Device Data in IoT:
Use it Early and Often

Josh Pederson, Director of Product Management | Ayla Networks

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The IoT is Huge and Growing

The Internet of Things is Impacting Every Market

2020

20.4B Connected Devices	6.2T Economic Impact	50% Of New Projects	1.29T IoT Spend
Gartner	*McKinsey*	*Gartner*	*IDC*

Smart Home is Picking up Speed

700 Million connected home appliances units shipped annually by 2020
IHS

30 Million Households to Add Smart Home in Next 12 Months
NextMarket Insights

50% of NA Households with broadband will be smart homes by 2020
Parks Associates

Applications in the home could have an economic impact of **$200 billion to $350 billion** per year in 2025
McKinsey

Smart home expected to reach **$58.68 billion** by 2020
Markets and Markets

Smart home products market will almost double to **19 million** units sold by 2017
Parks Associates

By 2022, a typical family home could contain **more than 500** smart devices
Gartner

Recurring service revenues will account for a **25% of smart home revenues**
ABI Research

Connected home accounts for 22% of US households, **growing at 30%** CAGR
McKinsey

The number of smart homes is expected to reach **500 million** to **700 million** by 2020
Gartner

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OEM Options Going Forward

Build It Yourself...

3. Enterprise Applications – the user interface for your business users

1. Hardware & SDKs – connected to network, exchanges data and command control

Cloud

2. Cloud – provides infrastructure, internet "pipe", intelligence, portals

4. Consumer Applications – the user interface for your customers
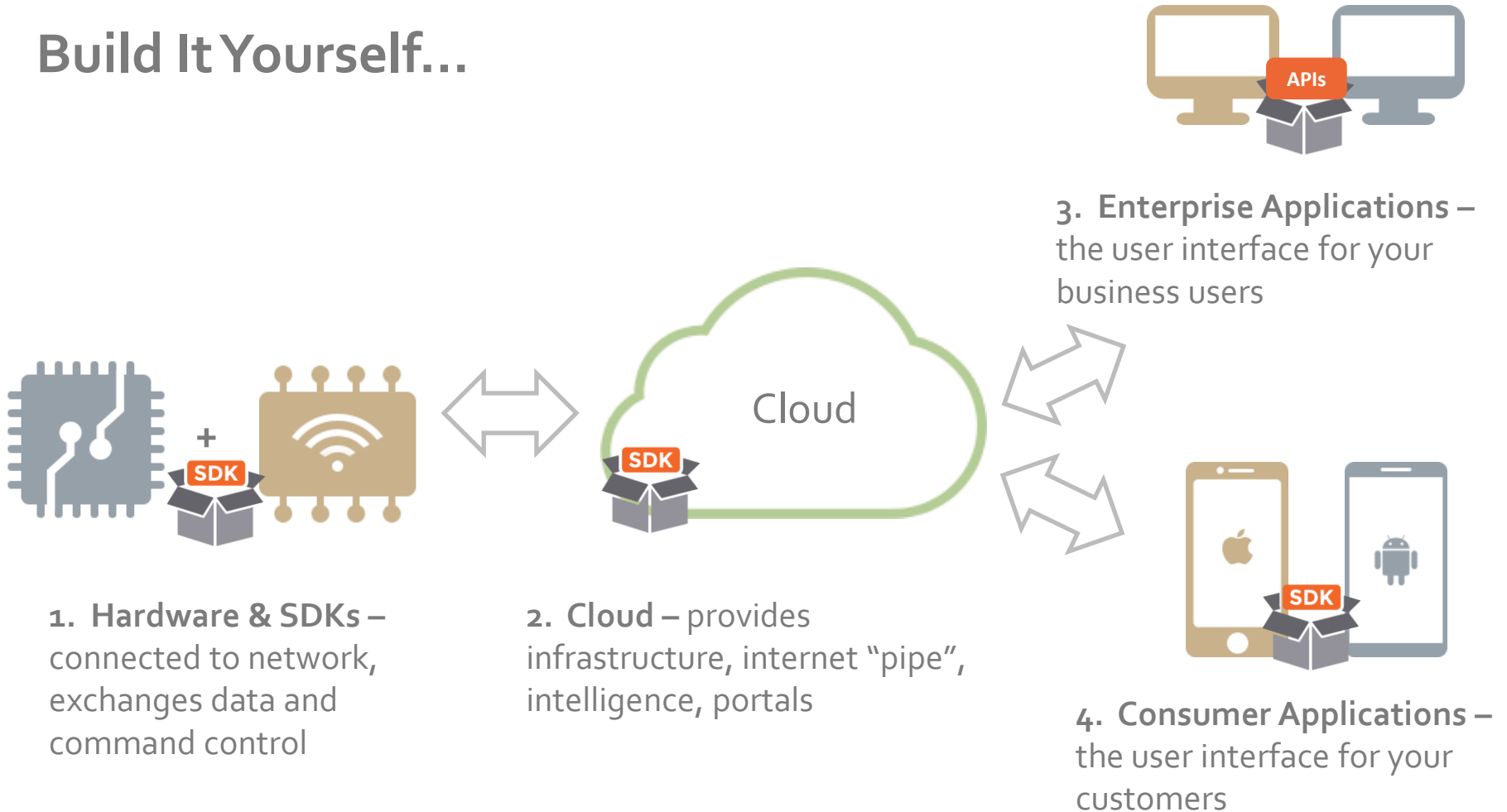
However, Lots of Issues to Consider

Many of Which Wont Differentiate Your Product

Cloud to Cloud Connectivity	SSL/TLS	Regional Requirements	Comm Protocols
Ease of Use	Network Security	Database Architecture	Value Added Services
3rd Party Data Feeds	Digital Certificates	Use Cases	Homekit Integration	Dev Opps
Latency	Hardware Selection	Data Analytics	RESTful API's
Redundancy/Uptime	Cloud Server Architecture	New Features	Sales	Privacy
Support	iOS/Android	IP Stacks	Scalability	Certifications	WiFi

Biggest Hurdle...It's a Moving Target!

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Or OEM Could Partner with an IoT Platform

Opportunity to Focus on Product Differentiation

- Future Proofed, Flexible
- True End-to-End System, No Piece Parts
- Enterprise Class Security & Scale
- Reduced Time-to-Market

- Configurability over Customization
- Global Availability & Support
- Actionable Data via Data Tools
- Unmatched Expertise

Ayla at a Glance

Ayla's Agile IoT Platform

Ayla Cloud Services

Analytics

Logging & Notification

Management & Provisioning Connectivity

3rd Party Apps

Development Portal

Ayla Embedded Agents

Ayla Application Libraries
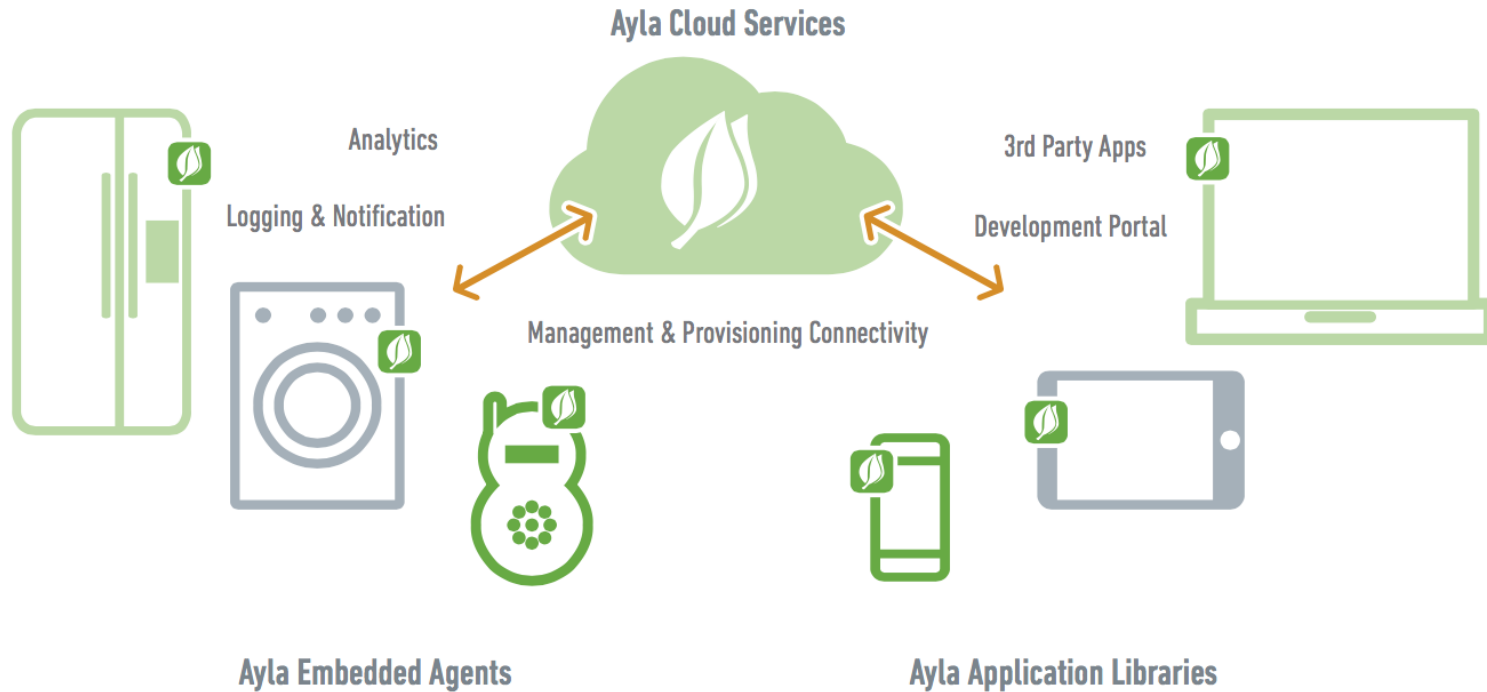
The leading B2B Enterprise IoT PaaS with Unmatched Market Traction Among Global Manufacturers Targeting Smart Home & Smart Building

Ayla's Agile IoT Platform™

Ayla Device Agents

Ayla Production Agent
✓

Ayla White Box Agent

Ayla Linux Agent

Generic Gateway

Ayla Cloud Services

Developer Portal

OEM Dashboard

User Management
- Role-Based Access Control (RBAC)
- Device Sharing
- Single Sign-On (SSO)
- OAuth

Device Management
- Registration Services
- Schedules & Timers
- Logging & Debugging
- Gateway Translation
- Alerts & Notifications
- Device Virtualization
- Device Grouping
- Location & Time Zone Services
- Over-the-Air Updates (OTA)
- LAN Connect ™

Data Management
- User Data Store
- Ayla Insights
- Device Data Store
- Multi-Property Support

Integration Services
- Rules Engine
- Apps & Feeds
- User Opt-In
- Triggers
- Batch Data Export
- Data Streaming Service (DSS)

Multi-Region Support

Ayla Mobile SDKs

Ayla Mobile SDK

PaaG

AMAP

Ayla Cloud-to-Cloud

RESTful APIs
API

End to End

Security & Privacy Management

Scalability and Configurability Services

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Trusted Partner of Leading Brands

Product Lifecycle

Development
(get it working to spec)

Iterate

Field Trials
(verify it works to spec | prepare for production)

Production
(support| understand usage)

Improve

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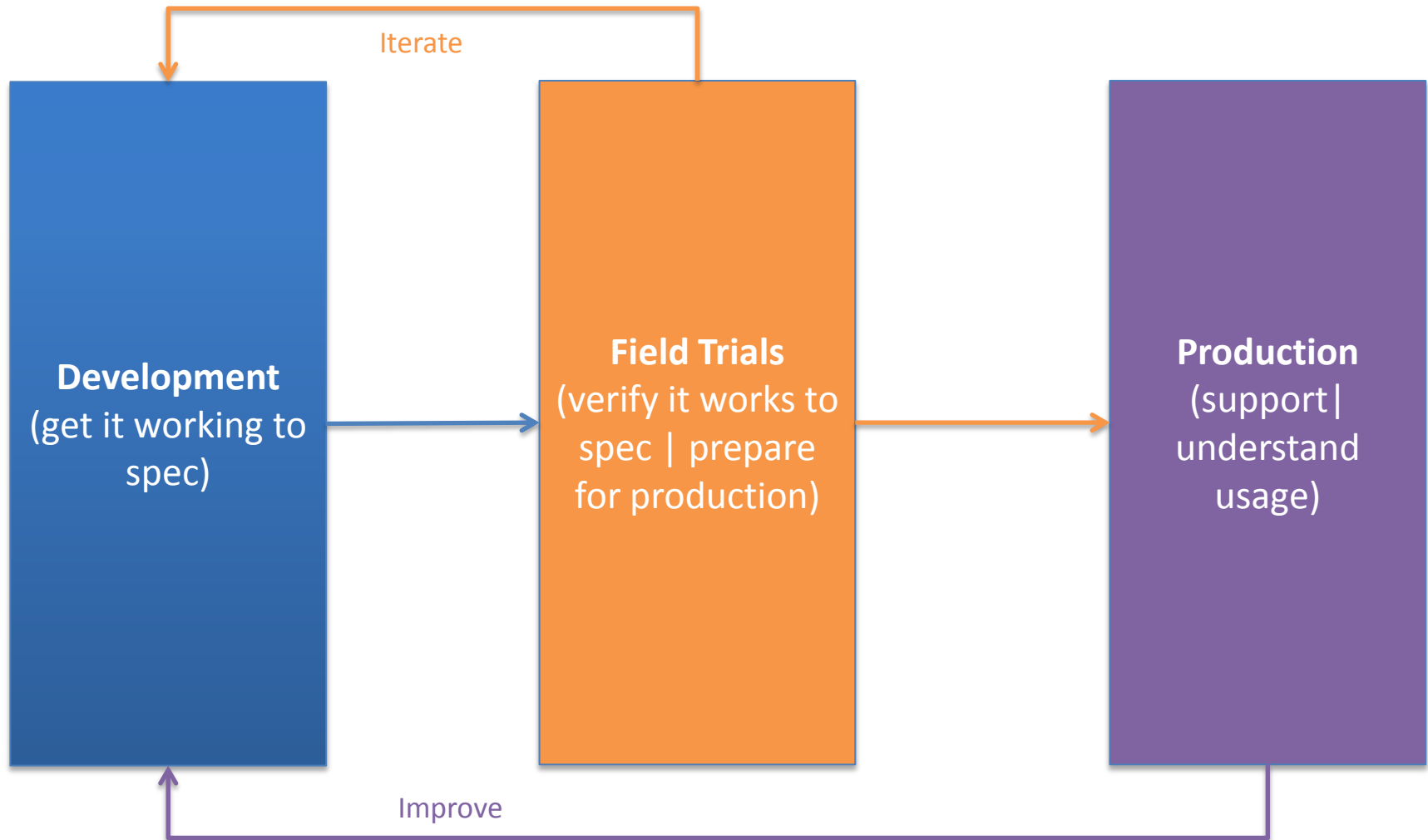
IoT-Driven Product Lifecycle + Analytics

DATA-CENTRIC DESIGN & ITERATION

PRODUCT USAGE INSIGHTS

QUALITY

EXPERIENCE

FEEDBACK

SUPPORT

Development
(agile requirements, building better products)

Field Trials
(proactive planning, deliver the experience)

Production
(adapt and focus the business – marketing, services etc.)

CONTINUOUS IMPROVEMENT & FEEDBACK
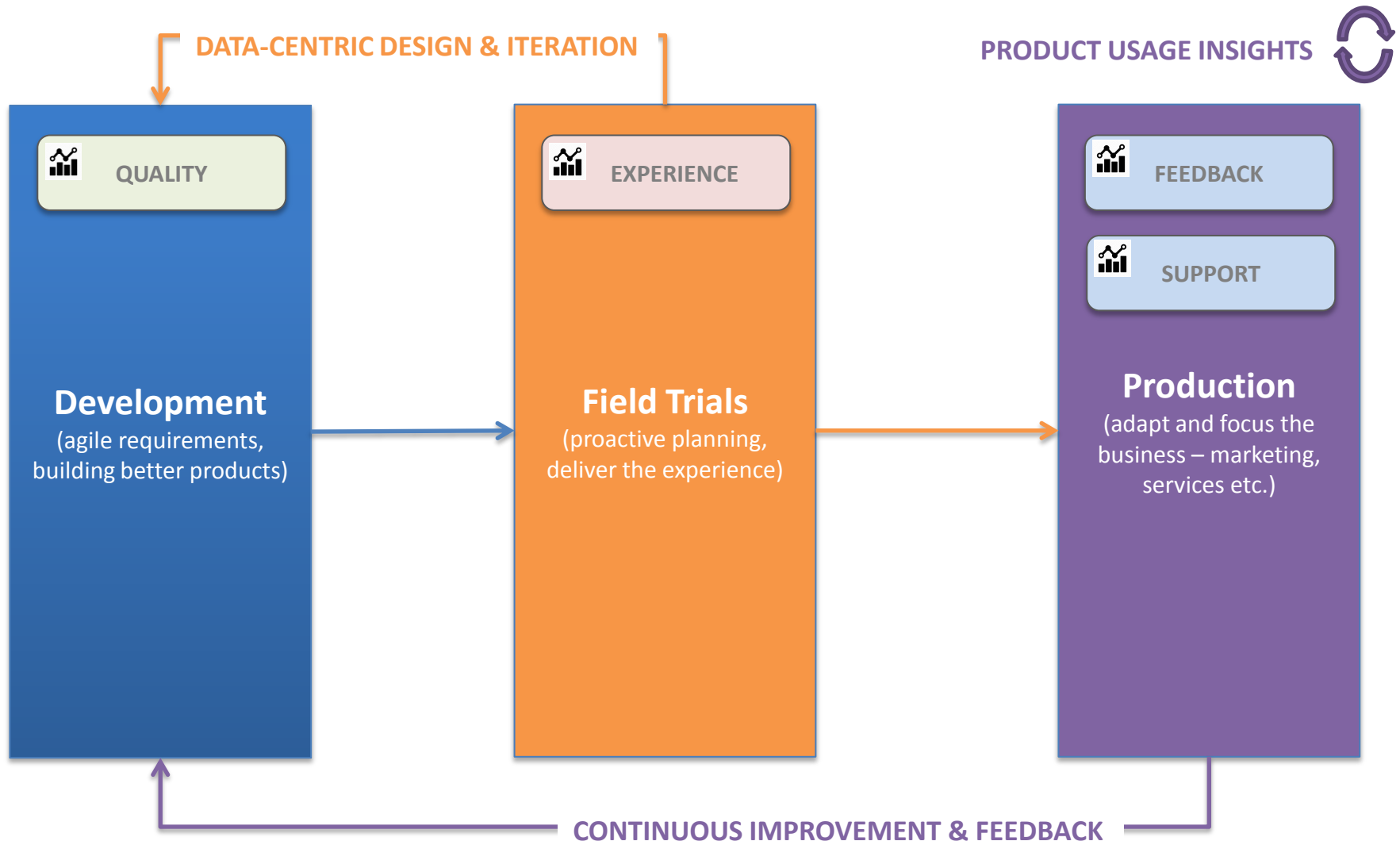
Access to Data

Options to suit analysis needs

- **Near-Real time**

    - Data Streaming Service (DSS)

    - Device –> cloud -> Out

- **Non-Real Time**

    - Batch export

    - Periodic pull of data

Product Lifecycle: Development

Development

QUALITY
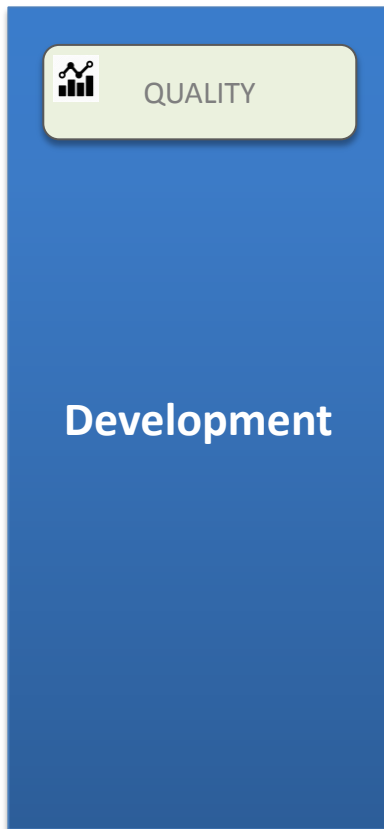
Analytics KPIs

- How are the products performing/behaving?
- How many faults/errors, when and why?
- What data are the products sending and when?
- Is the data well structured?
- Assess the product performance, any abnormalities?

Product Lifecycle: Development

QUALITY

Development

TROUBLE EVENT ANALYSIS
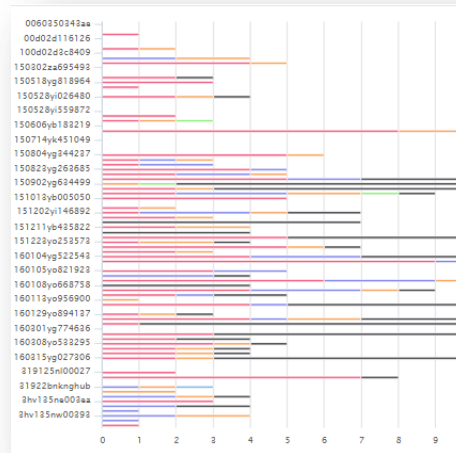
PRODUCT PERFORMANCE
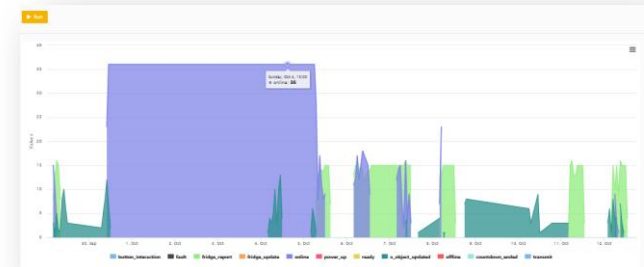
ANOMALY DETECTION

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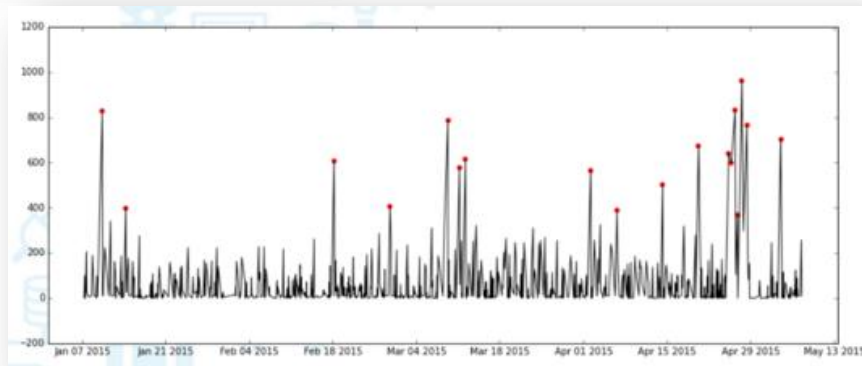
Behavior Timeline
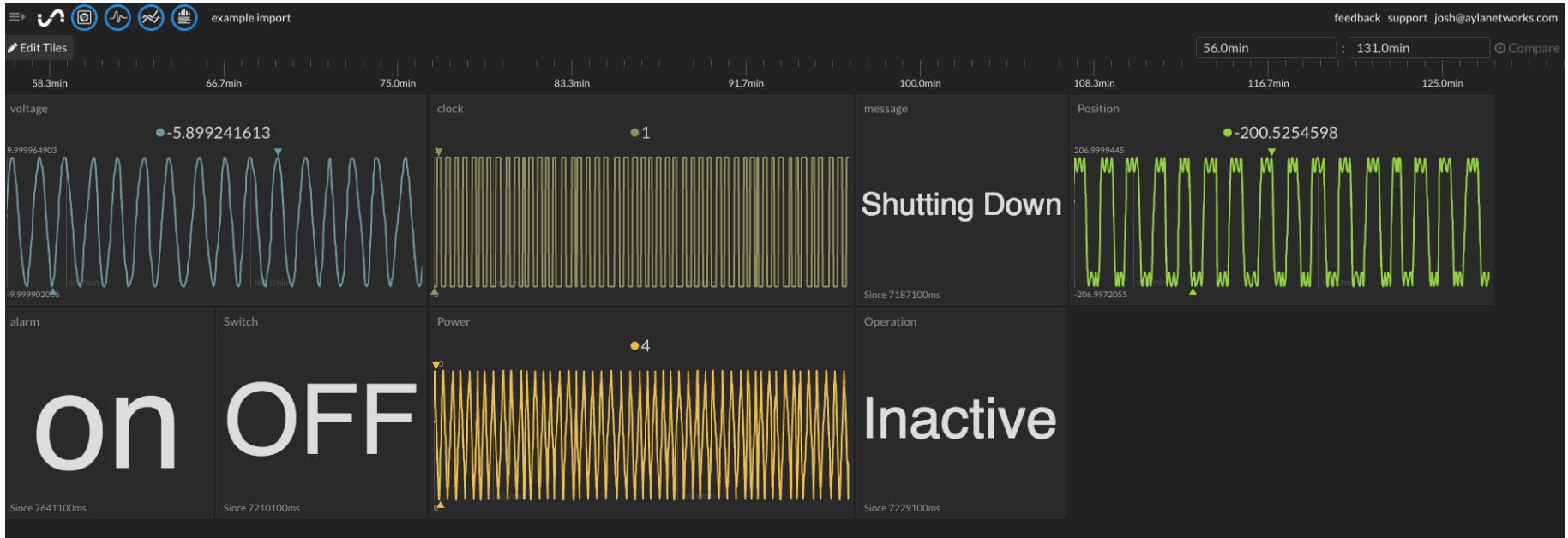
Product Lifecycle: Field Trials
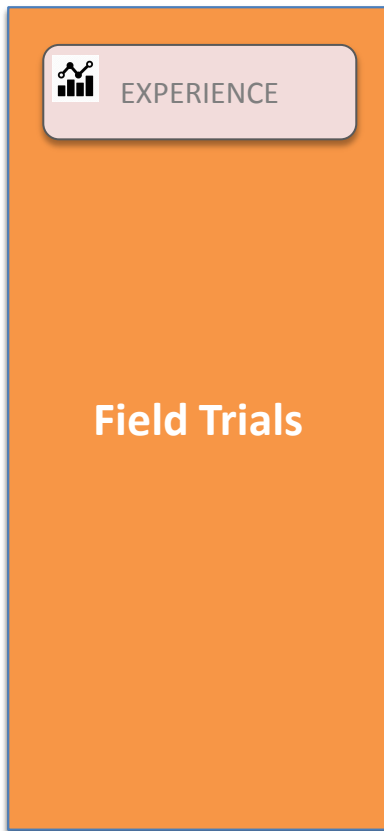
Analytics KPIs

- How often is each feature being used?
- What features tend to be used by the same users?
- Which features are your engaged users using most?
- What is the status of my deployment (maintenance and monitoring)?

EXPERIENCE

Field Trials

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Product Lifecycle: Field Trials

PRODUCT PACKAGE CLUSTERING
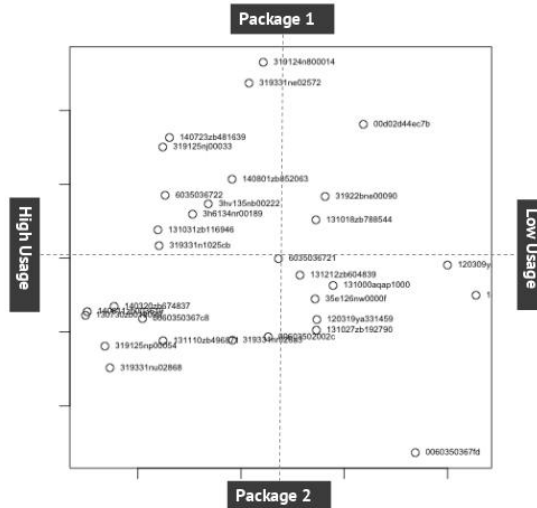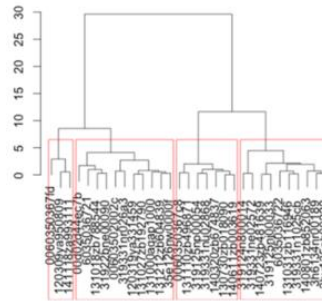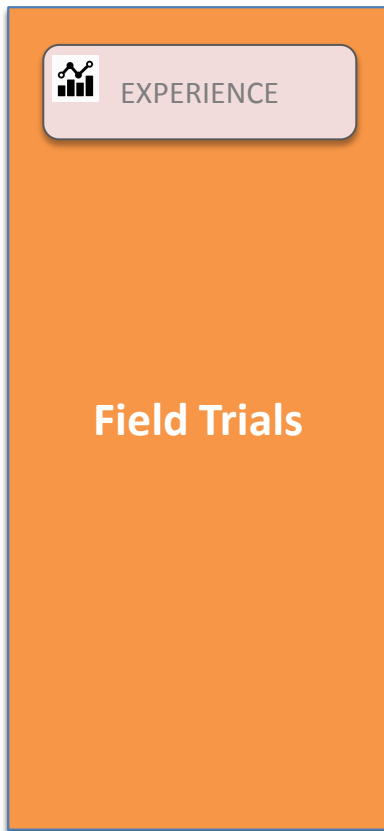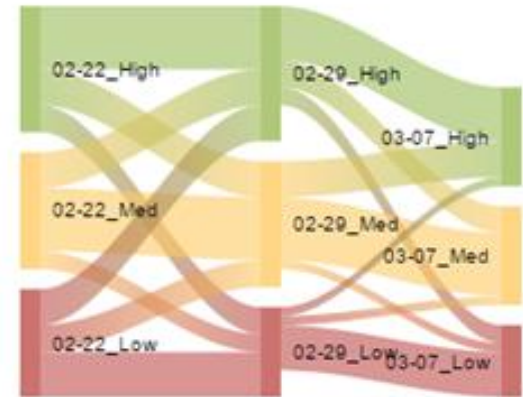
Product Lifecycle: Production

Analytics KPIs

- How many products are active/inactive, where & why?
- Track product life states from unconnected states (e.g. manufactured, shipped, purchased, etc.) to connected states (e.g. registered, activated, operated, etc.)
- Analyze consumption/usage to derive states for warranty/replenishment service
- <u>When will a device fail next?</u>

FEEDBACK

SUPPORT

Production

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Product Lifecycle: Production

Production

- FEEDBACK
- SUPPORT

PREDICTIVE MAINTENANCE

GEO ANALYSIS

Total Objects | Total Events | **Engagement Score** | Security Score
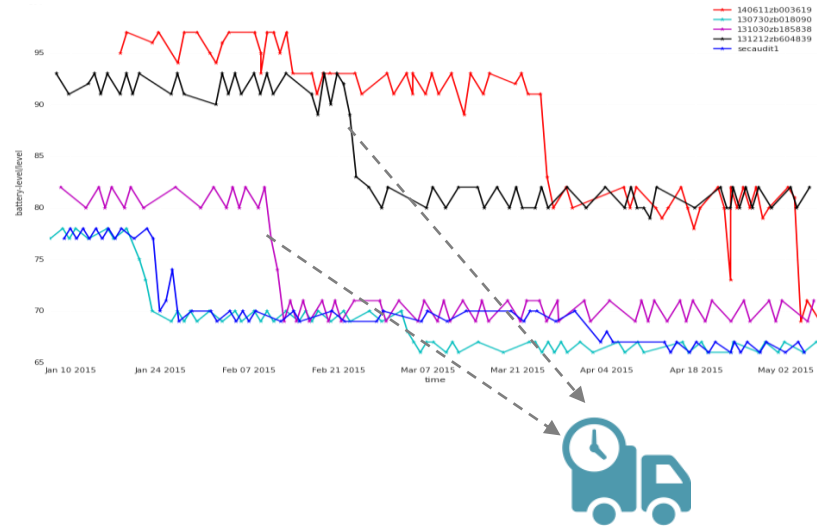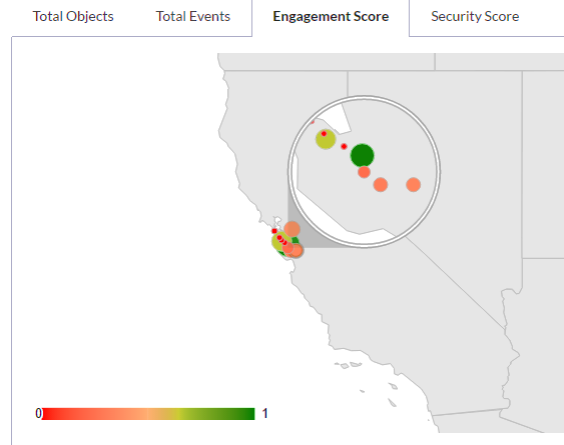
PRODUCT DISTRIBUTION & ACTIVITY ANALYSIS
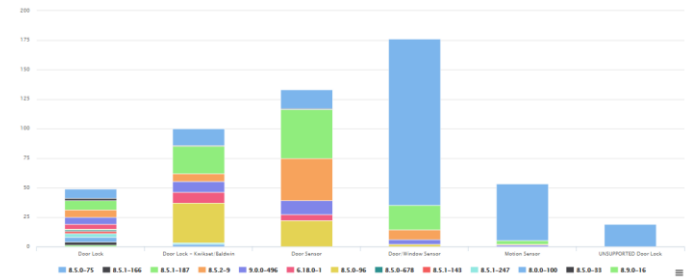
Feedback (Understanding Usage)

INSIGHTS FOR CONSUMER PRODUCT MANUFACTURERS

ROLES

- PRODUCT MANAGERS DEVELOPMENT
- SALES MARKETING
- SUPPORT SERVICES

INSIGHTS

CUSTOMER PROFILING
A executive summary of where products are located, how they are being used and performing, aggregate insights and other reports on your install base

CUSTOMER ENGAGEMENT
Engagement profiles group customers on their usage behaviour. A detailed report on the health, what are the anomalies and trends, asset score etc. – in a periodic, automated report.

CUSTOMER CHURN
Correlate user behaviour and product performance with actual churn, pinpoint behavioural triggers that lead to attrition and make targeted recommendations to increase upsell opportunities

PRODUCT USAGE & FEATURE TRACKING
What are the most popular features, are my products being used as expected or recommended, how can I focus my R&D spend etc. Enable usage-based business models and services

PRODUCT DIAGNOSTICS
Highlight trends, patterns and potential issues. Identify software, connectivity and pairing issues, product anomalies as well as operational issues and component failures.

PREDICTIVE TRENDS
Use data science models to predict time to action for products requiring replenishment/ replacement and other advanced data-enabled features, enable targeted service and marketing actions

OUTCOMES

- NEW REVENUE STREAMS
- NEW BUSINESS MODELS
- CROSS-ORGANIZATION VISIBILITY
- OPERATIONAL EFFICIENCY
- CUSTOMER SATISFACTION

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mnubo is an Internet of Things (IoT) company, providing Data Analytics solutions for connected Product Manufacturers and Service Providers. mnubo extracts business value from Industrial IoT data by delivering out-of-the-box insights, automated reports and advanced IoT data science. Find out more at www.mnubo.com
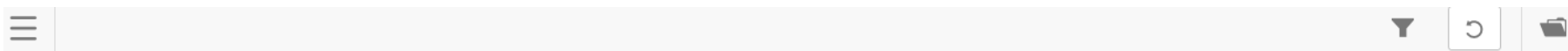
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Support: Use Cases

Requirements for access and latency

- **Reactive (non real-time)**

  - Trouble ticket comes in, look into device status / history to troubleshoot

- **Pre-emptive (real-time)**

  - Alert comes in, look into device status / history to troubleshoot

- **Predictive**

  - Know before fault occurs, move to prevent

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Understanding Deployment

Maintenance and monitoring at scale
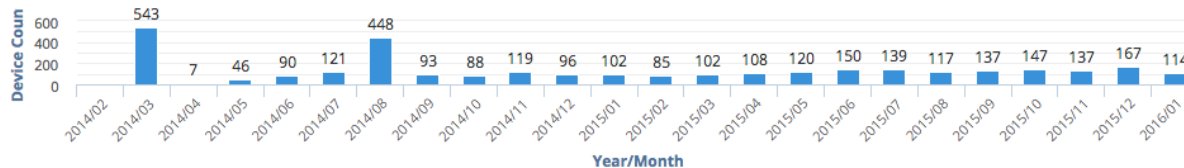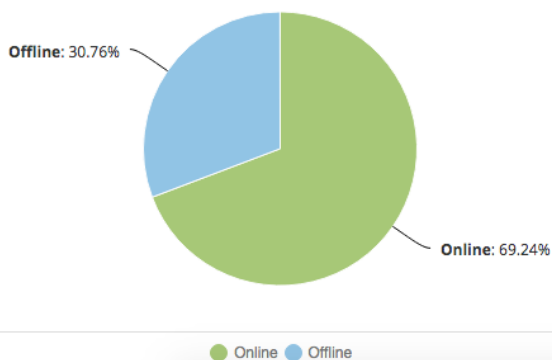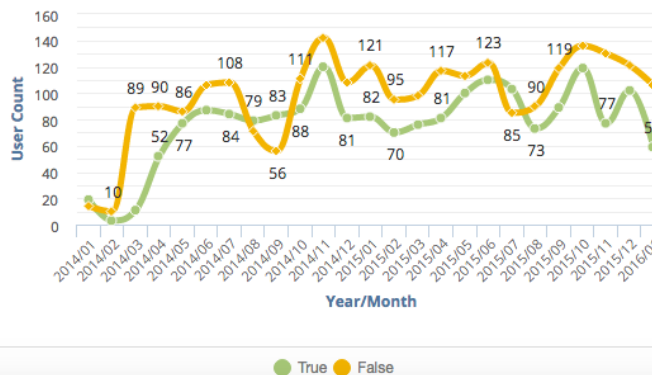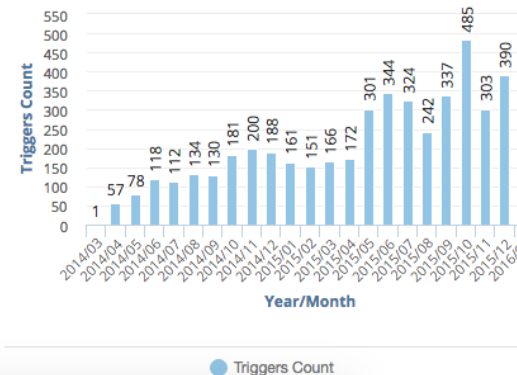
Understanding Device

Custom Portal Development

DEVICE DETAILS

INTEGRATION (SFDC)

ANALYSIS

Business: Enrich Device Data

3rd Party Services	Demographic, Weather feed
SaaS Business Systems	SalesForce, SAP
In-House Data	Financial, Warranty

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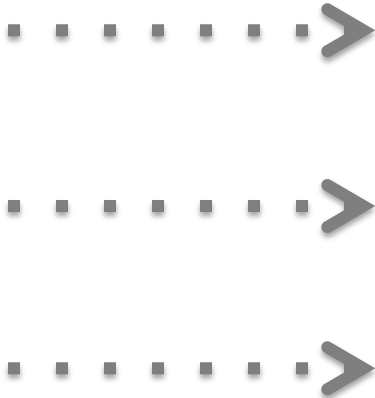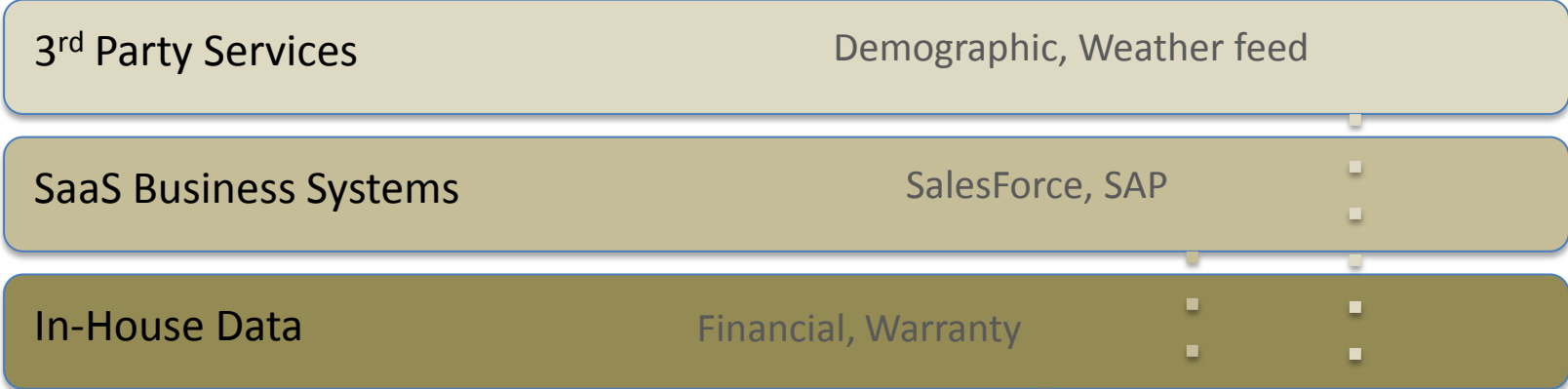
Solution Design

Top Down vs Bottom Up

AwayMode	int
CoolSetPoint	int
HeatSetPoint	int
OnOff	bool
HostSWVersion	string

HARDWARE + **DEVICE PROPERTIES** = **ANALYTICS**
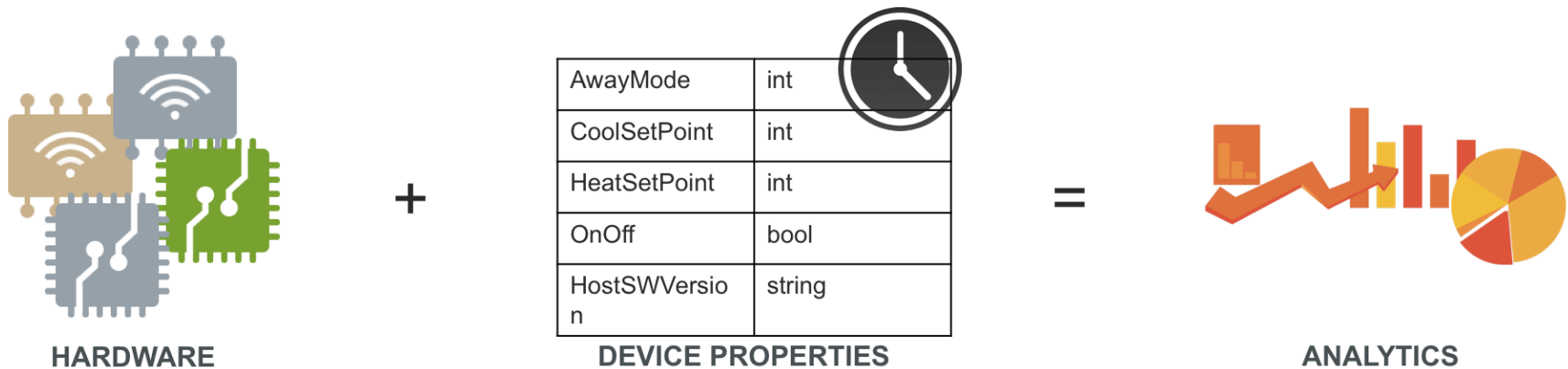
BALANCE HARDWARE CONSTRAINTS WITH **DEVICE BEHAVIOR** TO ENABLE ANALYTICS

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Validation

Test, then test, then test again

TEST EVERYTHING

SOLUTION FUNCTIONALITY
FORMAT OF DATA
VOLUME OF DATA
FREQUENCY OF DATA
OUTPUT OF ANALYTICS

TUNE ACCORDINGLY

PROPERTY TYPES
HIGHER/LOWER FREQUENCY
REPORT FORMAT

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Improvement

Measure and Refine
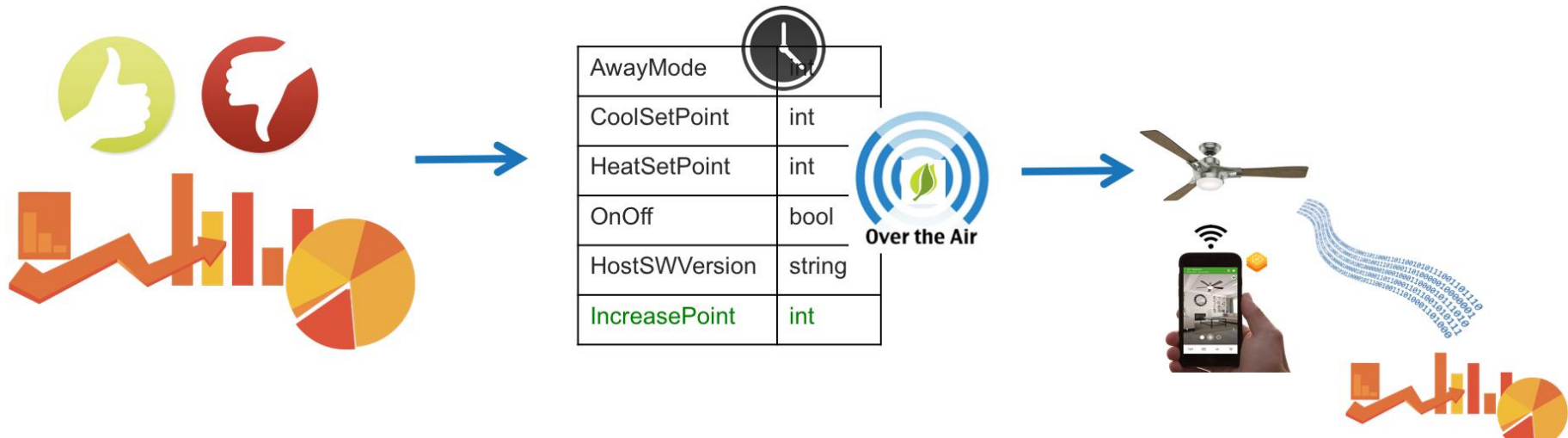
MEASURE EFFECTIVENESS OF ANALYTICS AND PUSH ADJUSTMENT **TO IOT SOLUTION** ACCORDINGLY

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Thank You!

www.aylanetworks.com

josh@aylanetworks.com

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