IOE-BASED ARCHITECTURE FOR ENHANCED CYBER SITUATIONAL AWARENESS

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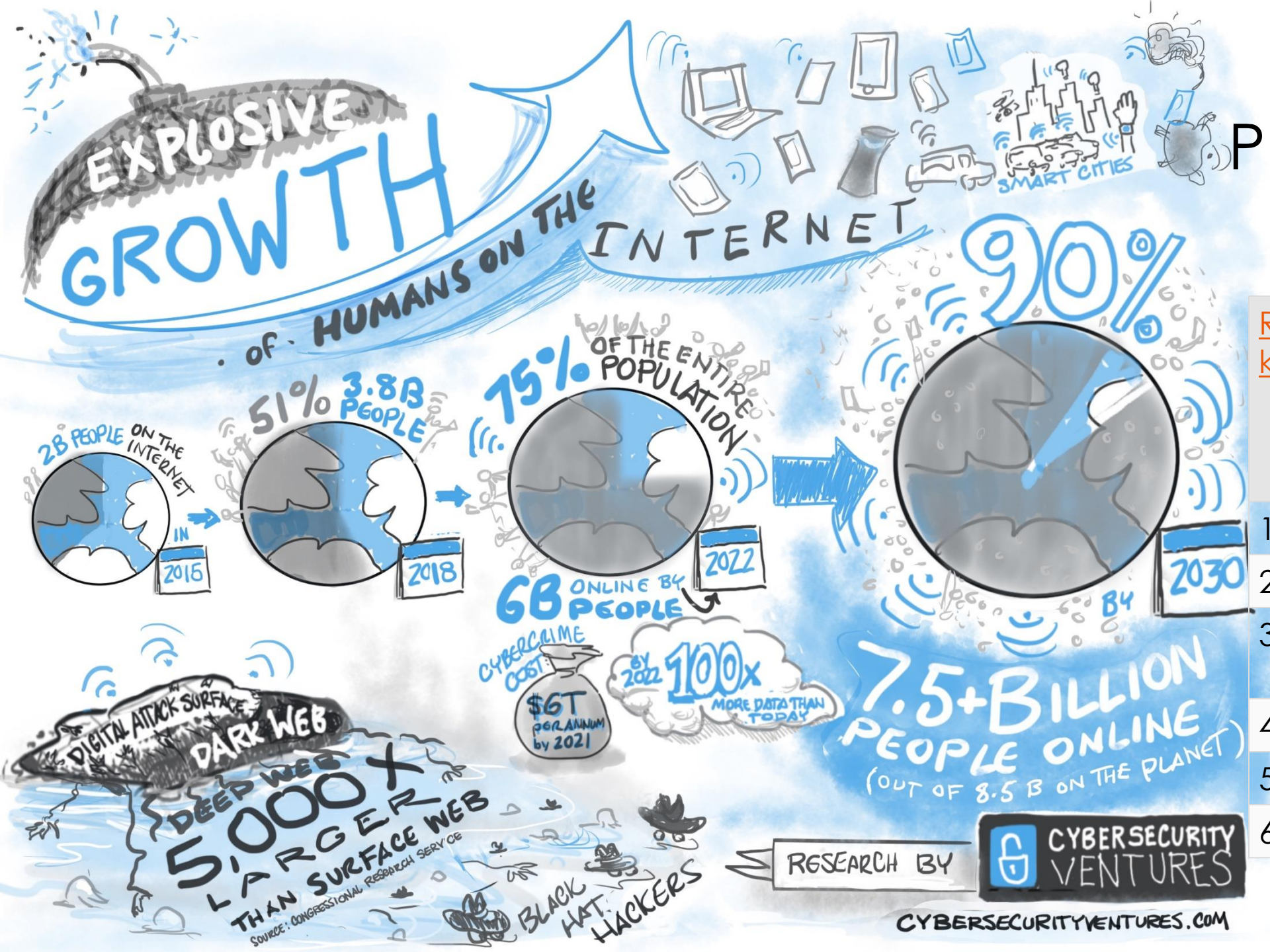
AGENDA

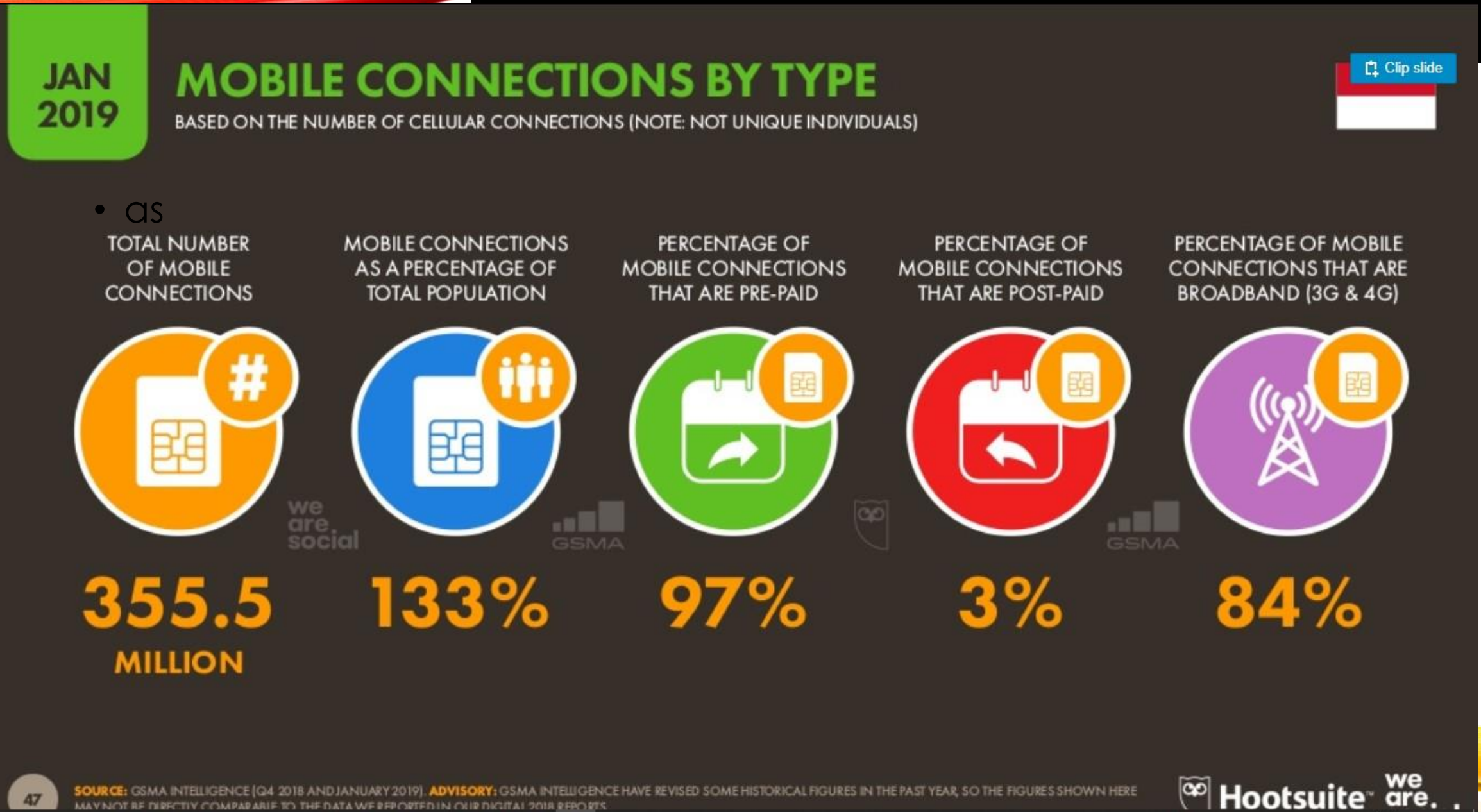
- Latar Belakang
- Cyber Situational Awareness
- Internet of Everything
- Use Case: Heterogeneous Vehicles
- Use Case: Gas and Oil Storage
- Penelitian dan Pengembangan



PERTUMBUHAN RUANG SIBER

Rank	Country	Population (million)	% Connected
1	China	1,433	58
2	India	1,366	45
3	United States	329	84
4	Indonesia	270	36
5	Pakistan	216	33
6	Brazil	211	68

KONEKSI MOBILE INDONESIA



- as

EKONOMI DIGITAL INDONESIA

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CYBER SITUATIONAL AWARENESS

SITUATIONAL AWARENESS

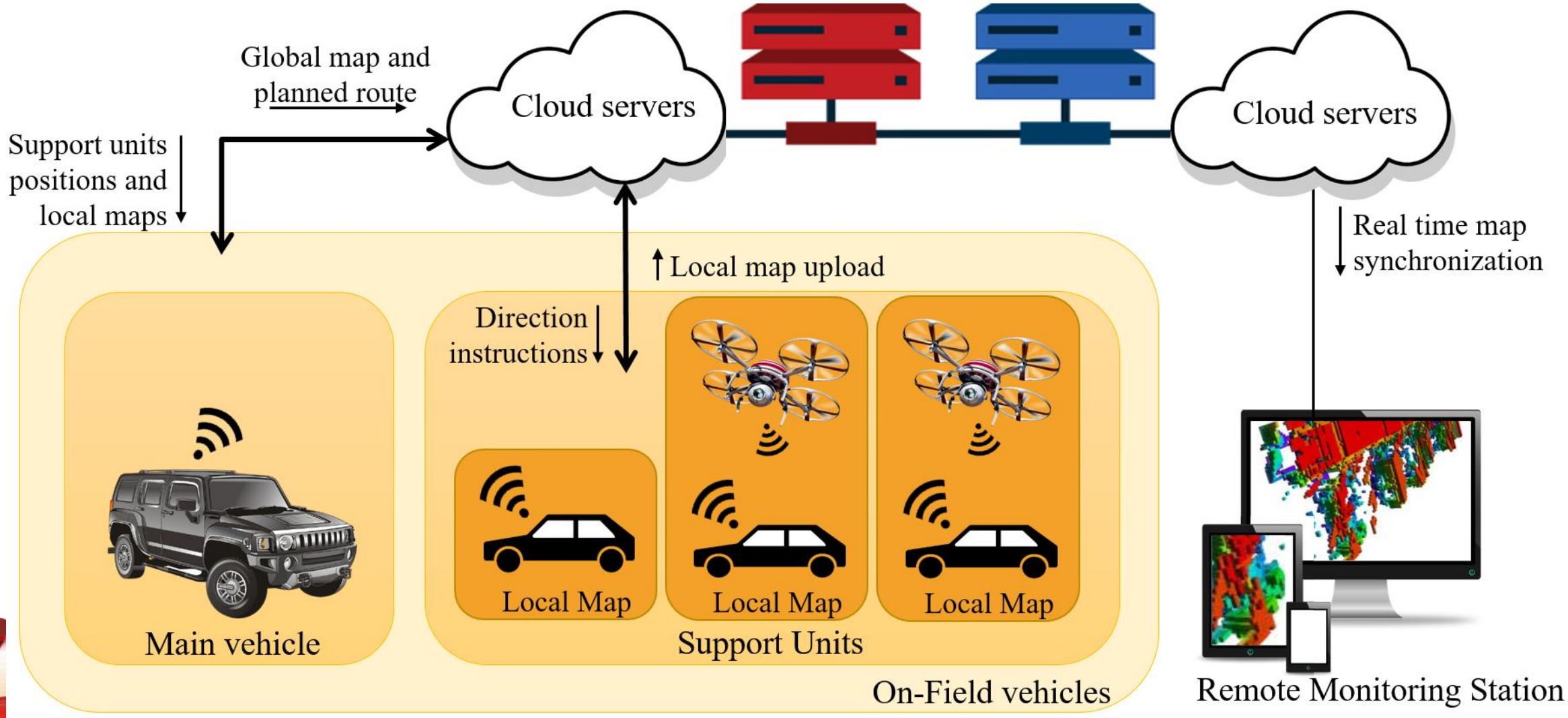
- The purpose of Situational Awareness is to actively ***discover and analyze information related to immediate operational stability and security*** and to coordinate such information across the enterprise to ensure that all organizational units are performing under a common operating picture
- ***Goal 1***: Threat monitoring is performed
  - Has responsibility for monitoring sources of threat information been assigned?
- ***Goal 2***: The requirements for communicating threat information are established
  - Have internal stakeholders (such as the critical service owner and incident management staff) been identified to whom threat information must be communicated?
- ***Goal 3***: Threat information is communicated
  - Is threat information communicated to stakeholders?

TANTANGAN

- Robust situational awareness
  - Low quantity or quality of data → serious consequences
- Enhancing situational awareness with ***IoE-based architecture***
  - Critical case → natural disasters
- High levels of situational awareness in other use cases
  - ***Autonomous vehicles***
  - ***Gas and oil storage***
  - Banking and finance
  - Electrical energy
  - Government operations
  - Water supply systems
- Fundamental research: modelling the complexity of the infrastructure to achieve situational awareness

USE CASE 1: HETEROGENEOUS VEHICLES

ARSITEKTUR SISTEM

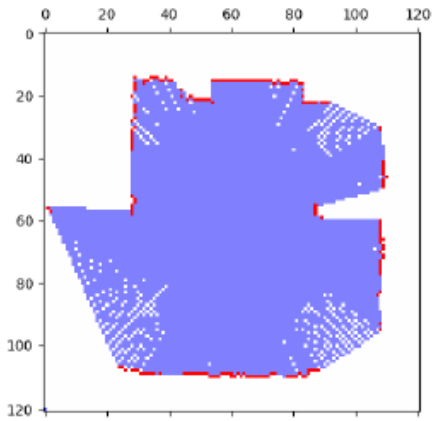


COLLABORATIVE SECURITY

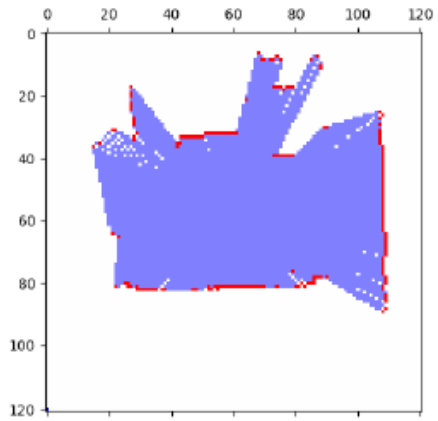
- ***Collaborative system*** → significantly improved situational awareness
  - Combination of IoE and swarm optimization
  - Map merging techniques
- Heterogeneous vehicle
  - ***A large network of interconnected vehicles*** will provide more accurate and efficient situational awareness
  - Main vehicle with objective destination, together with heterogeneous team of support vehicles
- IoE based system architecture
  - Heterogeneous support unit
  - Cloud servers

PATH & MAP PLANNING

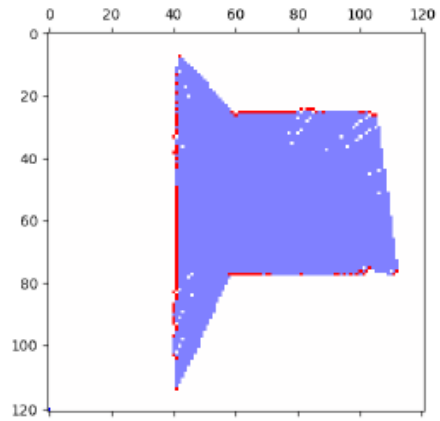
- Pemetaan dan penggabungan peta



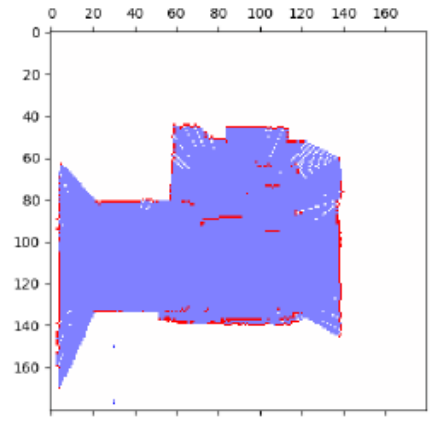
(a) Local map 1



(a) Local map 2



(a) Local map 3



(a) Merged map

USE CASE 2: OIL AND GAS SYSTEMS

TANTANGAN IOE MINYAK & GAS

- Aplikasi yang berdiri sendiri, 17 jaringan dengan standar berbeda, 30 ton pengkabelan
- Produksi data dalam ***Terabyte per hari***
- Keterbatasan bandwidth
- ***Security, security, security***
- Scala sangat besar (jutaan sensor)
- Standar proprietary (diperlukan interoperabilitas)

TANTANGAN SITUATIONAL AWARENESS

- Collaborative IoE untuk penguatan situational awareness

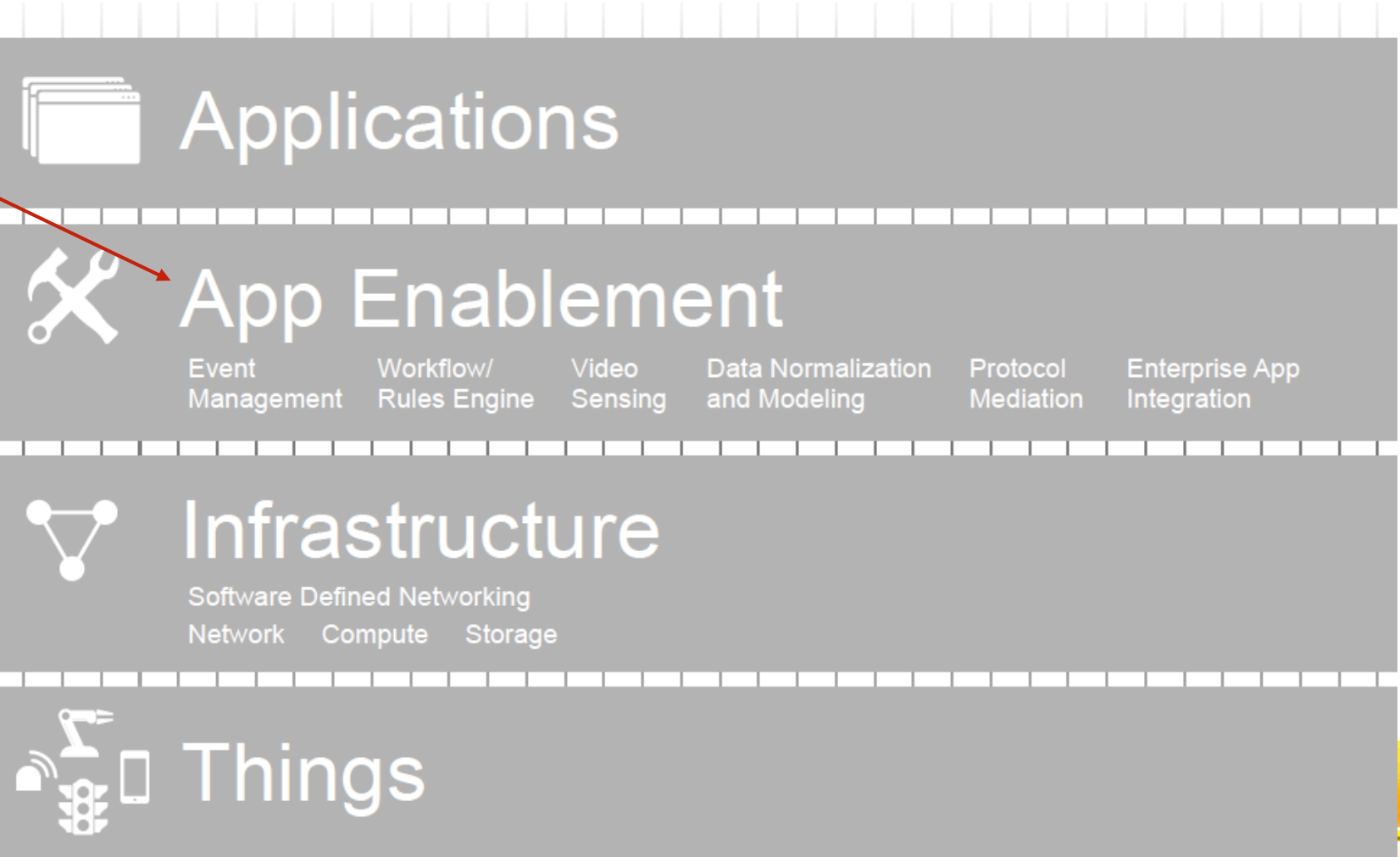
Cloud and Fog

Analytics

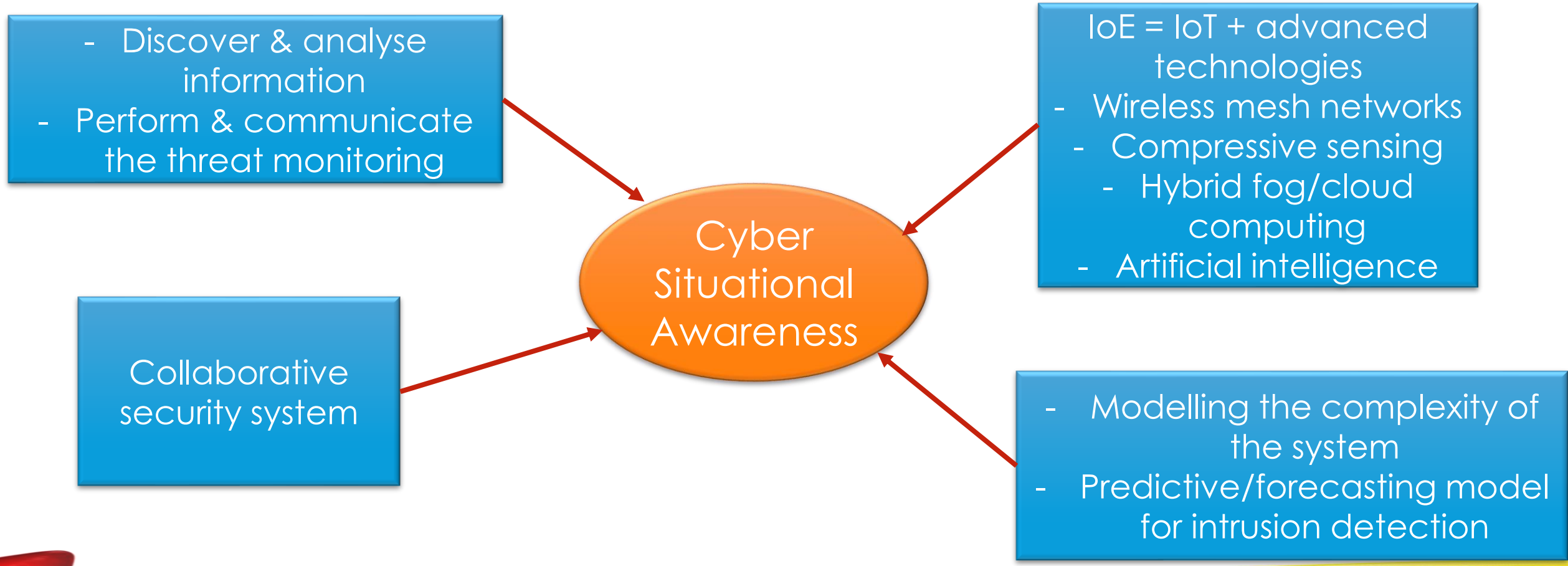
Security and Identity Management

Open and Programmability (APIs)

Ease of Use and Management



RANGKUMAN


- Discover & analyse information
- Perform & communicate the threat monitoring
IoE = IoT + advanced technologies
- Wireless mesh networks
- Compressive sensing
- Hybrid fog/cloud computing
- Artificial intelligence
Cyber Situational Awareness
Collaborative security system
- Modelling the complexity of the system
- Predictive/forecasting model for intrusion detection

TERIMA KASIH