CECS 579 - Information Security, California State University, Long Beach

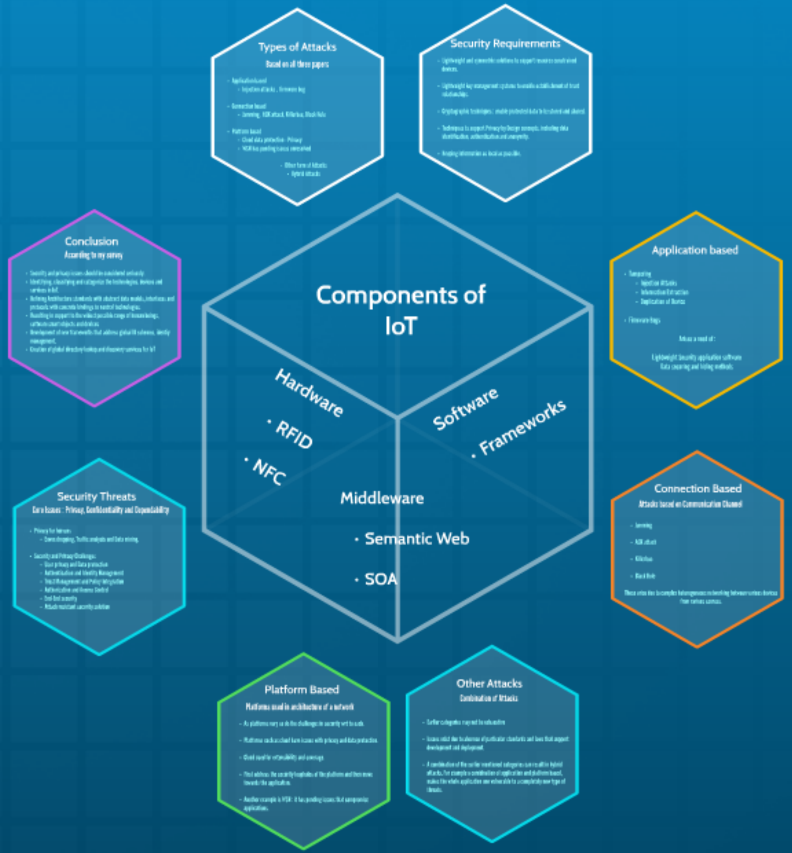
A Study of IoT

Attacks, Security threats and Requirements

Introduction

- IoT (Internet of Things) is a vision to ensure devices stay connected and collaborate with each other over the internet.
- Allows objects to be sensed and controlled remotely across existing infrastructure.
- " Things ", in IoT sense refer to devices, which are uniquely identified.
- These devices collect useful data that can be exchanged.

- Where there is communication, there are always ATTACKS



Types of Attacks

Based on all three papers

- Application based
  - Injection attacks , firmware bug
- Connection based
  - Jamming, KCK attack, Killerbee, Black hole
- Platform based
  - Cloud data protection - Privacy
  - NSX has pending issues unresolved
- Other form of Attacks
  - Hybrid attacks

Security Requirements

- Lightweight and symmetric solutions to support resource constrained devices.
- Lightweight key management systems to enable establishment of trust relationships.
- Cryptographic techniques : enable protected data to be stored and shared.
- Techniques to support Privacy by Design concepts, including data identification, authentication and anonymity.
- Keeping information as local as possible.

Conclusion

According to my survey

- Security and privacy issues should be considered seriously.
- Identifying, classifying and categorize the technologies, devices and services in IoT.
- Defining Architecture standards with abstract data models, interfaces and protocols with concrete bindings to neutral technologies.
- Providing in support to the widest possible range of human beings, software smart objects and devices.
- Development of new frameworks that address global ID schemes, identity management.
- Creation of global directory lookup and discovery services for IoT

Components of IoT

Hardware
- RFID
- NFC

Software
- Frameworks

Middleware
- Semantic Web
- SOA

Application based

- Tampering
  - Injection Attacks
  - Information Extraction
  - Duplication of Device
- Firmware Bugs

Arises a need of :

Lightweight Security application software
Data scanning and hiding methods.

Security Threats

Core Issues :: Privacy, Confidentiality and Dependability

- Privacy for humans
  - Eaves dropping, Traffic analysis and Data mining.
- Security and Privacy Challenges:
  - User privacy and Data protection
  - Authentication and Identity Management
  - Trust Management and Policy Integration
  - Authorization and Access Control
  - End-End security
  - Attack resistant security solution

Connection Based

Attacks based on Communication Channel

- Jamming
- KCK attack
- Killerbee
- Black Hole

These arise due to complex heterogeneous networking between various devices from various sources.

Platform Based

Platforms used in architecture of a network

- As platforms vary so do the challenges in security set to each.
- Platforms such as cloud have issues with privacy and data protection.
- Cloud used for scalability and coverage.
- First address the security loopholes of the platform and then move towards the application.
- Another example is NSX : it has pending issues that compromise applications.

Other Attacks

Combination of Attacks

- Earlier categories may not be exhaustive
- Issues exist due to absence of particular standards and laws that support development and deployment.
- A combination of the earlier mentioned categories can result in hybrid attacks. For example a combination of application and platform based, makes the whole application are vulnerable to a completely new type of threats.

AGENDA

- Introduction to IoT
- Components of IoT
- Types of Attacks on IOT
- Application based Attacks
- Connection based Attacks
- Platform based Attacks
- Other Attacks
- Security threats and Requirements

Conclusion

by Anuj Sharma 012755572

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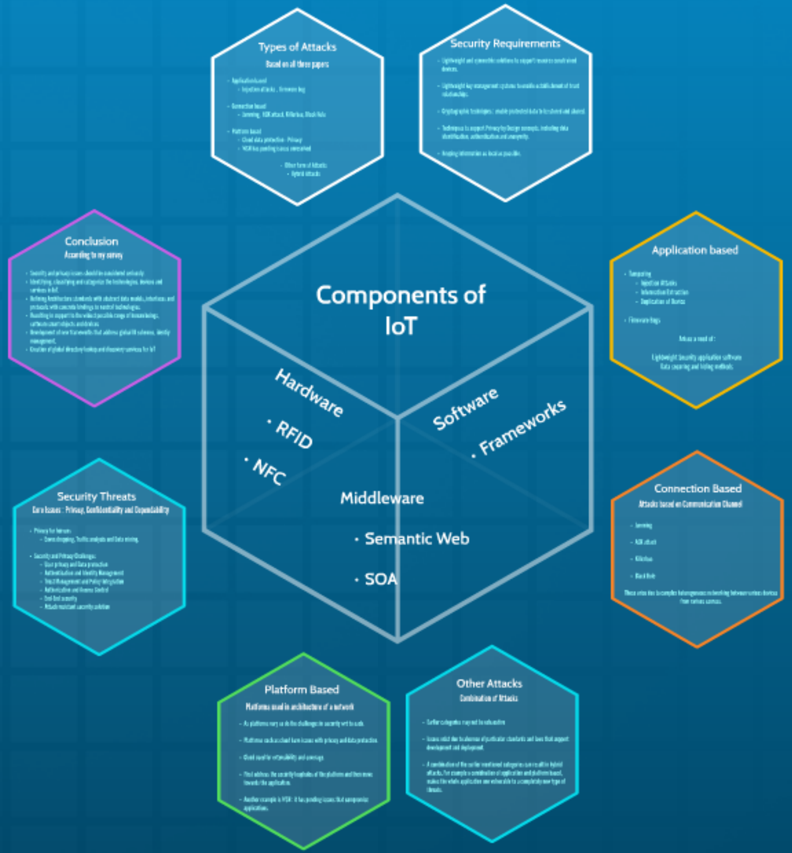

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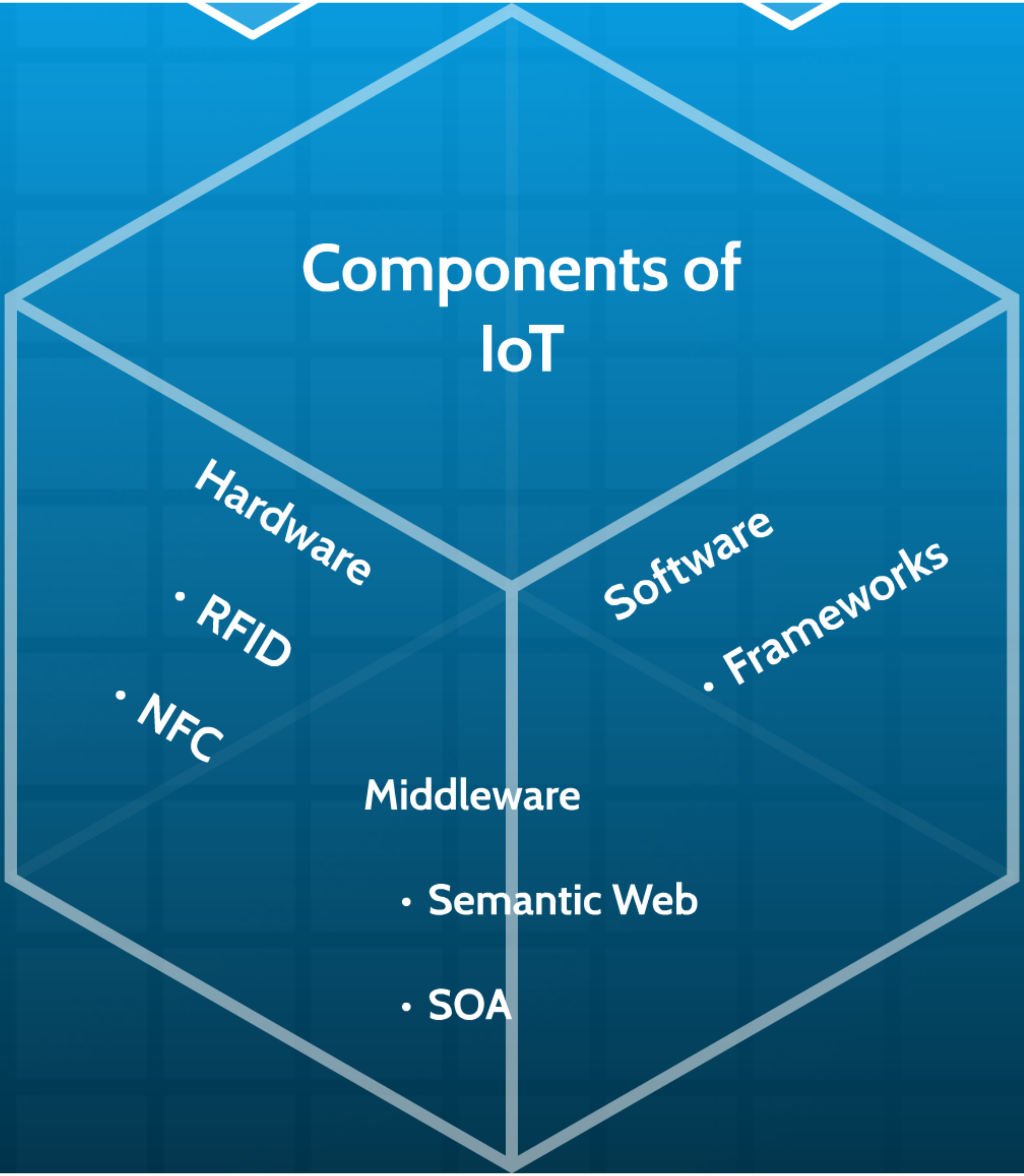

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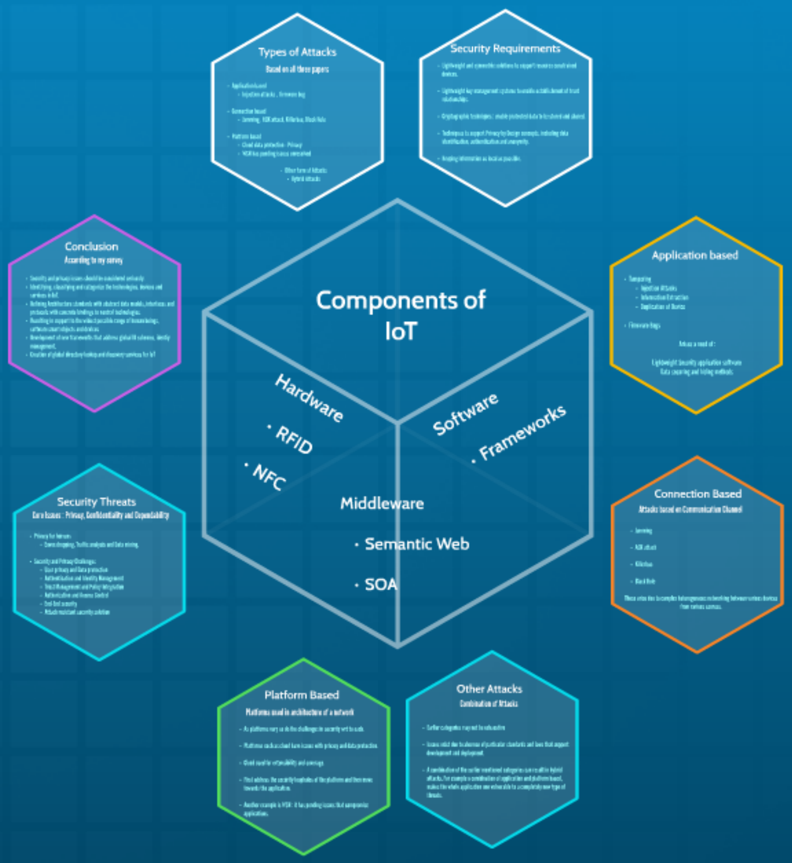

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