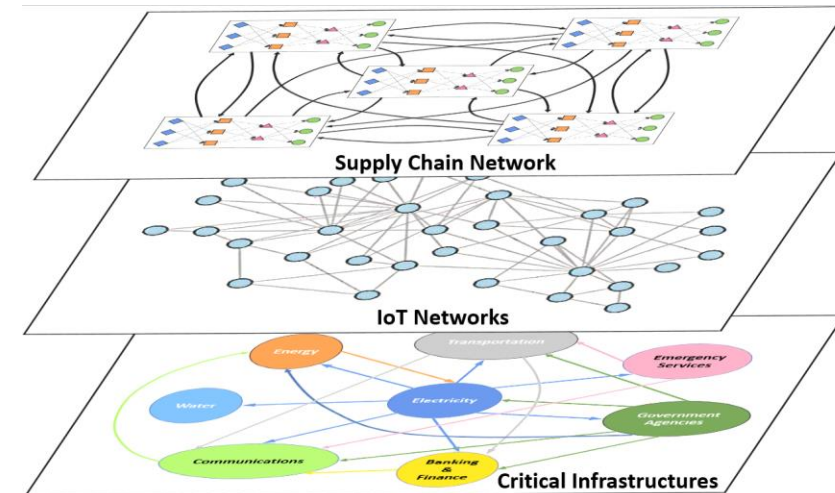


Multi-Layer Cyber-Physical Supply Chain Risk Analysis for Improving the Resilience of IoT-Enabled Critical Infrastructures

Jan. 27, 2021

Panel on Protecting Connected Cities Present and Future

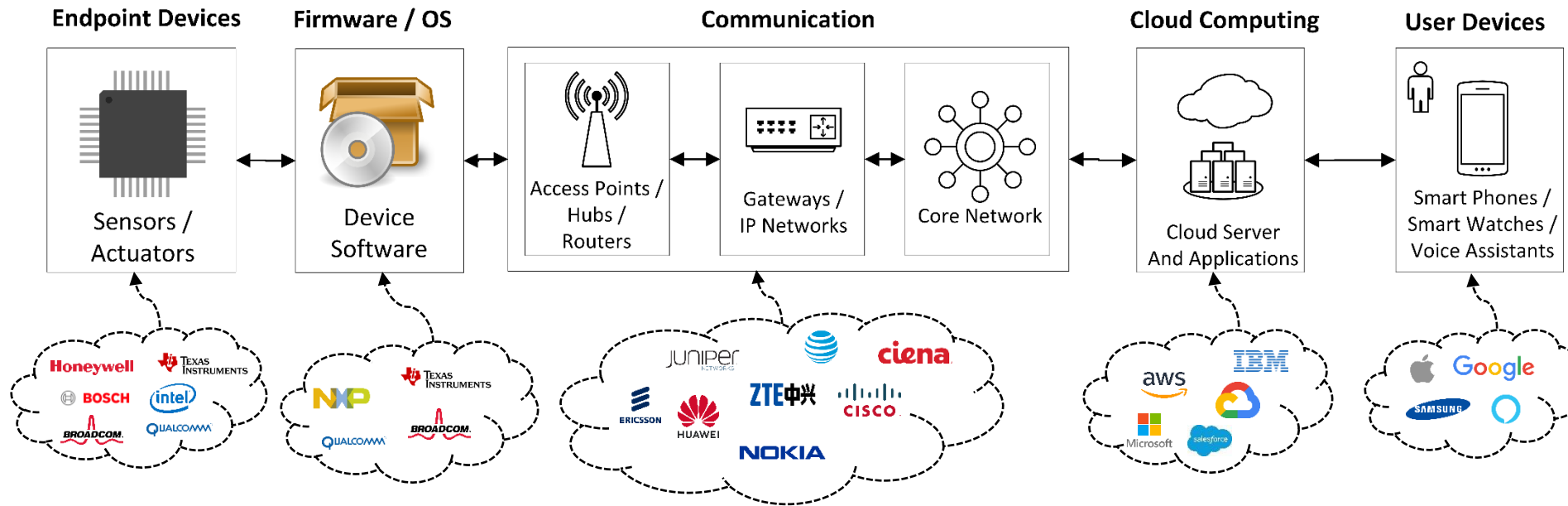
Future Cities and Reliance on Connectivity



- IoT widely adopted in infrastructure systems
- Interdependent infrastructure increases vulnerabilities to attacks
- Security and resilience of the IoT ecosystem becoming critical

IoT / ICT Value Chain and Vendor Involvement

- IoT / ICT systems comprise of an **interconnection** of multiple hardware and software components.
- **Multiple entry points** for vendor involvement in system safety and reliability.



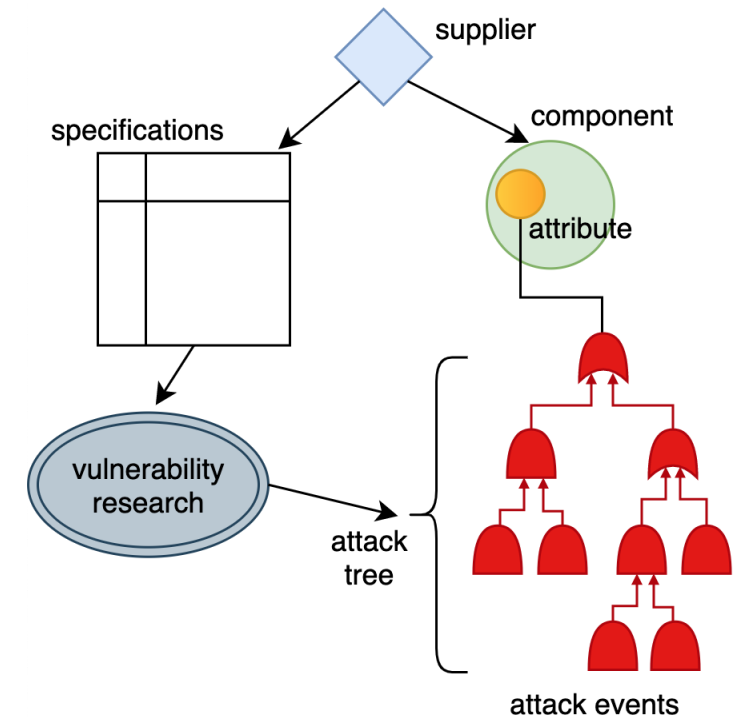
Common Attack Strategies and Countermeasures

Types of supply chain attacks

- Compromised software building tools
- Stolen code-sign certificates
- Malicious code shipped into hardware or firmware
- Pre-installed malware on devices

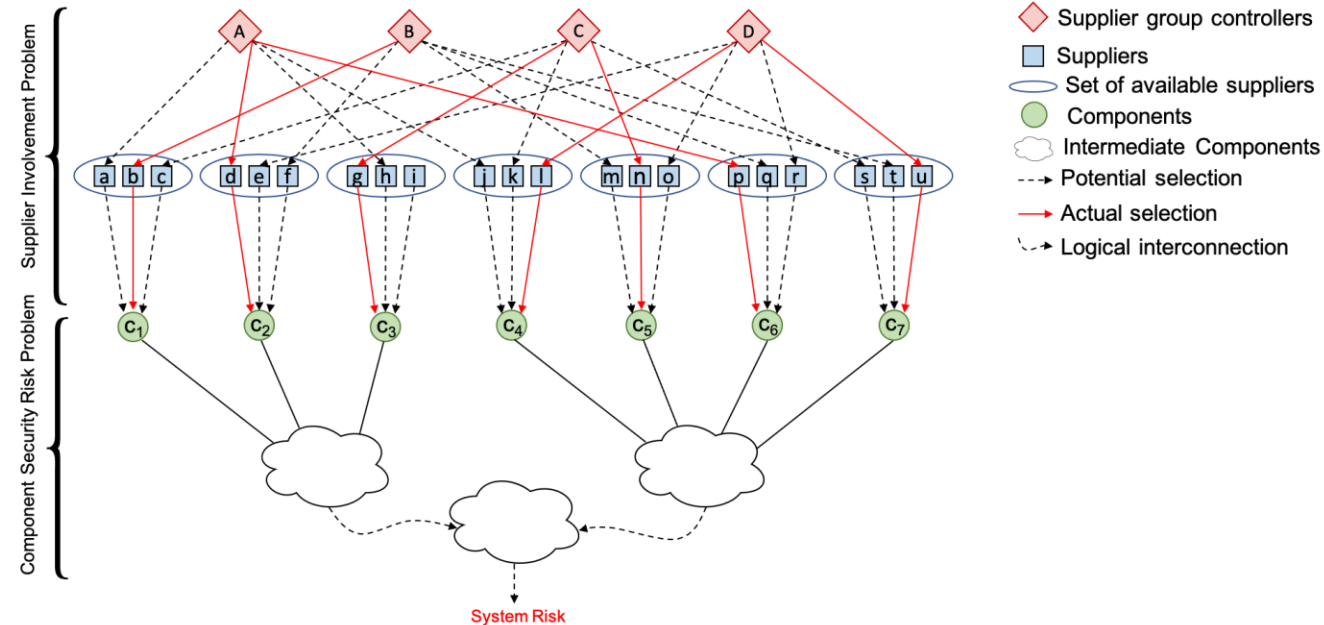
How to protect against supply chain attacks

- Code integrity policies
- Endpoint detection and response
- Regular updates and patching, multi-factor authentication, etc.
- Incident response process



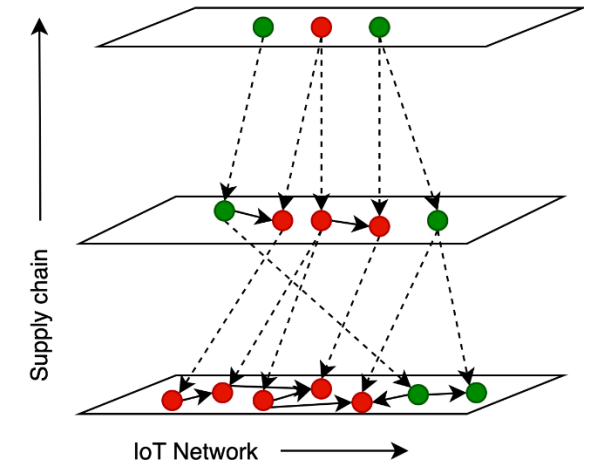
The Supply Chain Challenge

- **Complex vendor landscape:** hardware and software components
- **Changing dynamics** in the supply chain: mergers, takeovers, etc.
- Complete **supply chain hidden** from end user
- **Lack of available tools** for decision-making from a vendor standpoint



Our Focus: Ensuring Trusted Supply Chains

- Integrating vendor risk into the overall risk assessment
- Identify system vulnerabilities from vendors
- Recommendation for vendor selection and upgrade
- Compliance checking and policy implementation



Recent Results

[1] T. Kieras, M. J. Farooq, and Q. Zhu, "Modeling and Assessment of IoT Supply Chain Security Risks: The Role of Structural and Parametric Uncertainties", in IEEE Symposium on Security and Privacy, Workshop on Cyber Resilient Supply Chain Technologies, 2020.

[2] T. Kieras, M. J. Farooq, and Q. Zhu, "RIoTS: Risk Analysis of IoT Supply Chain Threats", in Proc. IEEE 6th World Forum on Internet of Things (WF-IoT 2020), New Orleans, USA.

Questions?

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