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**CYBER SECURITY AND  
RESILIENCE SYMPOSIUM**

TOWARDS A RESILIENT AVIATION CYBERSPACE

AMMAN, JORDAN | 15-17 OCTOBER 2019



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# A Cyber-Resilient IoT Certification Framework for Aviation Systems

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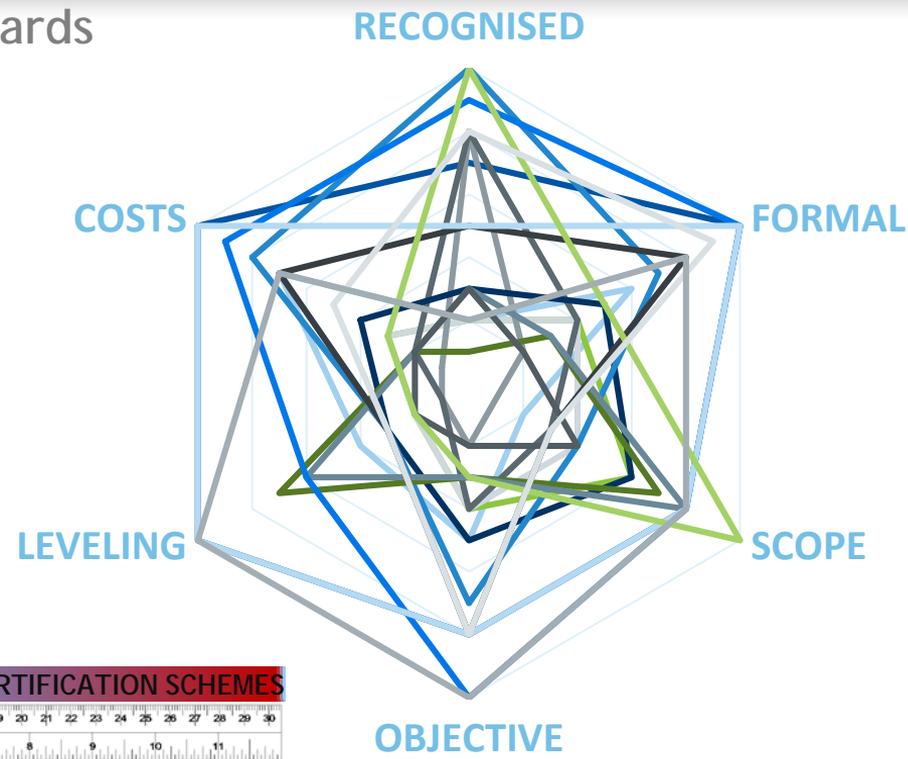
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# HOW DO WE MEASURE SECURITY ?





### Certification Standards what metrics ?



- CC std
- FIPS 140-2
- CSPN
- CPA
- FIDO L1
- FIDO L2
- UL CAP/2900
- PCI PTS
- UL LSP
- IOTSF
- GSMA IoT
- GP TEE
- CC cPP
- SOGIS

**METRICALS defined by STANDARDS/CERTIFICATION SCHEMES**



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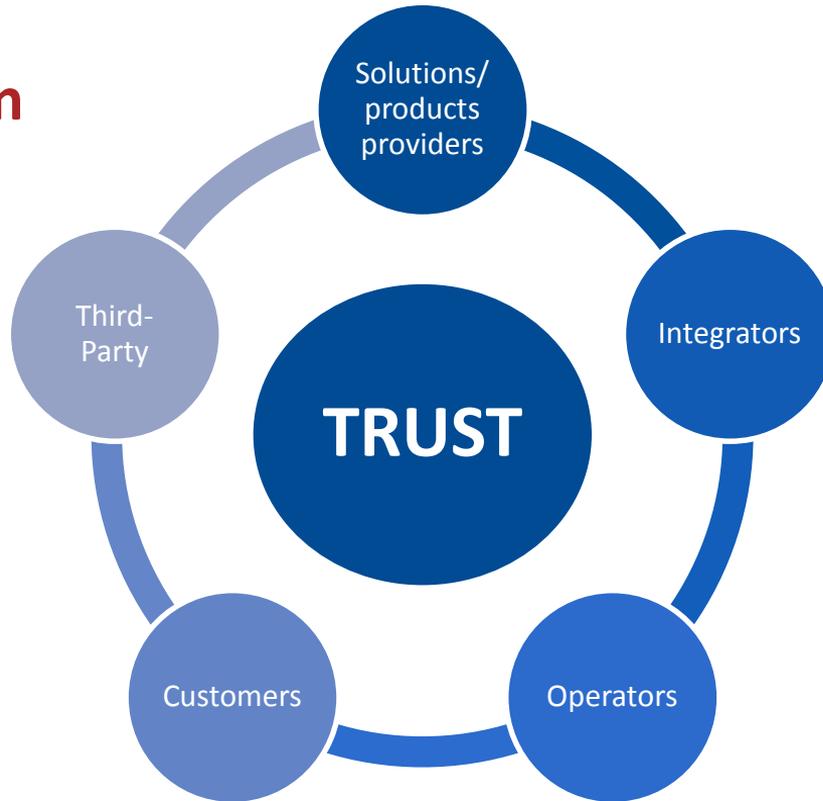
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# HOW DO WE TRUST THESE MEASURES ?





## Trust Definition



**TECHNICAL**  
(assessment, review,  
validation)

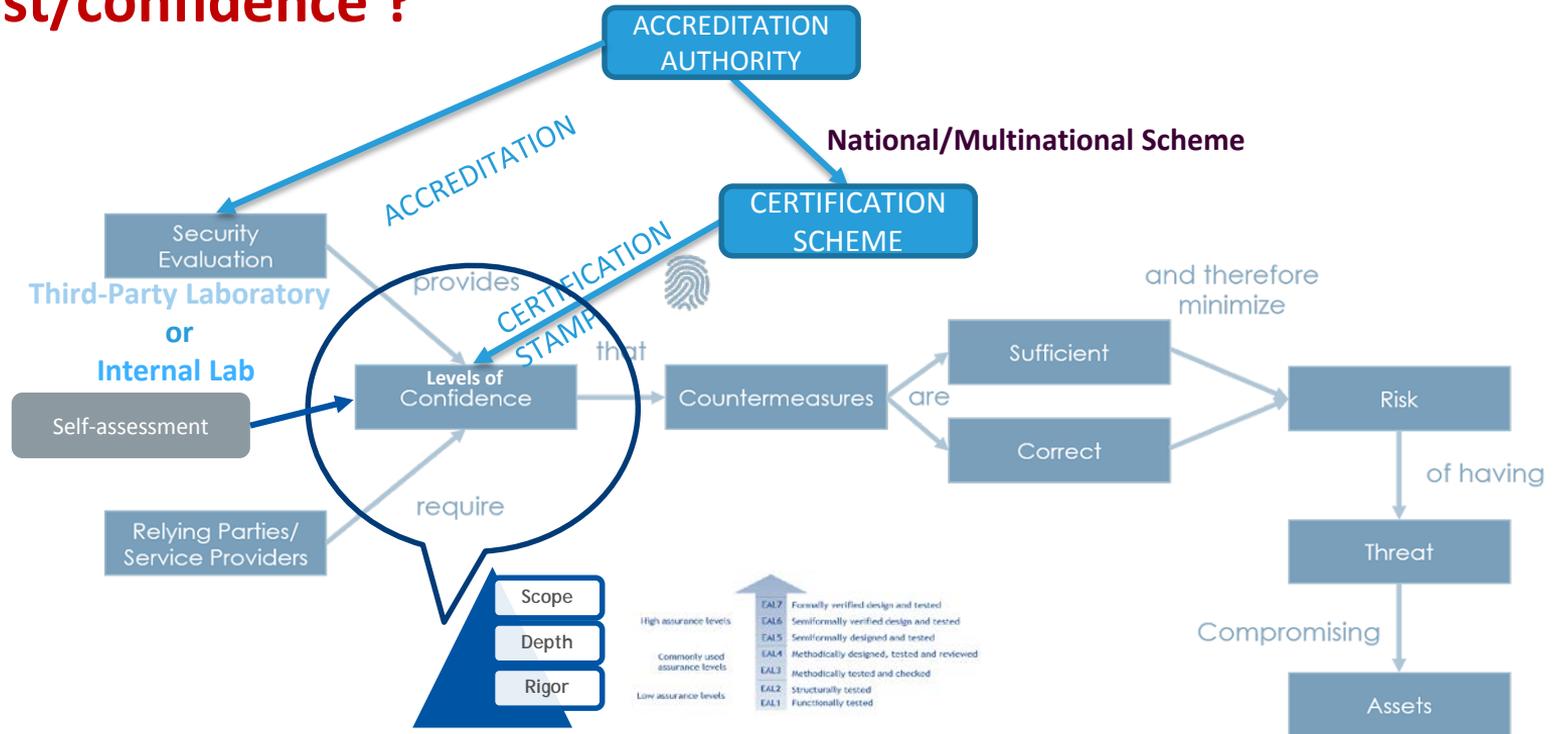
**LEGAL**  
(regulations,  
contracts,  
commitments,  
liabilities)

**SOCIAL**  
(reputation,  
transparency)



# Security Evaluation

## What trust/confidence ?





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# WHAT IS THE PROBLEM WITH EXISTING IT PRODUCTS CERTIFICATION ?





## Internet of Things

### Problems in Certification Practices

- Evaluation Lab
- CC consultancy (optional)
- In-house Evidence development
- Site visit expenses (optional)
- Travel Expenses (optional)
- Equipment Costs
- Lost opportunity
- Certification Scheme (ANSSI -> FREE, BSI -> 2,5K€ to 12K€)

#### → Evaluation Lab Examples of Fees:

- EAL 2: 80K€ → 150 K€
- EAL 3: 120K€ → 200 K€
- EAL 4+: 150K€ → 300 K€

“Objective” IT Products Certifications cost a considerable amount of **MONEY**, Takes **TIME** and is more often **VALID** for only a short time

EAL Level	Evaluation Times
EAL 2	4 – 6 months
EAL 3	6 – 9 months
EAL 4	7 – 12 months
>EAL 4	12 – 24 months



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# SO WHY NOT REUSE EXISTING EVALUATION TECHNIQUES FOR IoT ?





## IoT Product Security

# Why Not Reusing Existing Certification Techniques ?

•Cost, time, validity

•Can't be applied to the 50 Billion IoT product market ! Not enough resources to do that...

Subjective

•What is the credibility of the evaluation lab/pentester/etc. ?What does secure mean? Can we compare more or less secure products?

Scope

•Silo Approach - they often cover part of the problem, specific to an industry (banking, ID) but security & privacy is now a concern of every business and citizen.

Poor Security Definition

•There is no common and holistic approach to define security requirements per profile taking into account the threat model & risks due to the intended usage



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WHAT SOLUTION ?

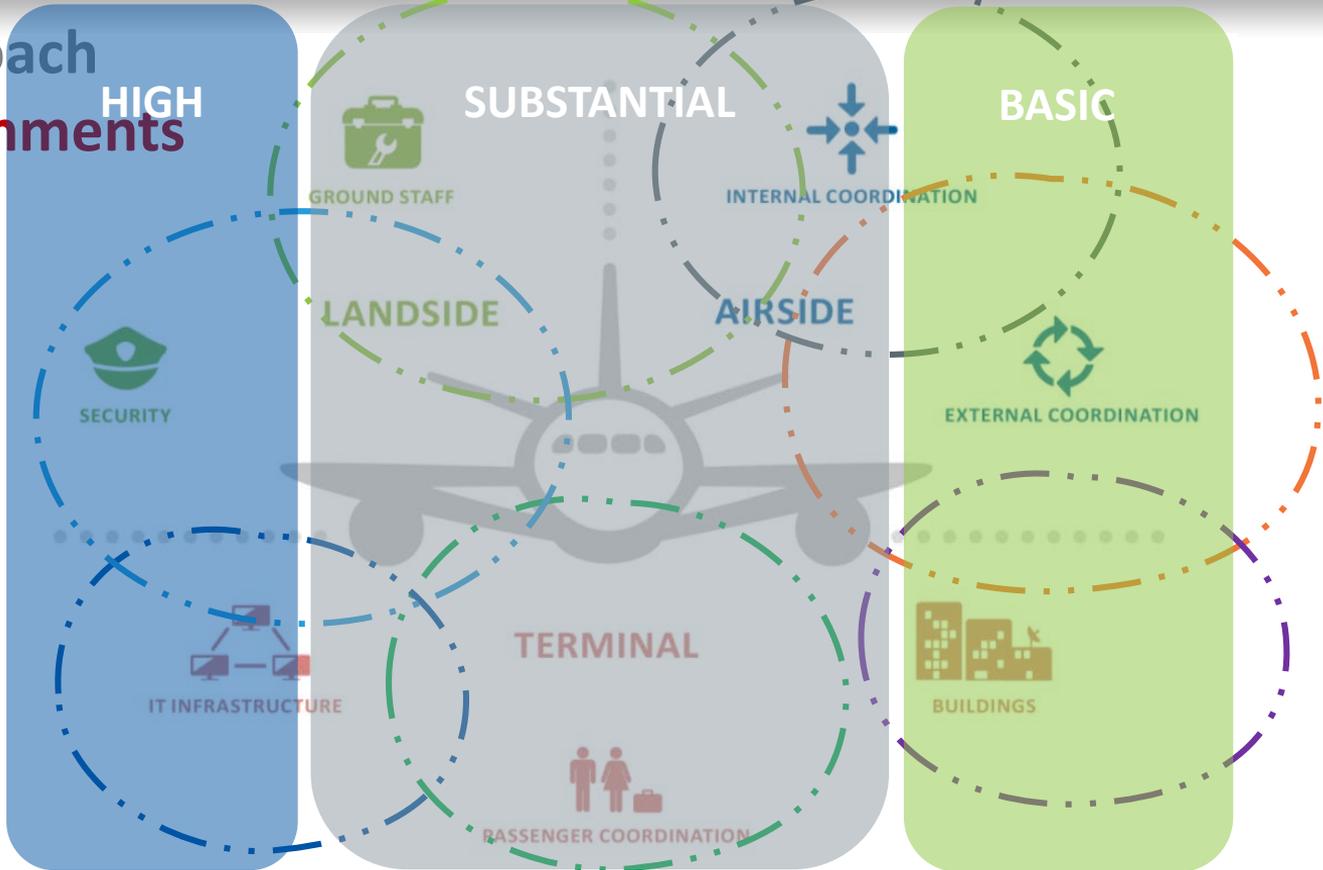
# AN IOT SECURITY CERTIFICATION FRAMEWORK FOR AVIATION SYSTEMS





# A Risk-Based Approach

## Operational Environments





# Risk-Based Security Assurance Activities

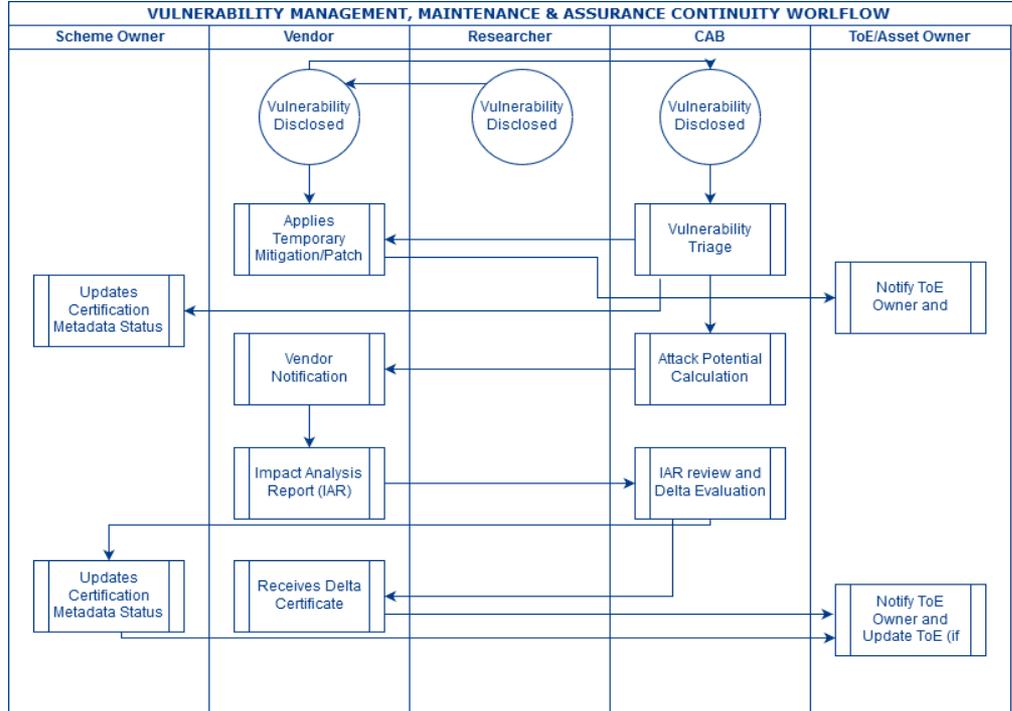
**SUBSTANTIAL**

IMPACT VS LIKELIHOOD	UNLIKELY (1)	LIKELY (2)	VERY LIKELY (3)	ALMOST CERTAIN (4)
SEVERE (4)	CA.DocumentationReview CA.SourceCodeReview CA.CompositionAnalysis (if applicable) VA.VulnerabilityScanning	CA.DocumentationReview CA.SourceCodeReview CA.FunctionalSecurityTesting CA.CompositionAnalysis (if applicable) VA.VulnerabilityScanning VA.BasicRobustnessTesting	CA.DocumentationReview CA.SourceCodeReview CA.FunctionalSecurityTesting CA.CompositionAnalysis (if applicable) VA.VulnerabilityScanning VA.BasicRobustnessTesting VA.AdvancedRobustnessTesting	CA.DocumentationReview CA.SourceCodeReview CA.FunctionalSecurityTesting CA.CompositionAnalysis (if applicable) VA.VulnerabilityScanning VA.BasicRobustnessTesting VA.AdvancedRobustnessTesting
MODERATE (3)				view y Testing sis (if applicable) ing esting ssTesting
MINOR (2)			VA.VulnerabilityScanning VA.BasicRobustnessTesting	CA.CompositionAnalysis (if applicable) VA.VulnerabilityScanning VA.BasicRobustnessTesting
LOW (1)	CA.DocumentationReview CA.CompositionAnalysis (if applicable)	CA.DocumentationReview CA.CompositionAnalysis (if applicable)	CA.DocumentationReview CA.CompositionAnalysis (if applicable) VA.VulnerabilityScanning	CA.DocumentationReview CA.SourceCodeReview CA.CompositionAnalysis (if applicable) VA.VulnerabilityScanning

- **Conformity Analysis** (Doc Review, Source Code Review, Composition Analysis, Security Functional Testing)
- **Vulnerability Analysis** (Scanning, Basic Robustness Testing, Advanced Robustness Testing, Non-Intrusive Pentesting)

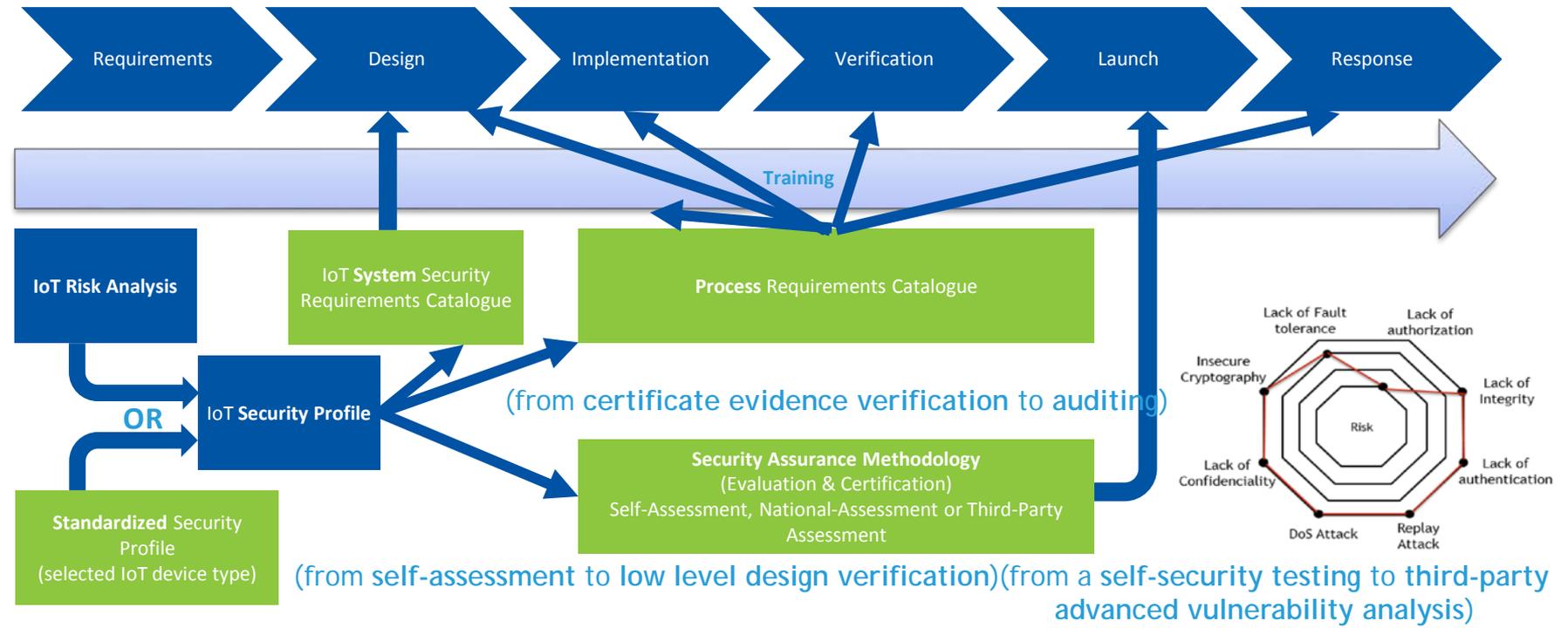


# Active Certificate Monitoring/Vulnerability Surveillance





# Smart Integration into the Life-Cycle





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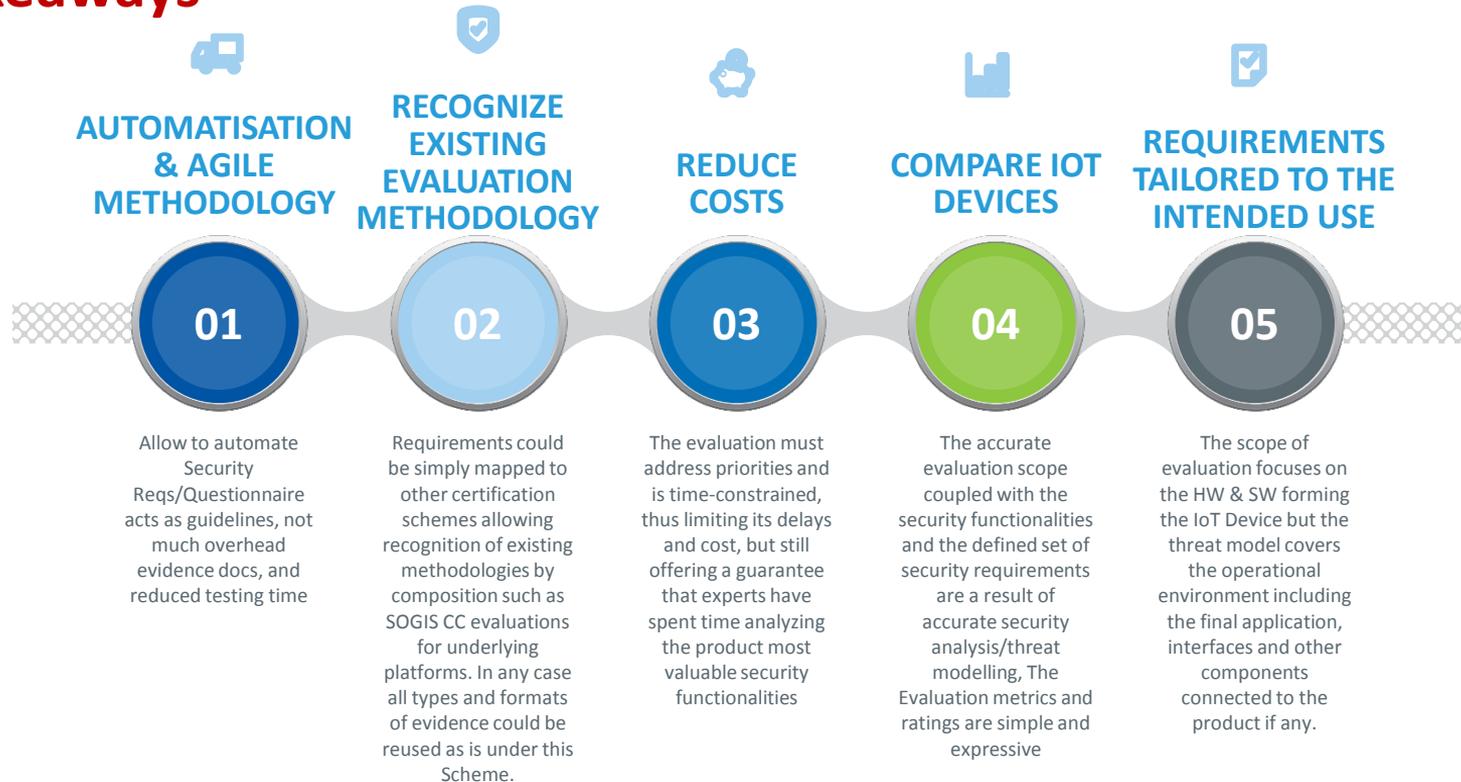
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## KEY TAKEAWAYS



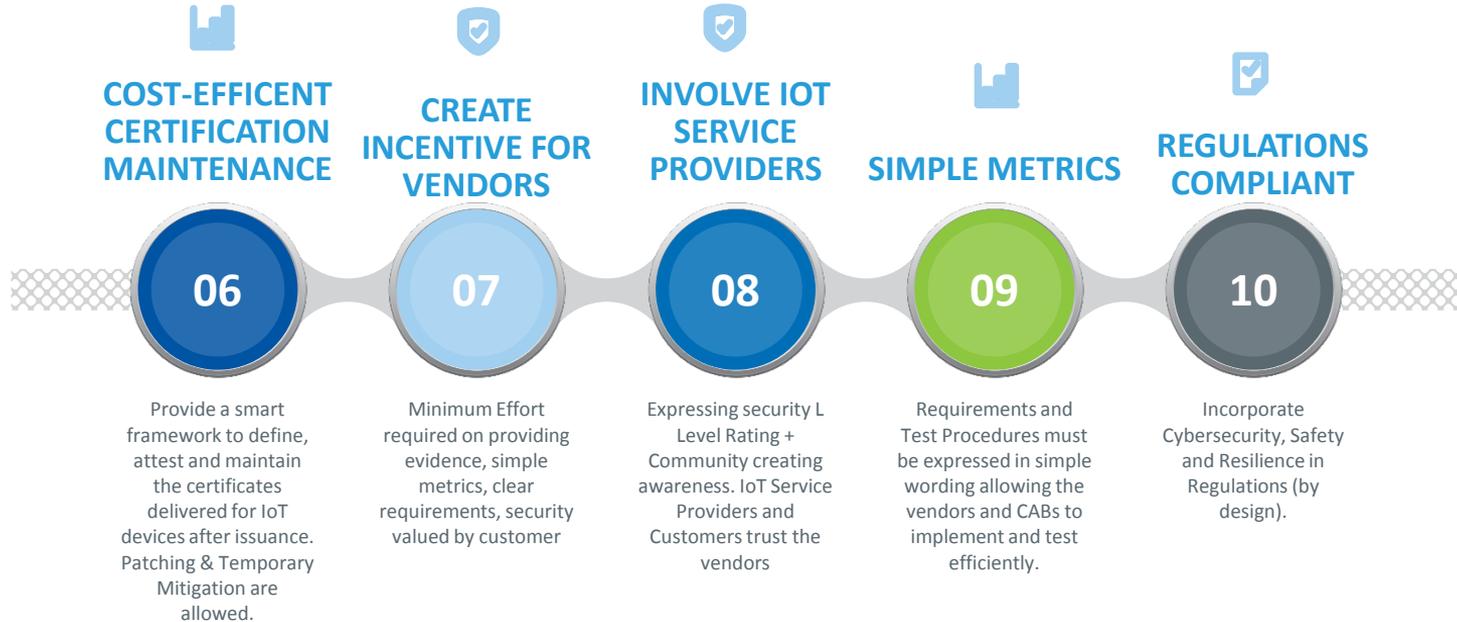


## Key Takeaways





## Key Takeaways





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# Thank you!

# Questions?

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North Atlantic  
[EUR/NAT] Office  
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Cairo

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Southern African  
[ESAF] Office  
Nairobi

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[APAC] Sub-office  
Beijing

Asia and Pacific  
[APAC] Office  
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## THANK YOU

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من الربط بين أرجاء العالم