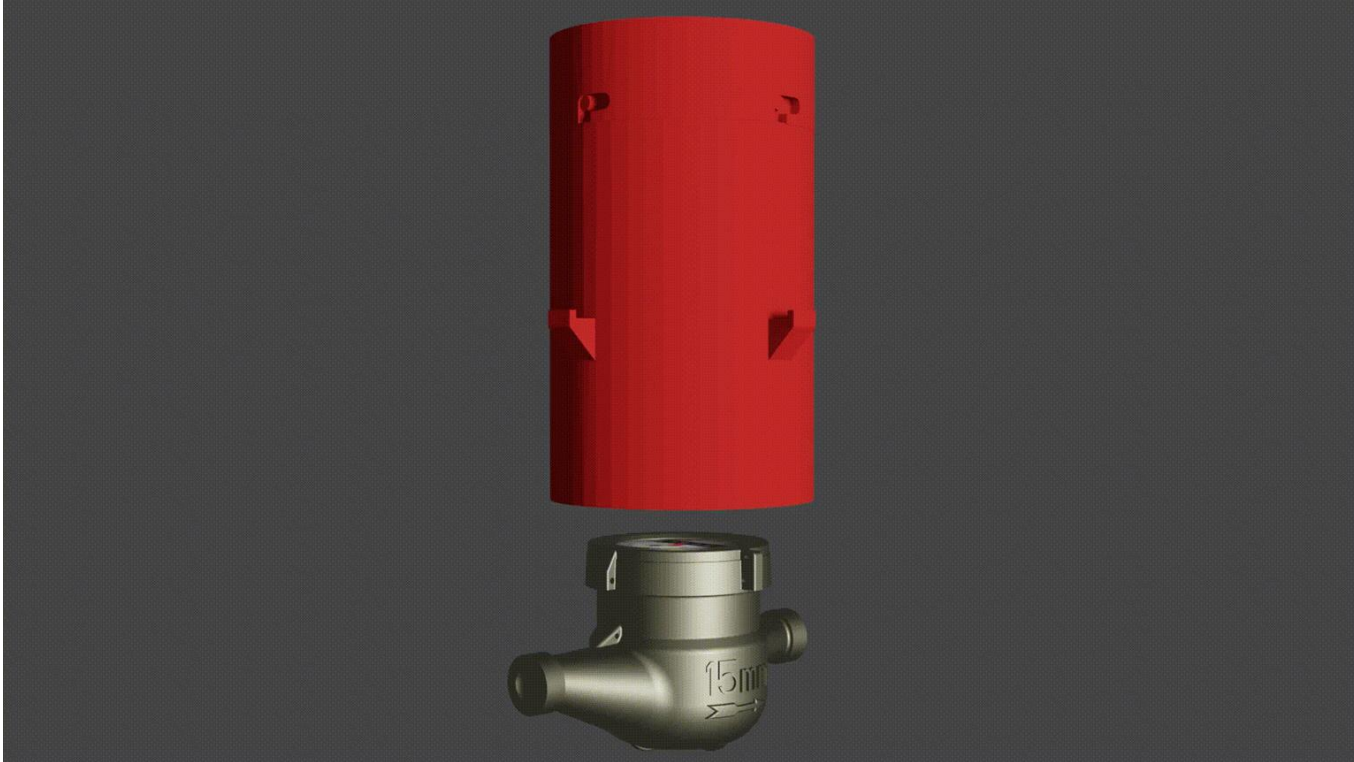


Sustainability Initiative: Context

- 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 Housing 3D Design





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





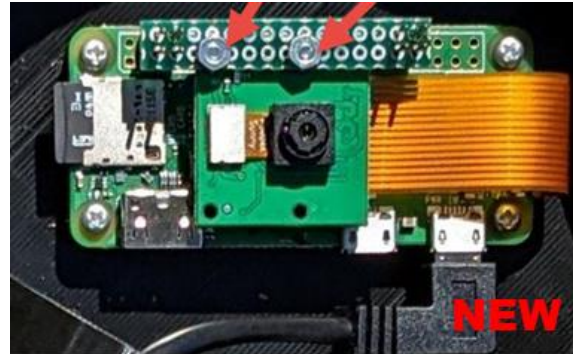
Our Journey

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



Our Journey

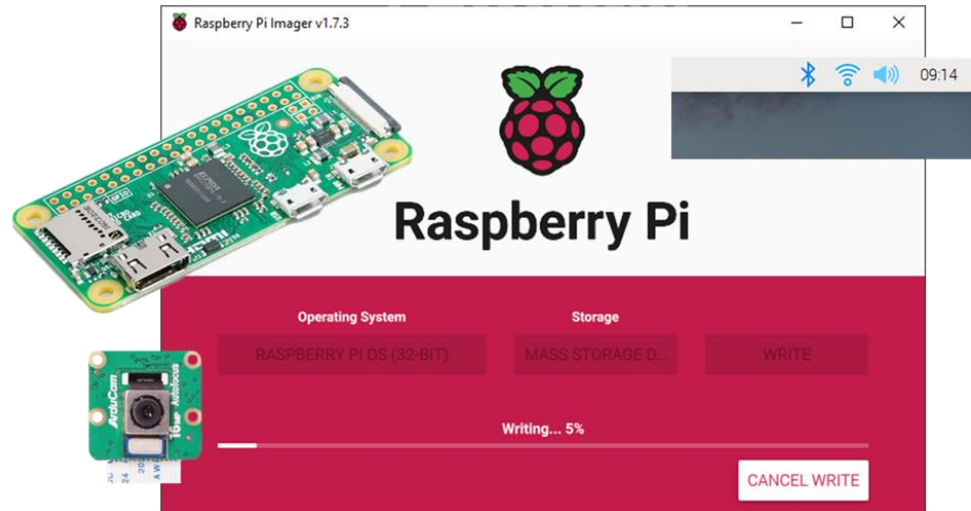
- **Hardware Upgrade** – switch from Arduino-based controllers to Raspberry Pi; improved high quality camera with auto-focus





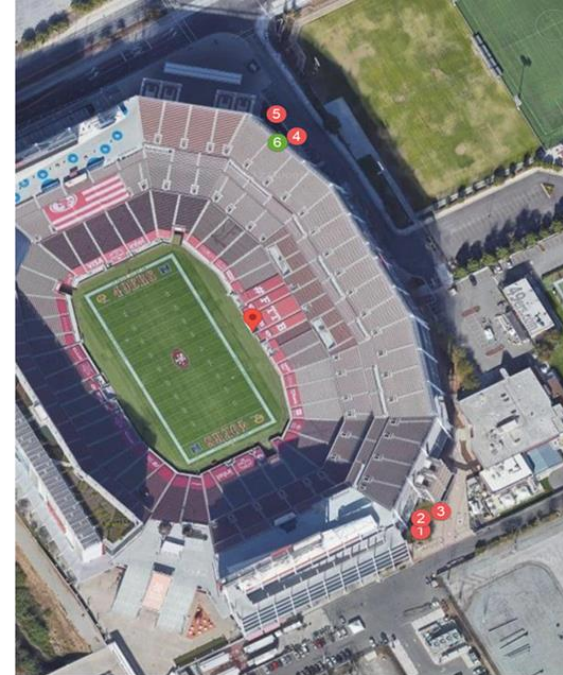
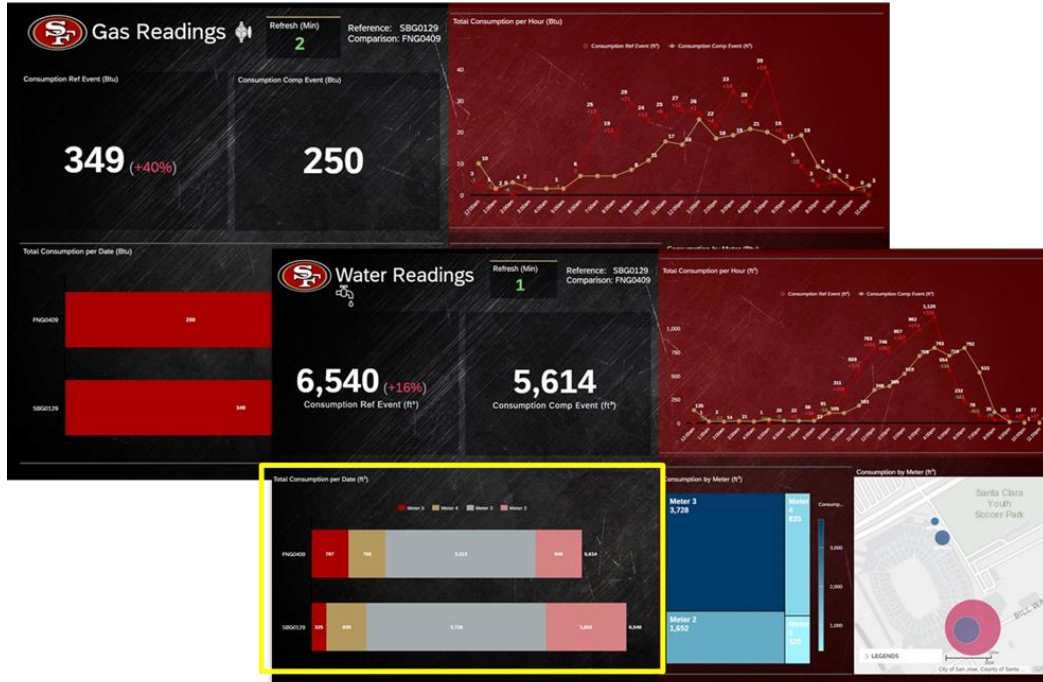
Our Journey

- **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
- Fixed electricity lines to meters
- 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)

How to Connect with Me

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