Design for Security (DFSEC)
Solutions for the Programmable World

Security by Design

**Scalable**
to meet the rising security and privacy demands of 5G, IoT...

**Integrated**
as a part of our product creation, security baked-into 100% of products as a part of our product creation

**Automated**
through threat intelligence, efficient correlation, Continuous Integration.
Nokia Design for Security

- Scope of coverage: process, people, technology
- Implementation: proactive & reactive measures, flexible to work with new technologies & requirements
Security baked into Nokia product life-cycle “CREATE”
Nokia Design for Security (DFSEC)

A flexible framework to incorporate emerging technologies & requirements

Proactive
- Planning: Threat & risk analysis; requirements & architecture
- Development: secure coding; hardening, privacy
- Integration & verification: security testing & security updates, malware scanning
- Security Compliance: Gap analysis and Mitigation plan

Reactive
- Security vulnerability management
- Security updates and patching

Opportunity Definition | Planning | Design & Implement | Integrate & Test | Limited Deployment | Volume Deployment | Maintenance | End of Life
--- | --- | --- | --- | --- | --- | --- | ---
C0 | C1 | C2/C3 | ... | CP | C5 | C7 | C10

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Design for Security

Key components of Security Management Process

**Proactive**

**Design for Security (DFSEC)**
- Feature screening
  - Security threat & risk analysis
  - Privacy Impact Assessment

- Systems engineering
  - Security & privacy requirements
  - Security architecture specification

- Development
  - Secure coding
  - Source Code security testing
  - Product hardening

- Integration & verification
  - Security testing
  - Malware scanning
  - Data Scrambling verification (privacy)

- Compliance: Gap analysis and Mitigation plan

**Reactive**

**Security vulnerability management**

**Fault management process**

**Vulnerability information from public sources**
Design for Security process
Process supported by a virtual security organization inside Nokia

Lead
Product Security Office: in charge of defining / maintaining the process, the tools and checklists

Product Security Community

Mobile Networks (MN) BG

Network Infrastructure (NI) BG

Cloud & Network Services (CNS) BG

Business Unit

Product Line

Business Unit

Product Line

Business Unit

Product Line

Product Line

Product Line

Product Security Manager (PSM):
Enforcement of Nokia's product security methodology on product and system development activities. PSMs are in the BGs, but not part of the Product Lines

Security Lead (SL): Leader of product security activities in product lines that is responsible to implement the proactive and reactive security processes. SLs are in R&D of Product Lines.
Security & privacy testing as part of integration and verification

Security testing
- Port scanning
- Vulnerability scanning
- Web application vulnerability scanning
- Robustness testing
- Denial-of-Service testing

Malware scanning

Data scrambling verification (privacy)
<table>
<thead>
<tr>
<th>Area</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>DFSEC process compliance</td>
<td>DFSEC process: Ensures that DFSEC milestone deliverables are done and the DFSEC process followed</td>
</tr>
<tr>
<td>Security Testing</td>
<td>Security Testing: analyze the security exposure and to find vulnerabilities and robustness issues</td>
</tr>
<tr>
<td>Vulnerability Management</td>
<td>Vulnerability Management: to effectively handle relevant 3rd party vulnerabilities and ensure a release free of known high severity vulnerabilities</td>
</tr>
<tr>
<td>Hardening</td>
<td>Hardening: secure the system by removing unneeded functionality and configuring the remaining securely</td>
</tr>
<tr>
<td>Virtualization</td>
<td>Virtualization: Requirements for secure virtualized products</td>
</tr>
<tr>
<td>Privacy</td>
<td>Privacy: Requirements for privacy respecting products</td>
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</tbody>
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