Project 10: Mobility

"Name of Presenter"

Presenter

Enter details about the presenter here.
More details about the presenter.

The LOGIIC Model of Government and Industry Partnership

Linking the Oil and Gas Industry to Improve Cyber Security

Project 10: Mobility

Background

Assessment Approach

Assessment Findings

Conclusion

Mobility

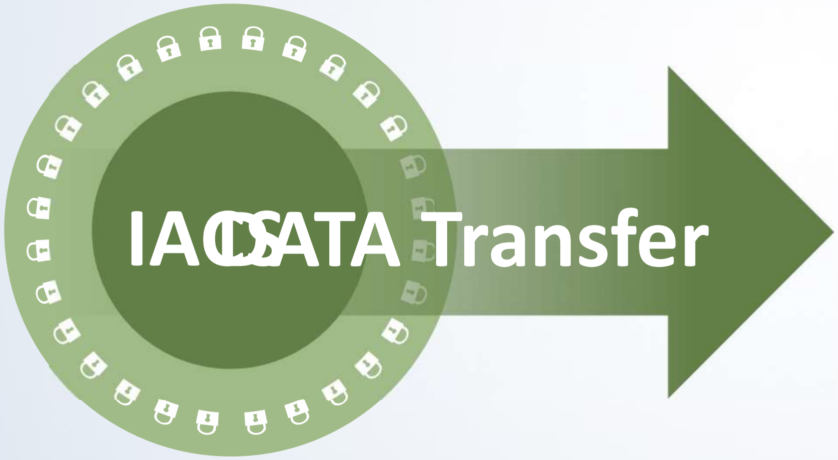
Background

Overview

- Focused on assessment and analysis
- Mobile devices to display IACS situational data
- Evaluated different mobility technologies
- Conducted assessments in an IACS laboratory
- Findings were published in a report

Objective

Evaluate currently availabl ns,
that provide connectivity b ACS
environment and decision r side.



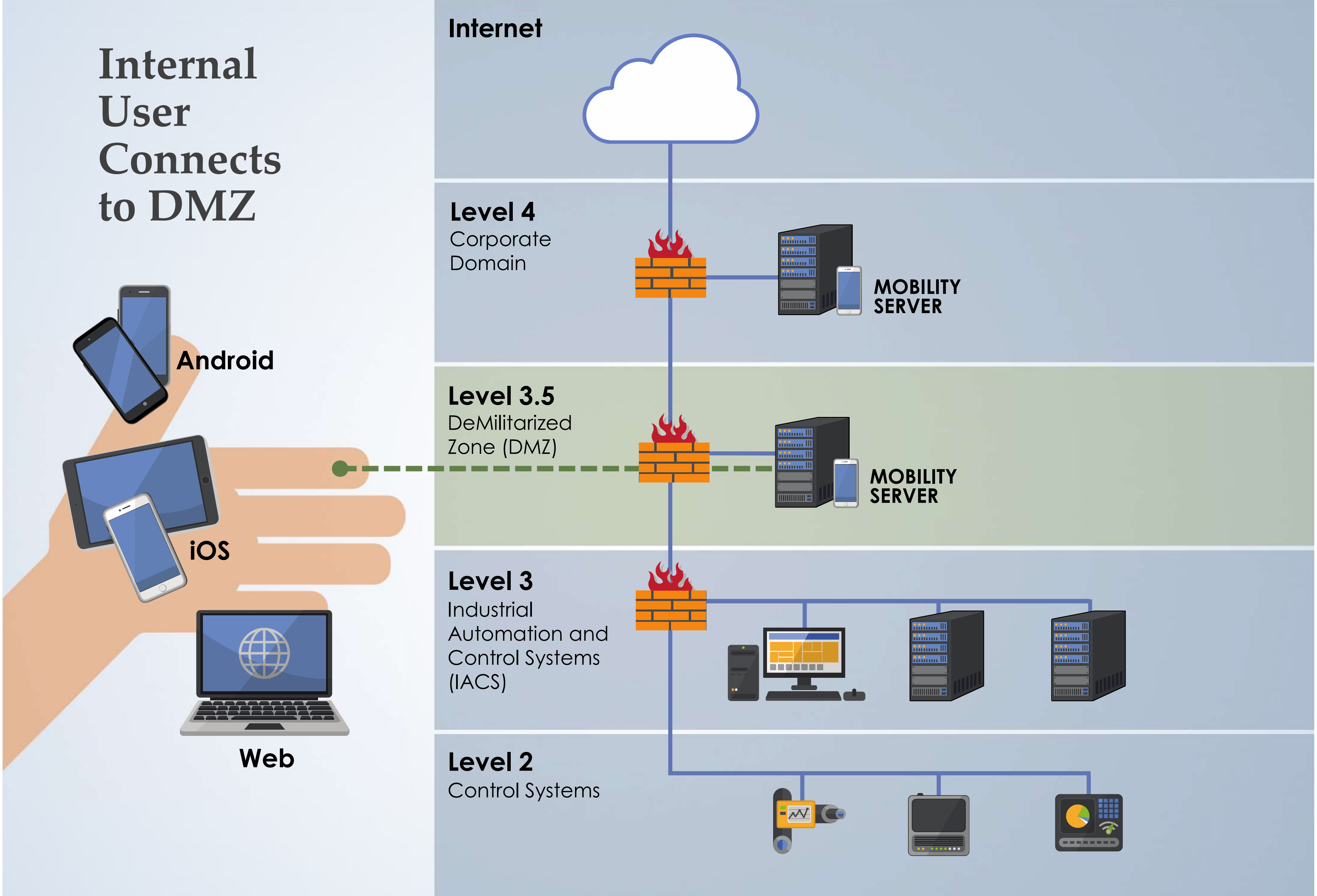
Surveys

- Surveyed Executive Committee members in December 2014 and November 2015
- Findings show mobility is significantly important to LOGIIC members
- Many plan to implement or expand mobility in their operations

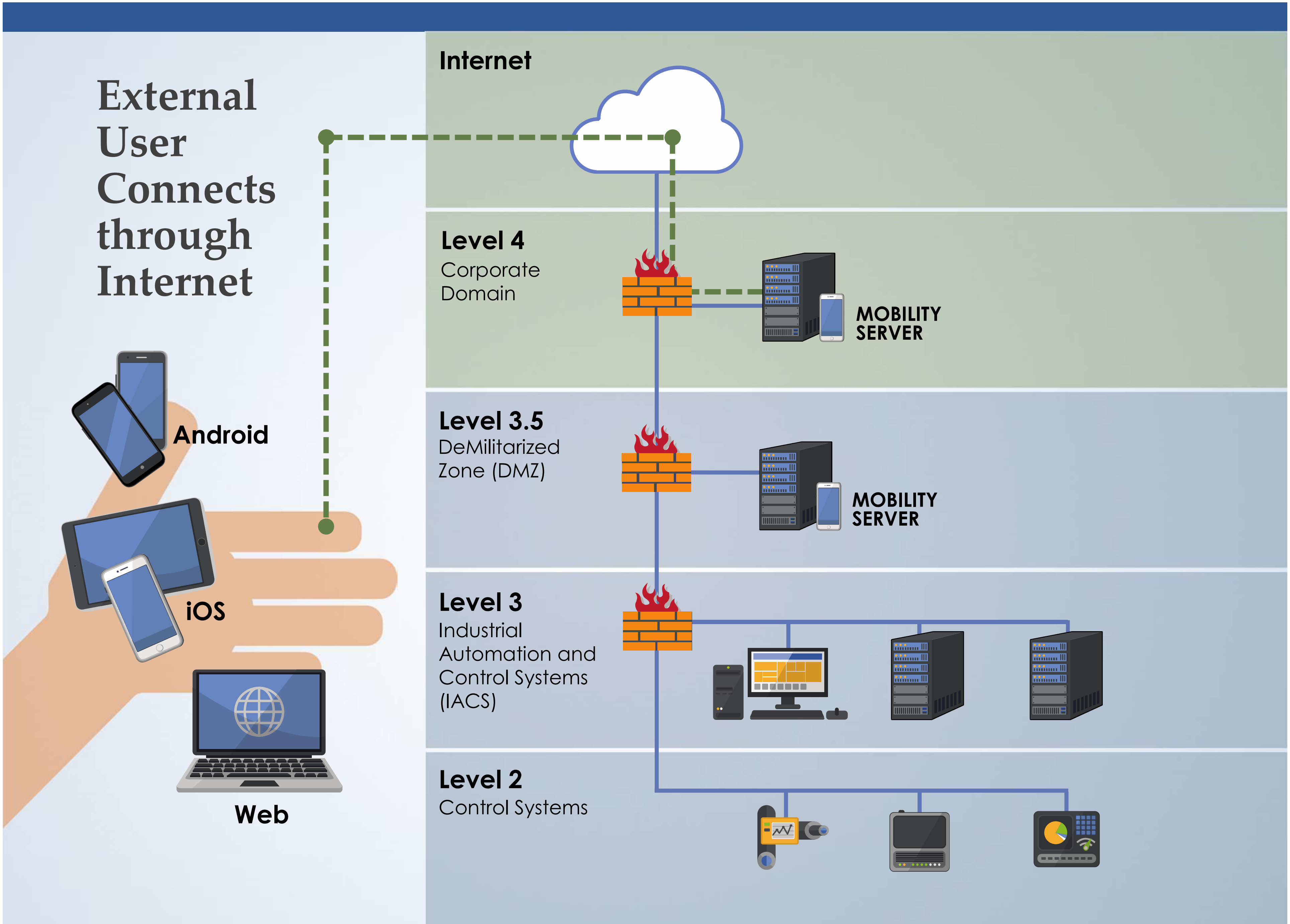
Architectures

- Vendors offer different connectivity options
- Most mobile solutions are implemented at the asset owner site
- ‘Internal’ and ‘External’ connection options

Internal User Connects to DMZ



External User Connects through Internet



Internet

Level 4
Corporate Domain

Level 3.5
DeMilitarized Zone (DMZ)

Level 3
Industrial Automation and Control Systems (IACS)

Level 2
Control Systems

Mobility

Assessment Approach

Methodology

THREAT
RISK
CONSEQUENCE

Risk = Threat x Vulnerability x Consequence

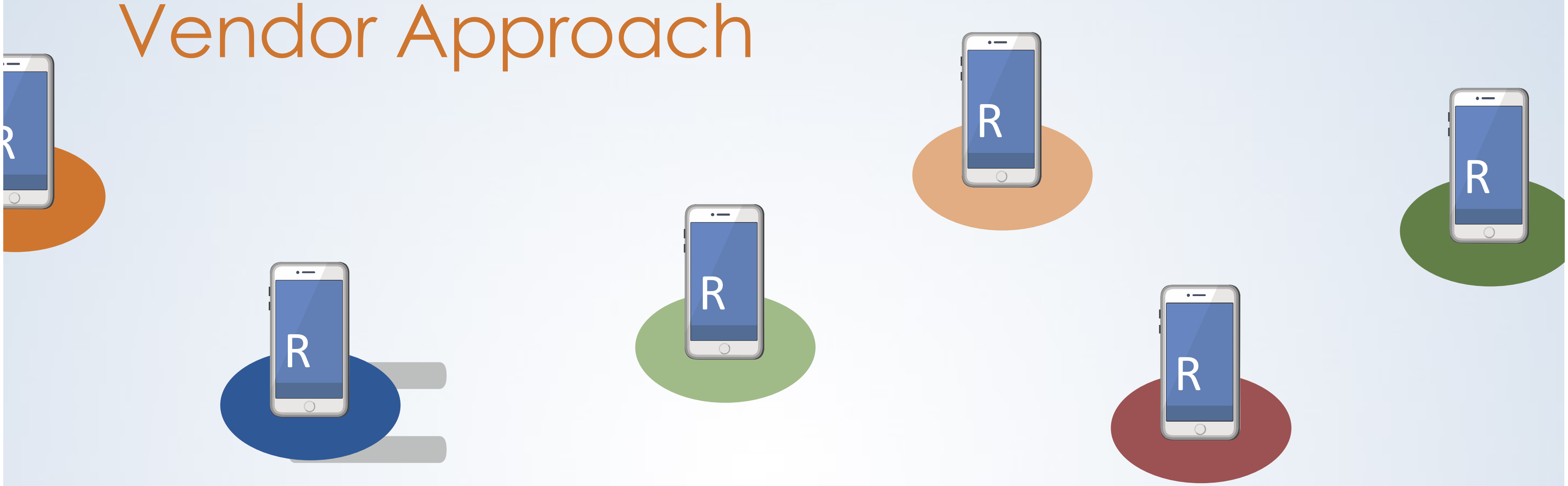
Onsite Assessment

- Reconnaissance
- Information capture and data retrieval attempts
- Targeted attacks
- Denial of service (DoS)

TEST PLAN
P
q
R

Scenarios & Rules

Vendor Approach



- Automation vendor & third-party solutions
- Each assessment conducted as an independent sub-project

Test Approach

Insider and outsider threat scenarios

SME attack methods

Public and customized exploits and payloads

Test equipment

Pre-work Phase

- Vendor Set-up
- Connection of test equipment
- Network validation
- Reconnaissance
- Traffic capture

Test Scenarios

01 Packet Captures

02 Data Storage and Leakage

03 Insecure Communication

04 App Authentication and Authorization

05 Crypto Algorithm and Key Management

06 Session Management

07 Client-side Injection

08 Server-side Controls

09 Reverse Engineering and Binary Protections

10 Code Analysis

11 Default App Configuration

12 Applicable Existing Exploits

Test Tools u Web Apps

Nessus®

SSLstrip

Wireshark®

Burp Suite

SQLiteSpy

sqlmap

Kali Linux™

SoapUI Pro

Test Tools U Android and iOS

- Kali Linux™
- KingoRoot
- Wireshark®
- Burp Suite
- ABD
- Jadx
- SSLstrip
- Nessus®
- Apktool
- SQLiteSpy
- drozer
- Otool
- ondevice console
- Pangu
- keychain dumper
- Cycript
- sqlmap
- Big Boss Tools

Analysis of Findings

TECHNICAL

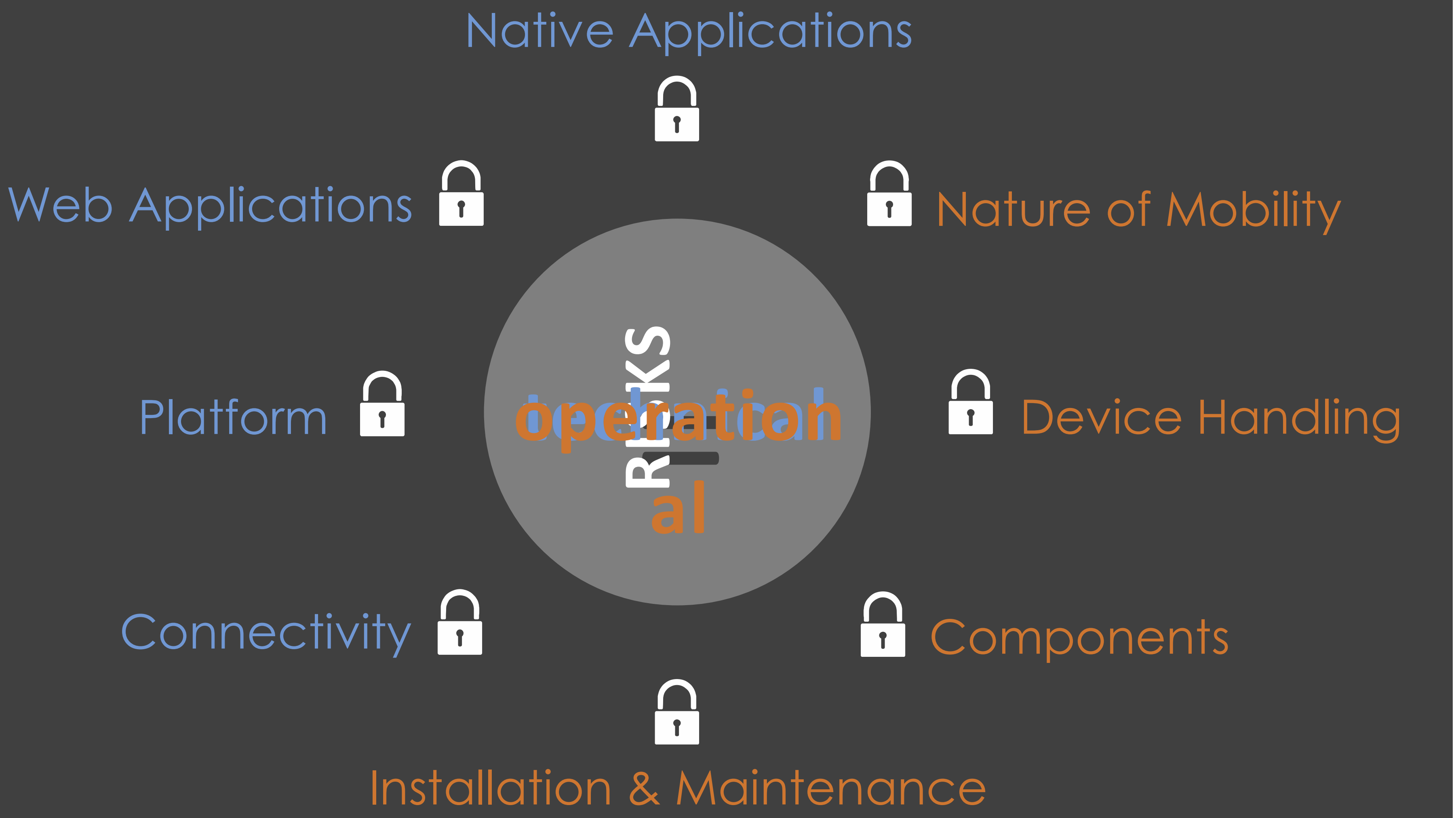
- Research
- Documentation
- Assessment Tests
- Background Info
- Observations
- Functional Tests

OPERATIONAL

- Usability
- Ease of Setup
- Maintenance Requirements
- Skillsets to Maintain and Use System

Mobility

Assessment Findings



Native Applications
Web Applications
Nature of Mobility
RISKS
technical
operational
Platform
Device Handling
Connectivity
Components
Installation & Maintenance

Common Risks in Native Applications

- No certificate checking and pinning
- No jailbreak or debug detection
- No obfuscation
- No ARC memory management

Common Risks in Web Applications

- Cross site scripting vulnerabilities
- Session handling and termination risks
- Cookie management

Platform Risks

- Android vs iOS
- Key handling and platform requirements
- Signature verification
- Good coding practices, patches, and maintenance needed to mitigate any risks

Connectivity Risks

- “Internal User” vs “External User” connections
- Vendor management
- Asset Owner management

Nature of Mobility

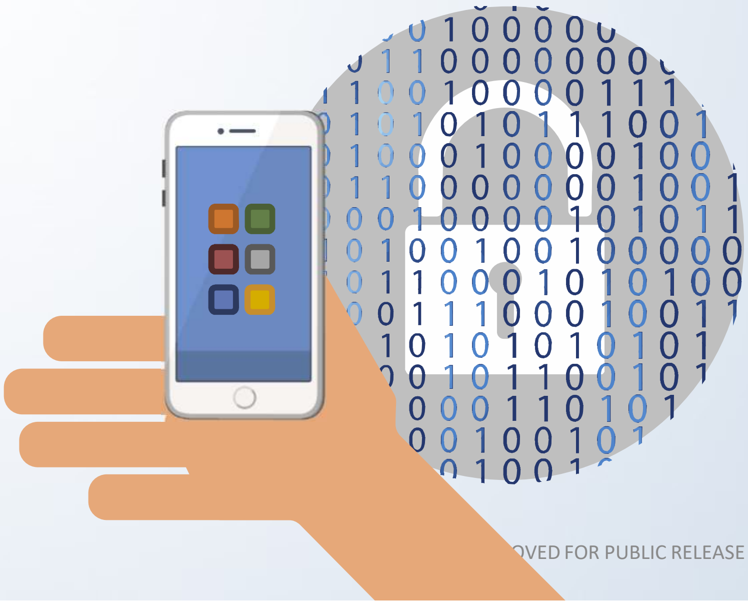
- High-value data on a small, movable device
- User policies
- Management of accounts, permissions, devices
- Updates

Device Handling

- Unauthorized view
- Single-user devices
- Operational user policies
- Decommissioning

Supply-Chain Components

- Web and application tools and components can introduce new risks
- Ability of the vendor or asset owner to mitigate risks
- Important to understand coding framework



Installation, Maintenance & Management

Installation typically with vendor, followed by:

- Server maintenance
- Application updates
- User and device management
- Long-term support considerations

Mobility

Conclusion

Mobility Considerations

- Movement of data outside the IACS environment requires careful planning
- Many benefits exist to using mobility

- Close collaboration with vendor needed to mitigate technical risks
- Operational risks may best be handled through security policies and procedures

- A risk analysis should be conducted prior to selection and implementation of a solution
- Solutions vary in design, connectivity options, and management
- Selection may be based on risk, return on investment, resources available for management, etc

What is provided by the vendor?

Can a third-party mobile device be used?

- Most vendors provide software solutions that can be integrated on the asset owner's mobile devices
- Vendors may provide native applications to run on Android or iOS, or web app access

What security controls are required to secure the server or application?

- Server access control, lifecycle maintenance, and change management
- Vendor applications should be maintained and patched
- Mitigation of supply chain management of risks

Q+A

How do the mobile devices connect to the server?

- Most vendors offer two ways of connecting
  - From inside the network
  - From the Internet
- Connectivity choices should be based on operational need, value of data, and acceptable risk

Within the application, what functionality is provided – read data only, or perform control?

- Solutions tested provided read-only access to data
- Other solutions advertise control capability is may be possible

Q+A

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What security controls are required to maintain the integrity of data in transit?

- Data in transit requires implementation of encryption
- Asset owners should verify the most current and secure methods are in place and can be maintained

Q+A

Is data stored on the device?

- Data, alerts, and status messages can be stored on the mobile device
- Data at rest on the device should be encrypted and controlled

What authentication mechanisms are in place?

- Authentication if an application or web browser is used to access the data
- Alerts and status messages that appear on the device may not require authentication to view

Approach to Mobility

- Solution designs vary
- No single model for securing mobile solutions in IACS
- Asset owners should work with the vendor to understand all technical details
- Select a solution that best matches a risk portfolio and operational goals

Important Technical Details

An asset owner should be aware of:

- Solution design
- Network configuration
- Device options
- Security of data
- Management

Conclusions

Implementing mobility for IACS data, while maintaining a secure environment, requires carefully implemented:

- Technical security measures
- Operational user policies

Additional Considerations

Spectrum of available mobile solutions

Rapidly evolving market space

Selecting a solution based on risk portfolio, operational needs, and life-cycle

Variety of options for connectivity, data display, user awareness

Implementing mobility in IACS
can be done securely
if technical and design aspects
are managed with security controls
and security is managed
throughout the life-cycle.