

Introduction to Software Development

Week 2 Day 3

Led by: Emily Crose

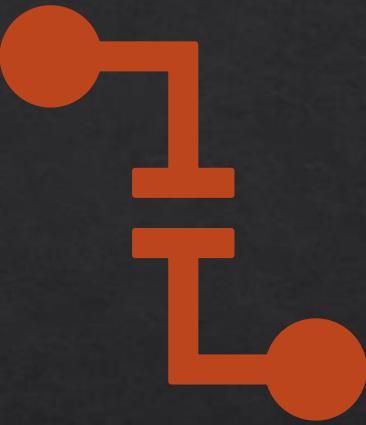
for

Oakland University

Last Session Recap

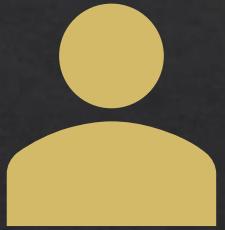


Questions From The Last
Session?



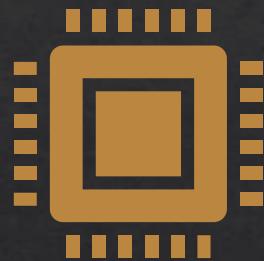
Separation of Duties

Separation Of Duties



Team separation of duties

Which team is assigned to do what



Network separation of duties (engineering)

Which devices do what

Why is this important?



INCREASES
EFFICIENCY

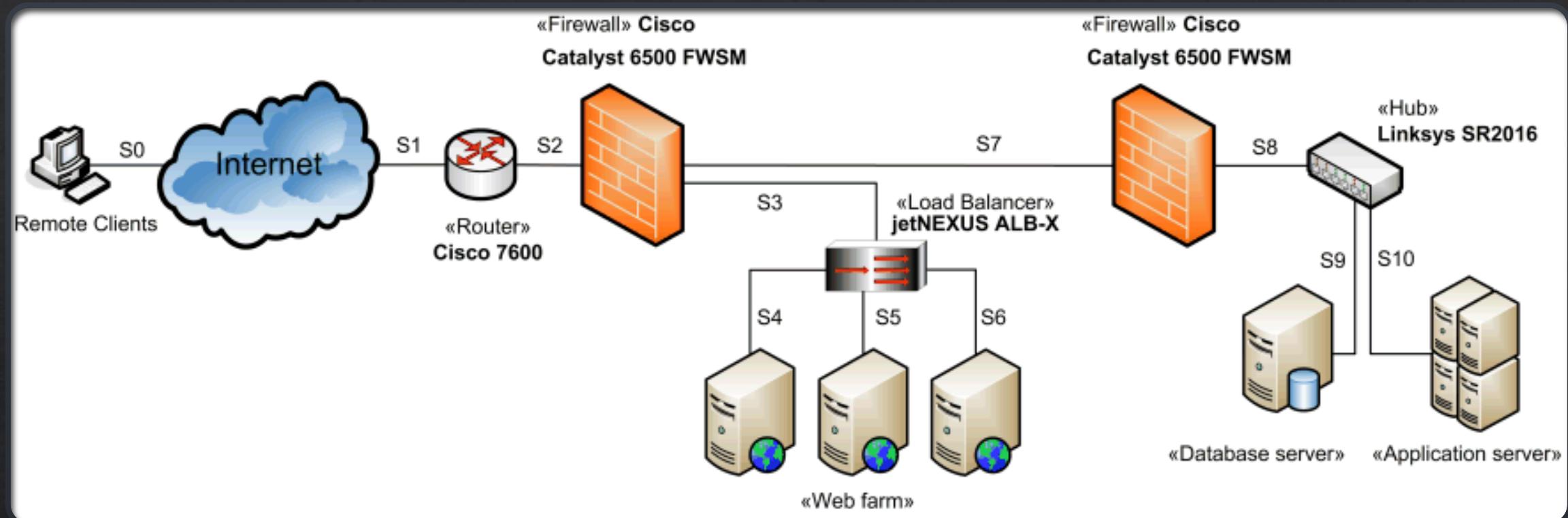


INCREASES
SECURITY

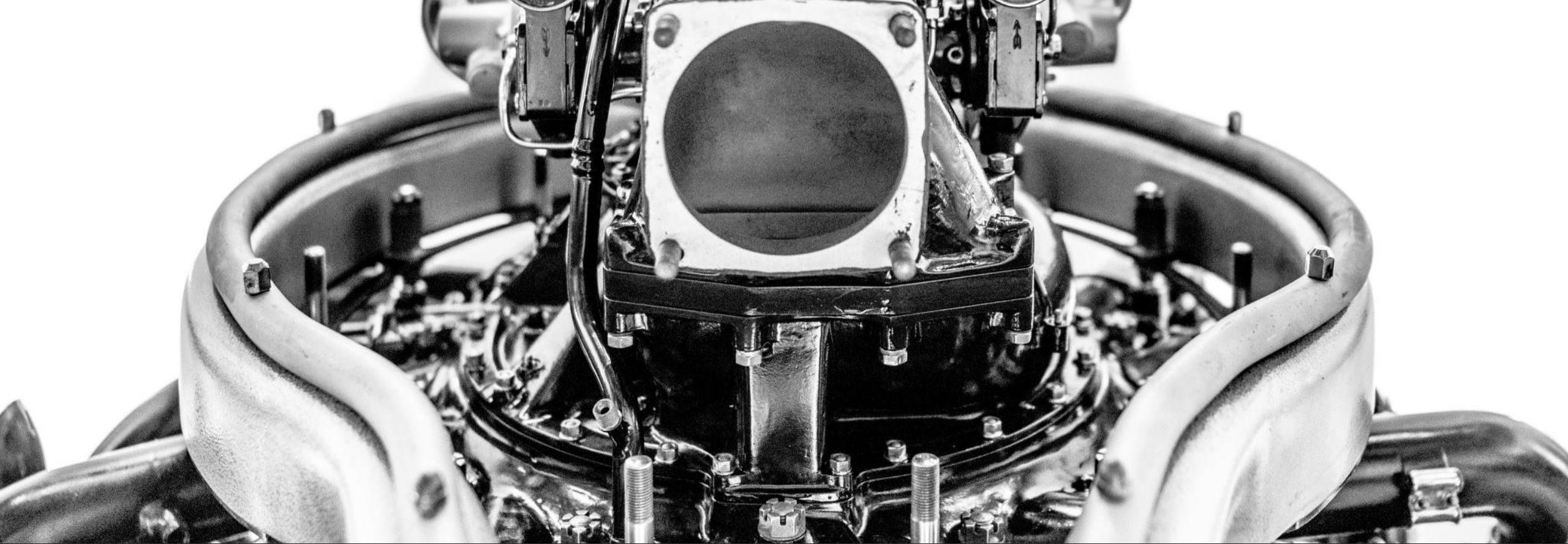
No individual, group, or device should be given any more privileges than it needs!

Principle of Least Privilege

Network Topology



Network Topology



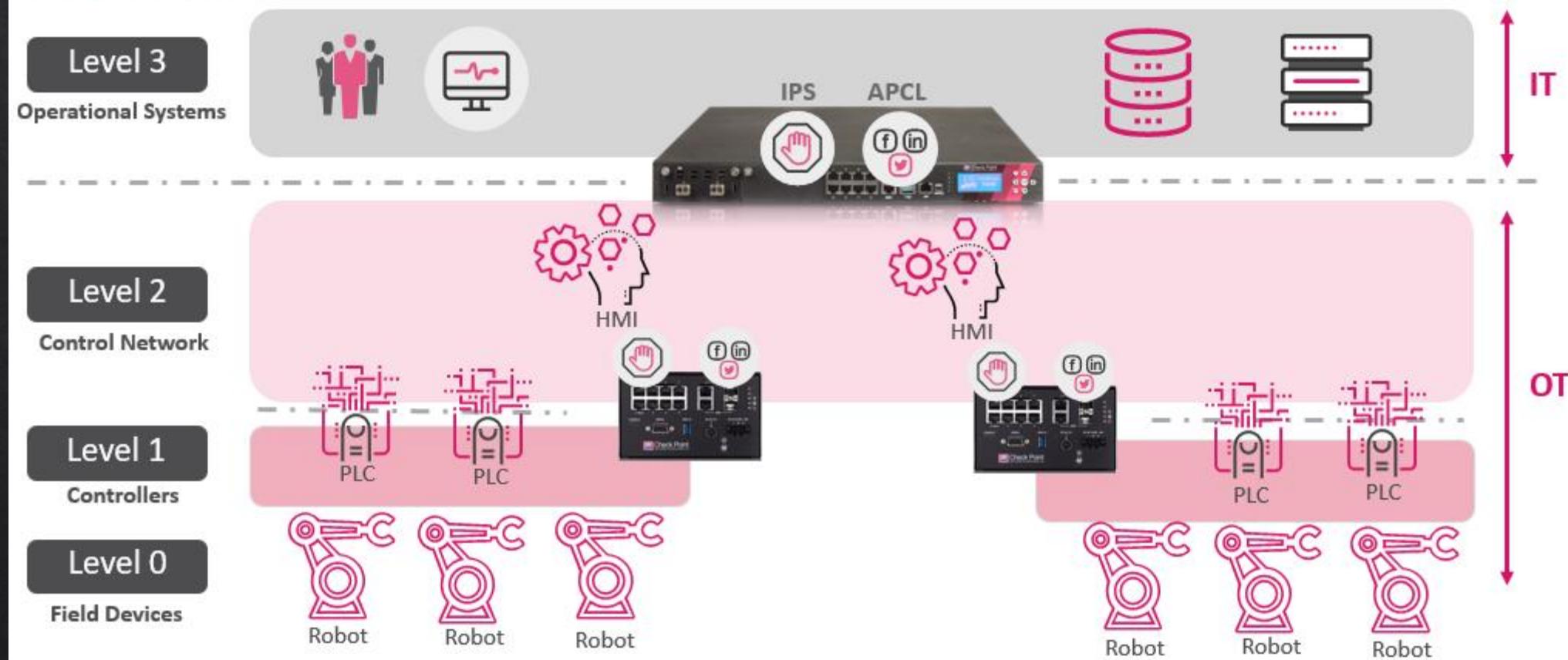
Purdue Model Explained

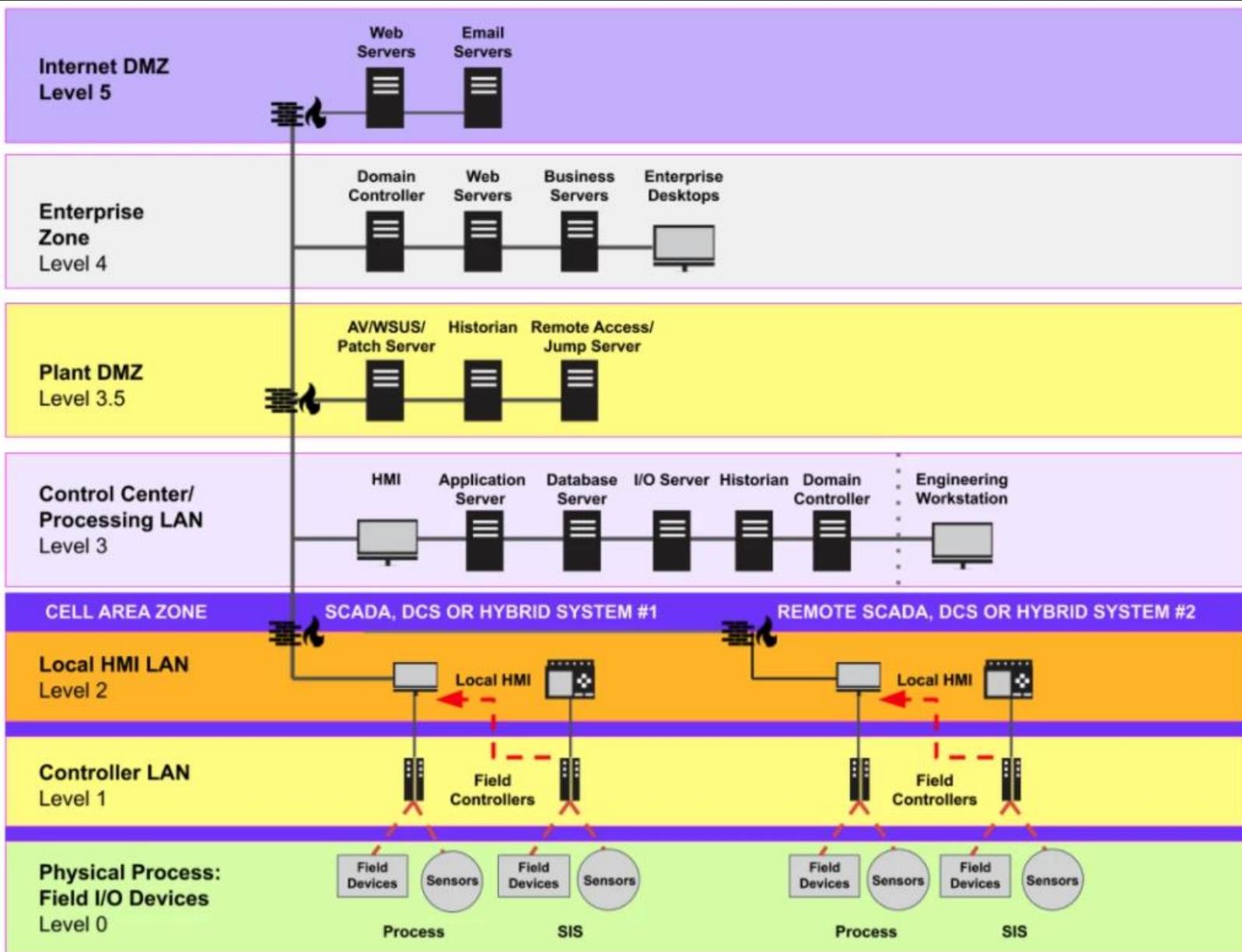
Purdue Model, What Is It?

A method of arranging and segmenting networked operational technology (OT) devices.



The Purdue Model





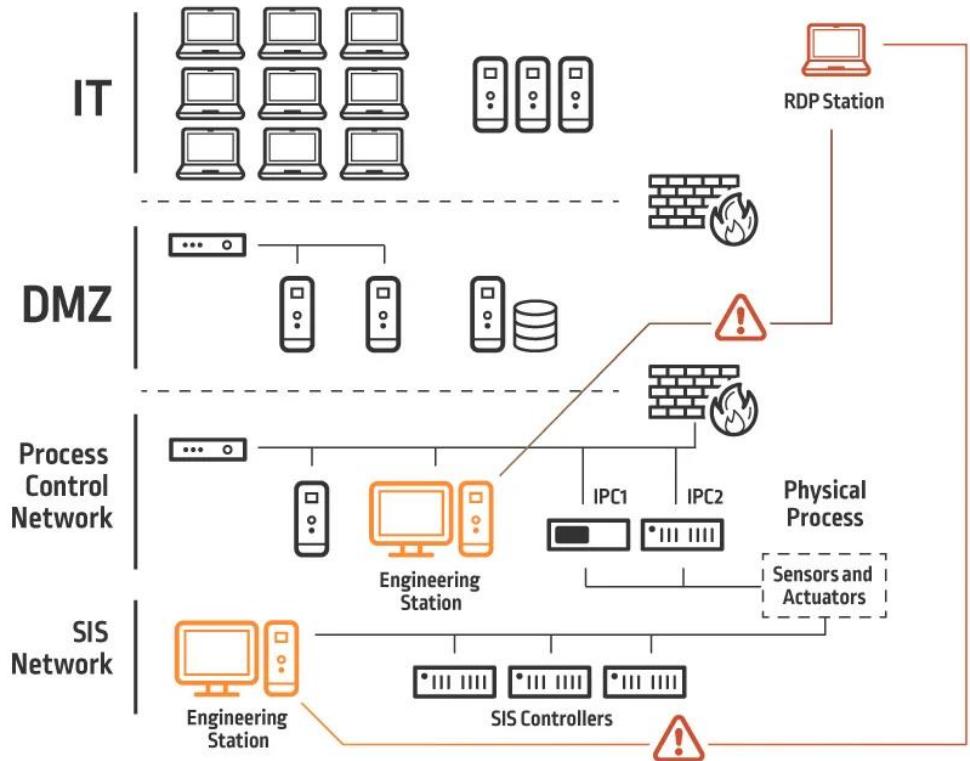
Anatomy Of A Complex OT Attack

TRICONEX

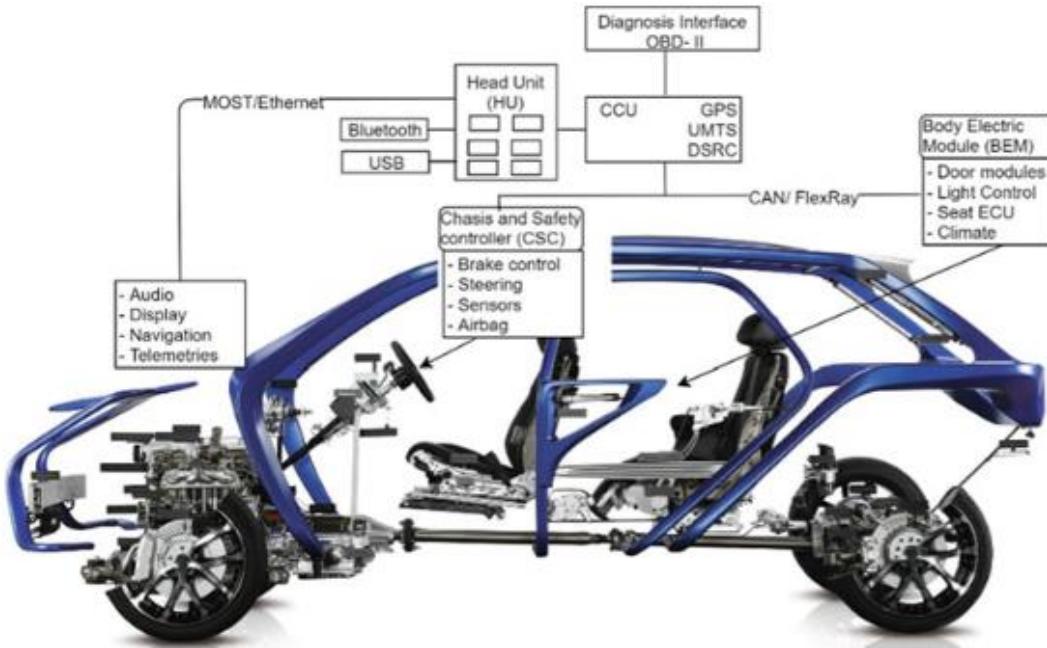
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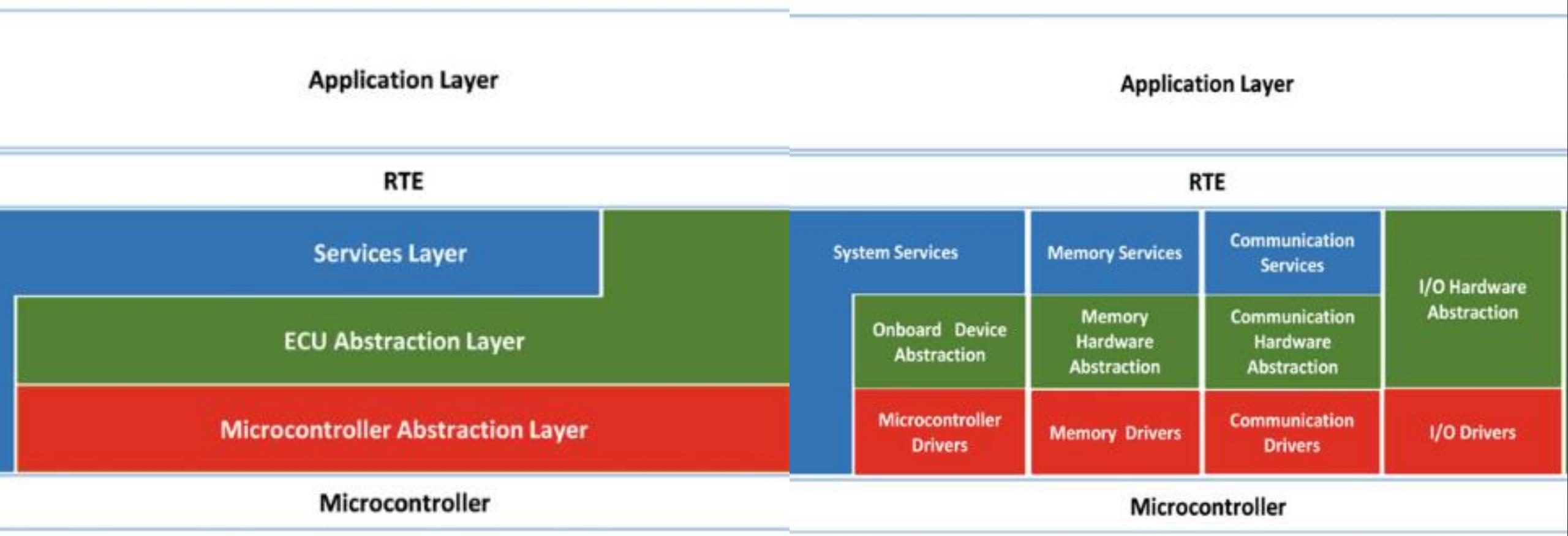


Inside The Victim Network

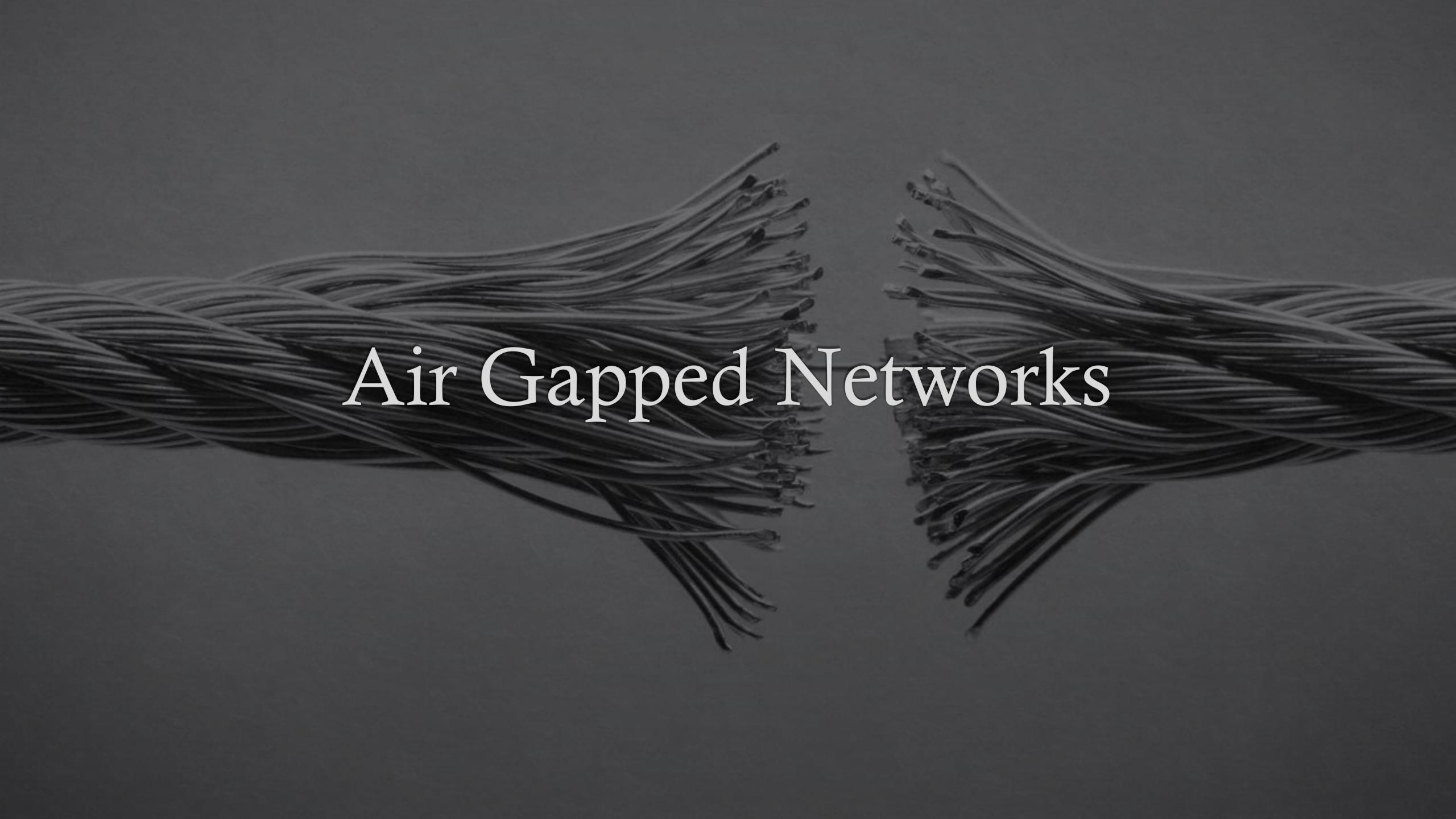


Separation of Duties

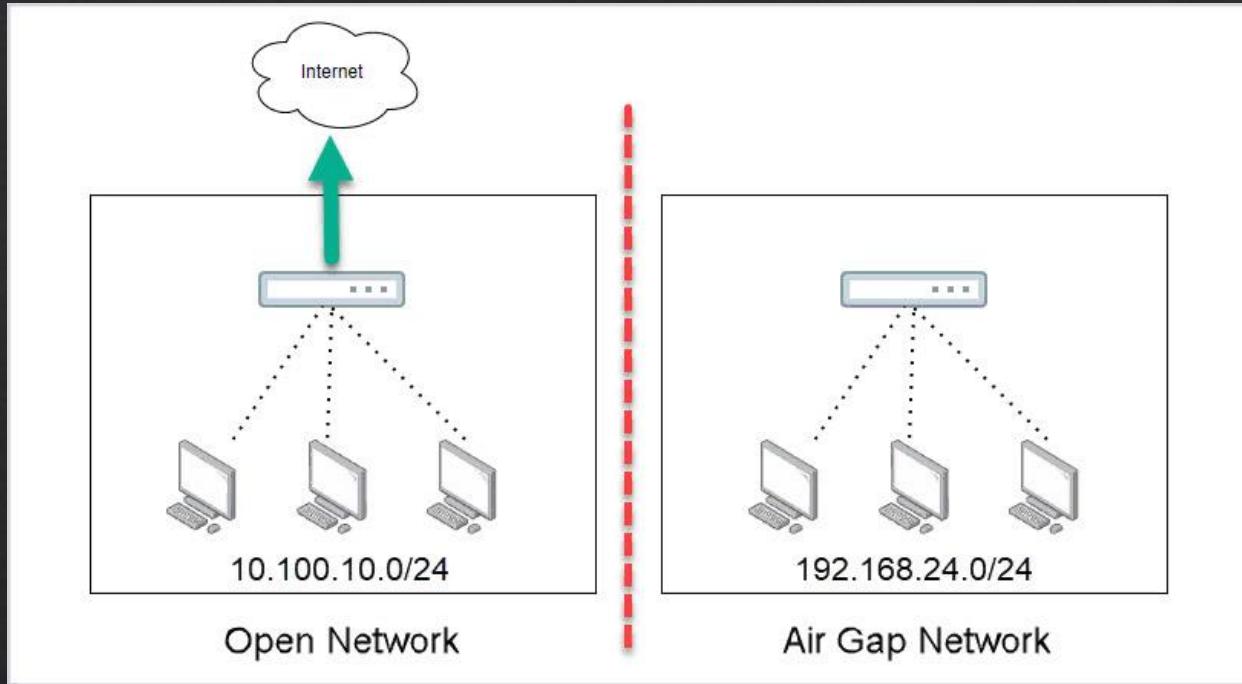




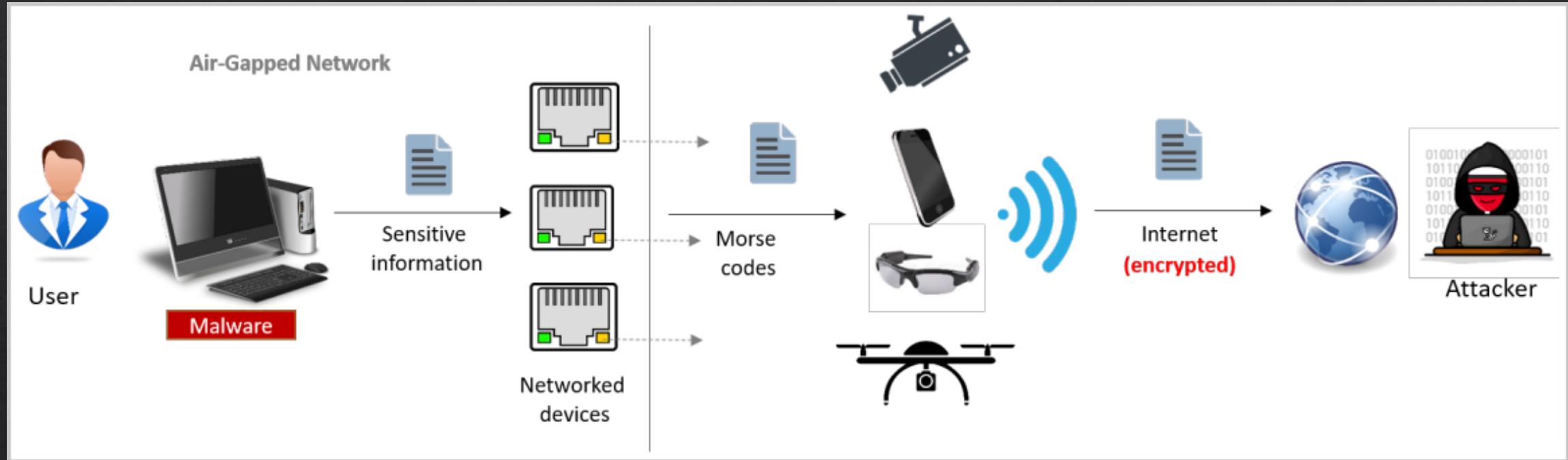
Separation of Software Components



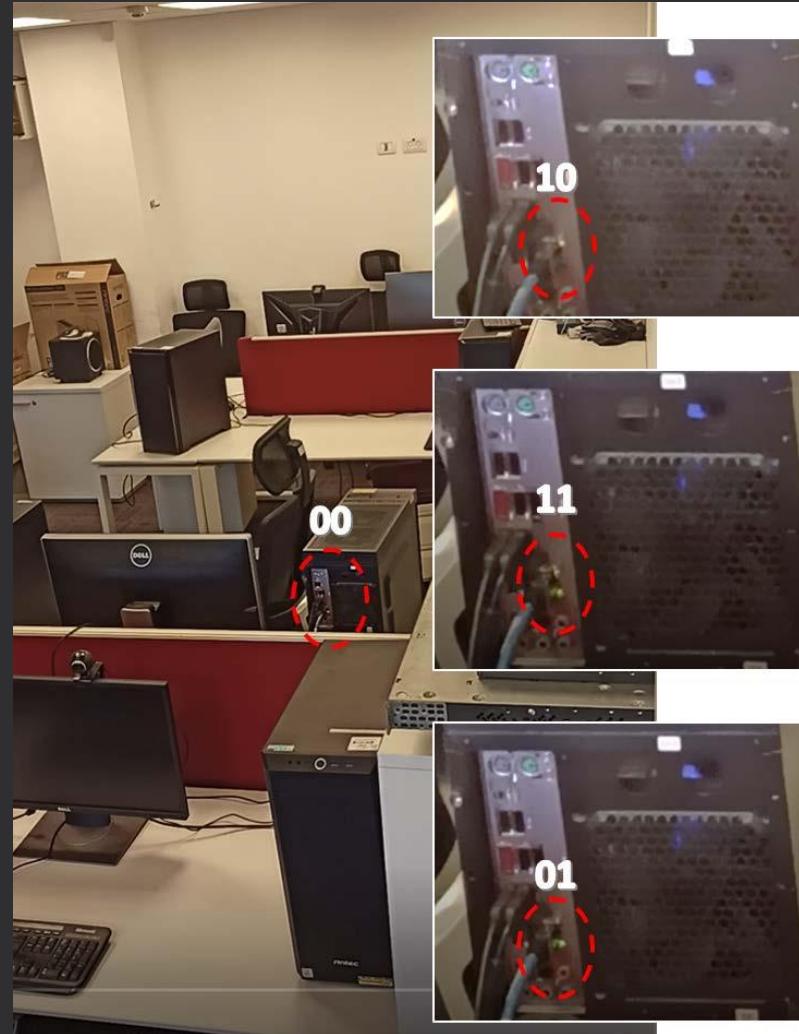
Air Gapped Networks



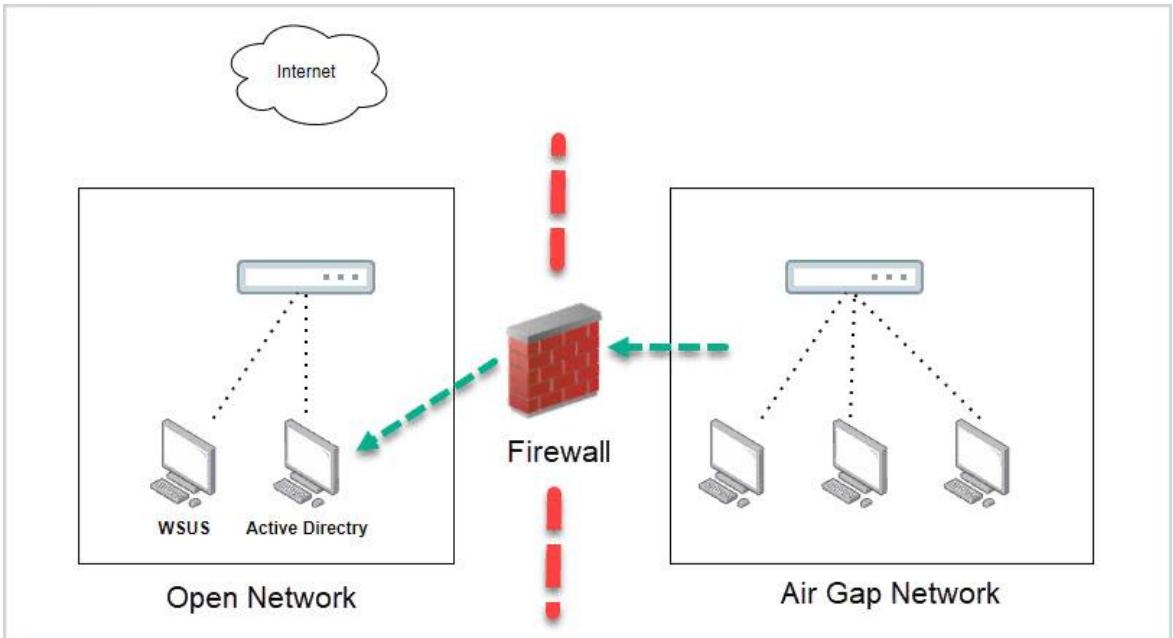
Air Gapped Networks



An Interesting Attack



Is This An Airgap?



Is There A Point To
Air Gapping?

10 minute
break



What Does
Separation
Mean For
Development?

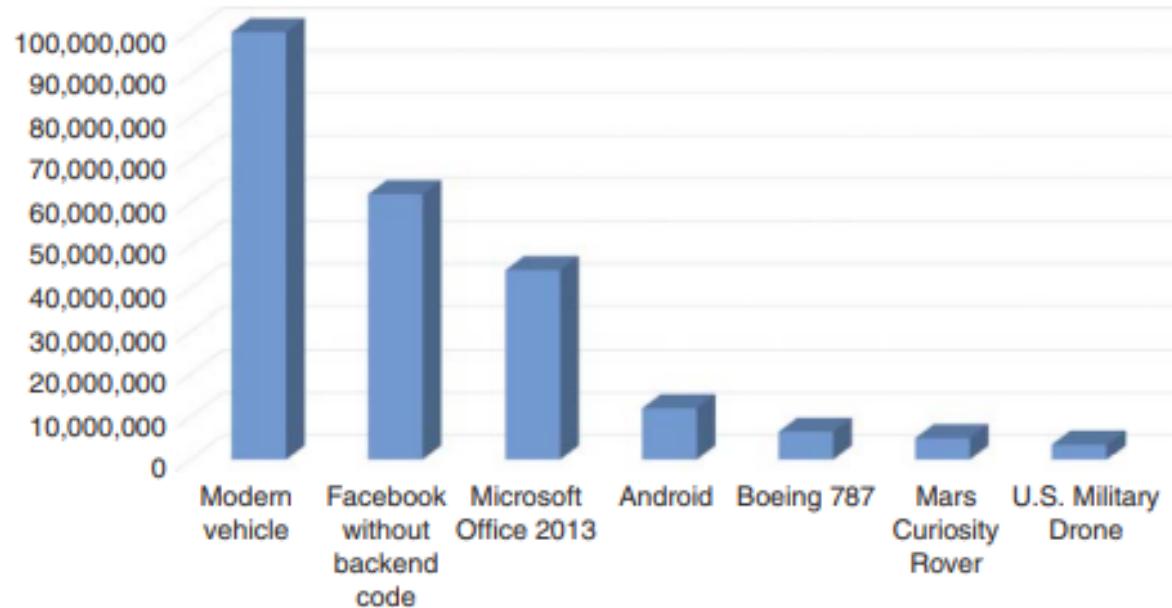


How Does Software Fit In?

A blurred, colorful background of a car driving at night, with motion streaks of orange, yellow, and blue light. The car's side profile is visible, showing a dark door and a side mirror.

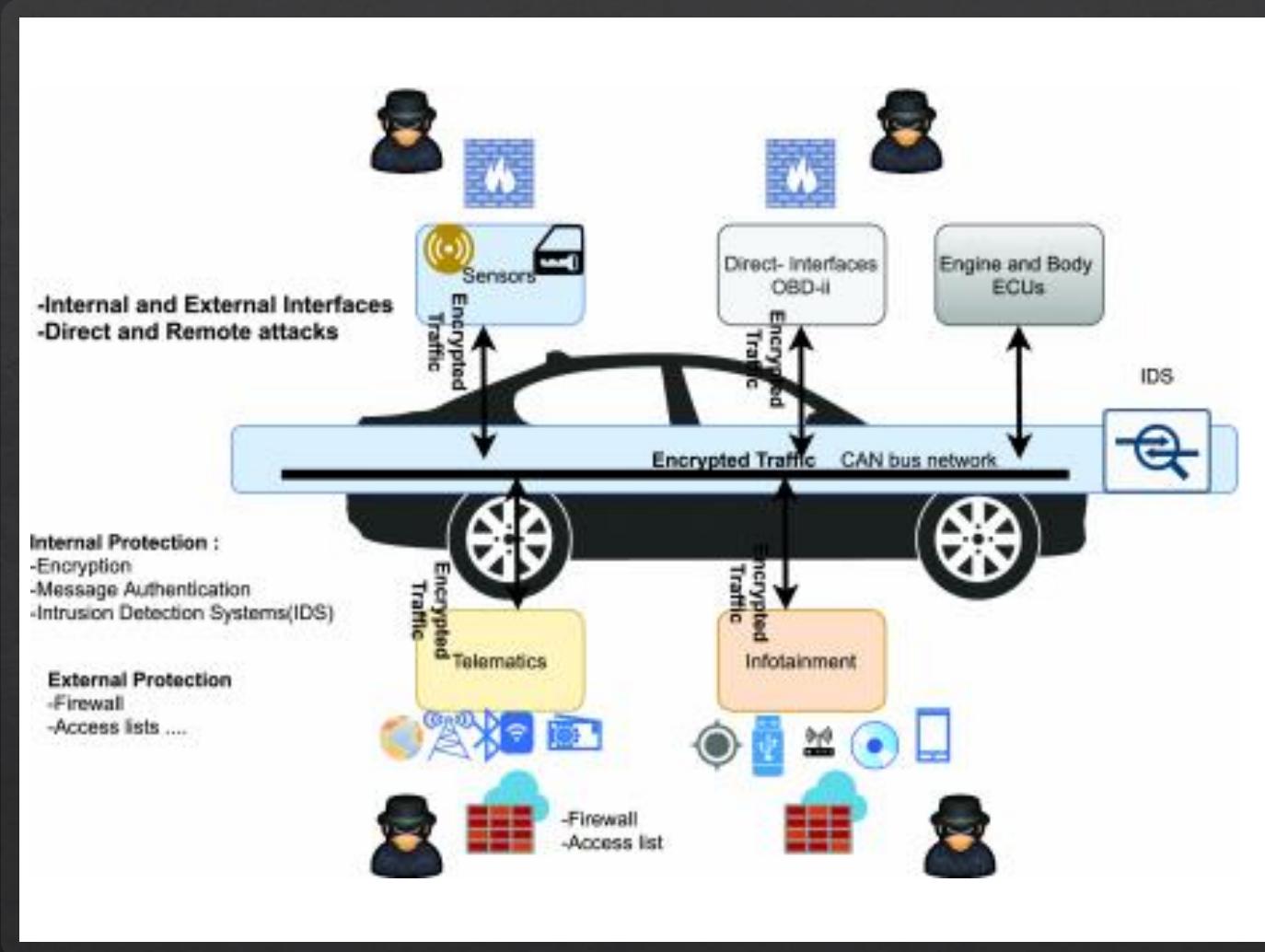
Can This Apply To Cars?

Software By Lines Of Code

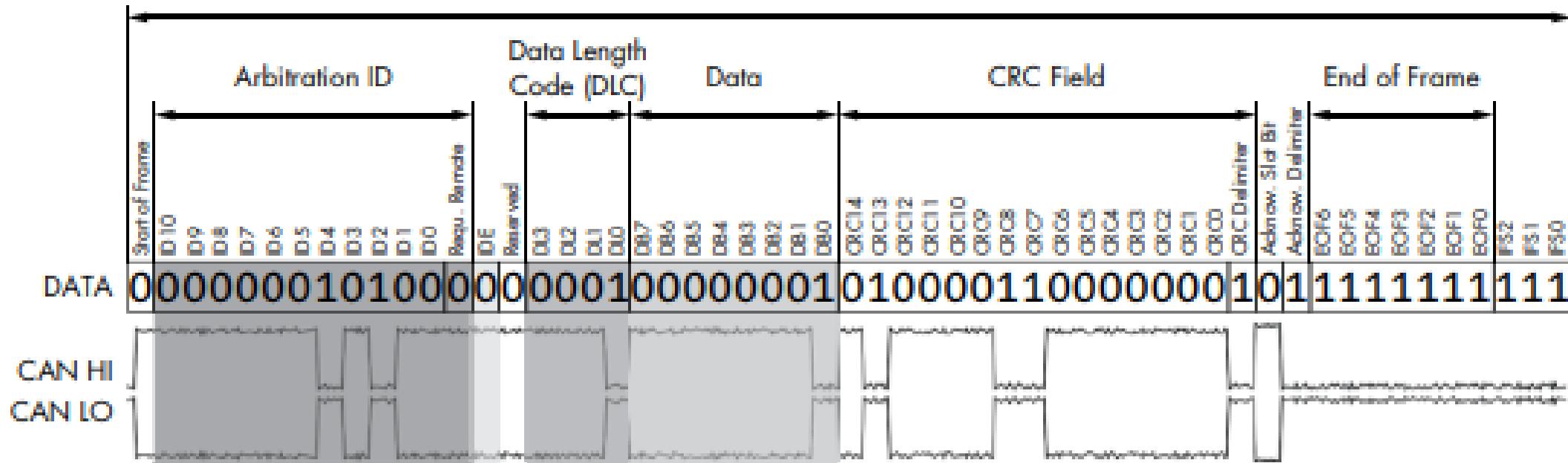


Controller Area Network (CAN)

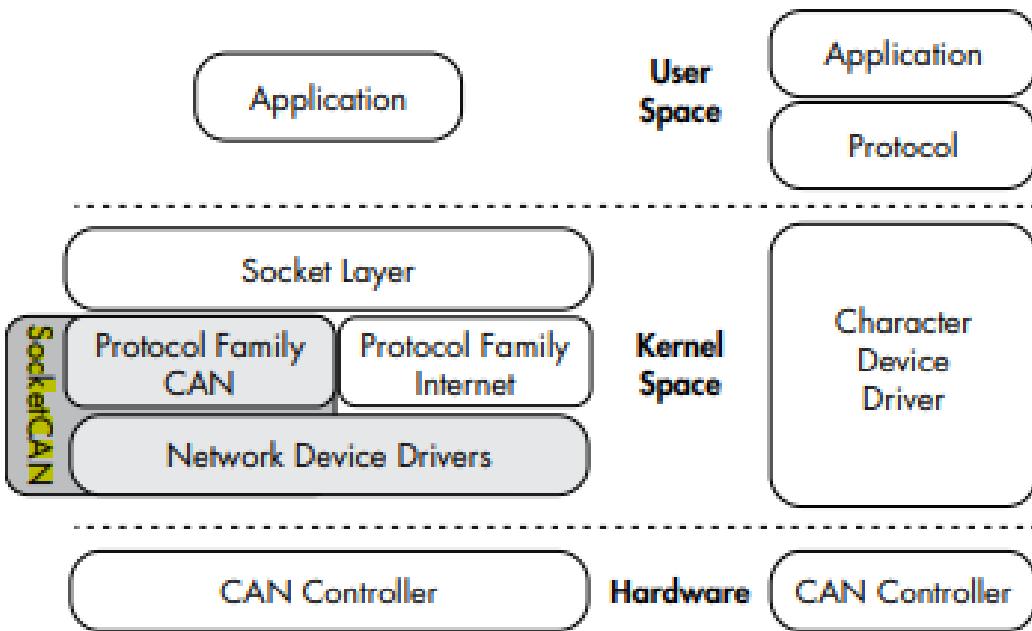
Controller Area Network



Complete CAN Frame



SocketCAN

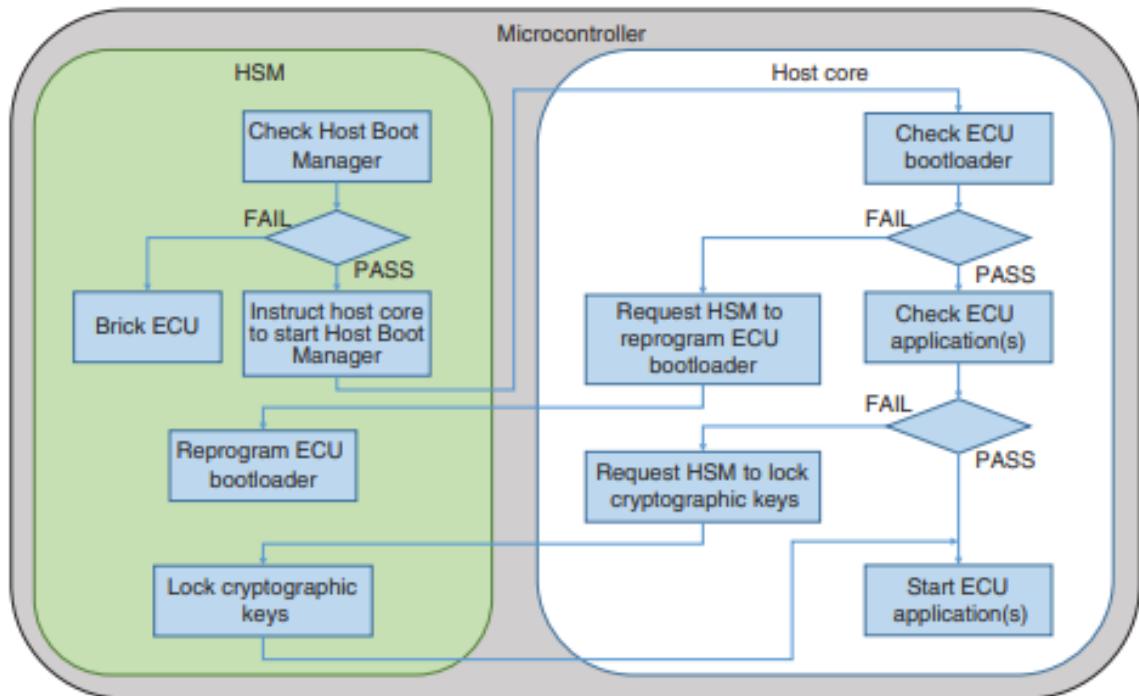




Where's the Security??

Secure Booting

Vehicle Secure Boot



Additional Protocols In Use

ISO-TP

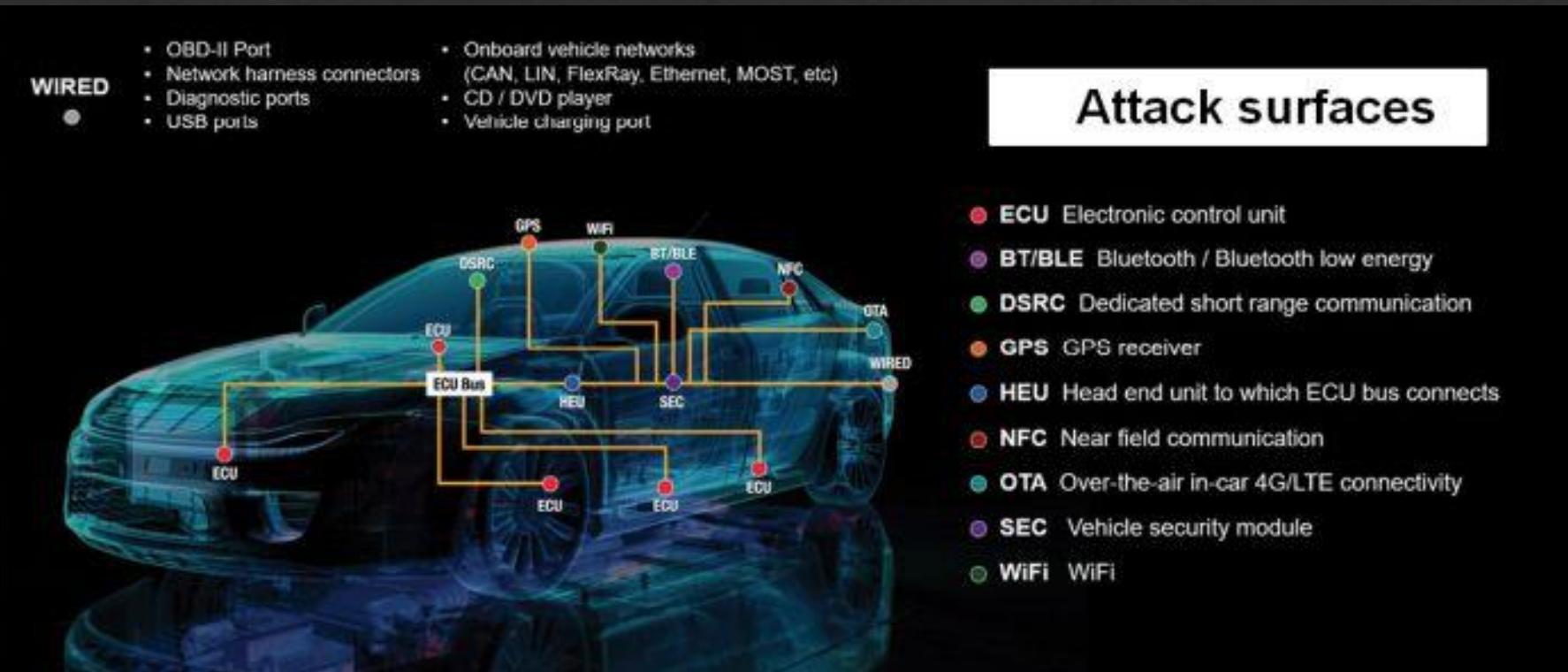
CANopen

GMLAN

A.K.A. ISO
15765-2

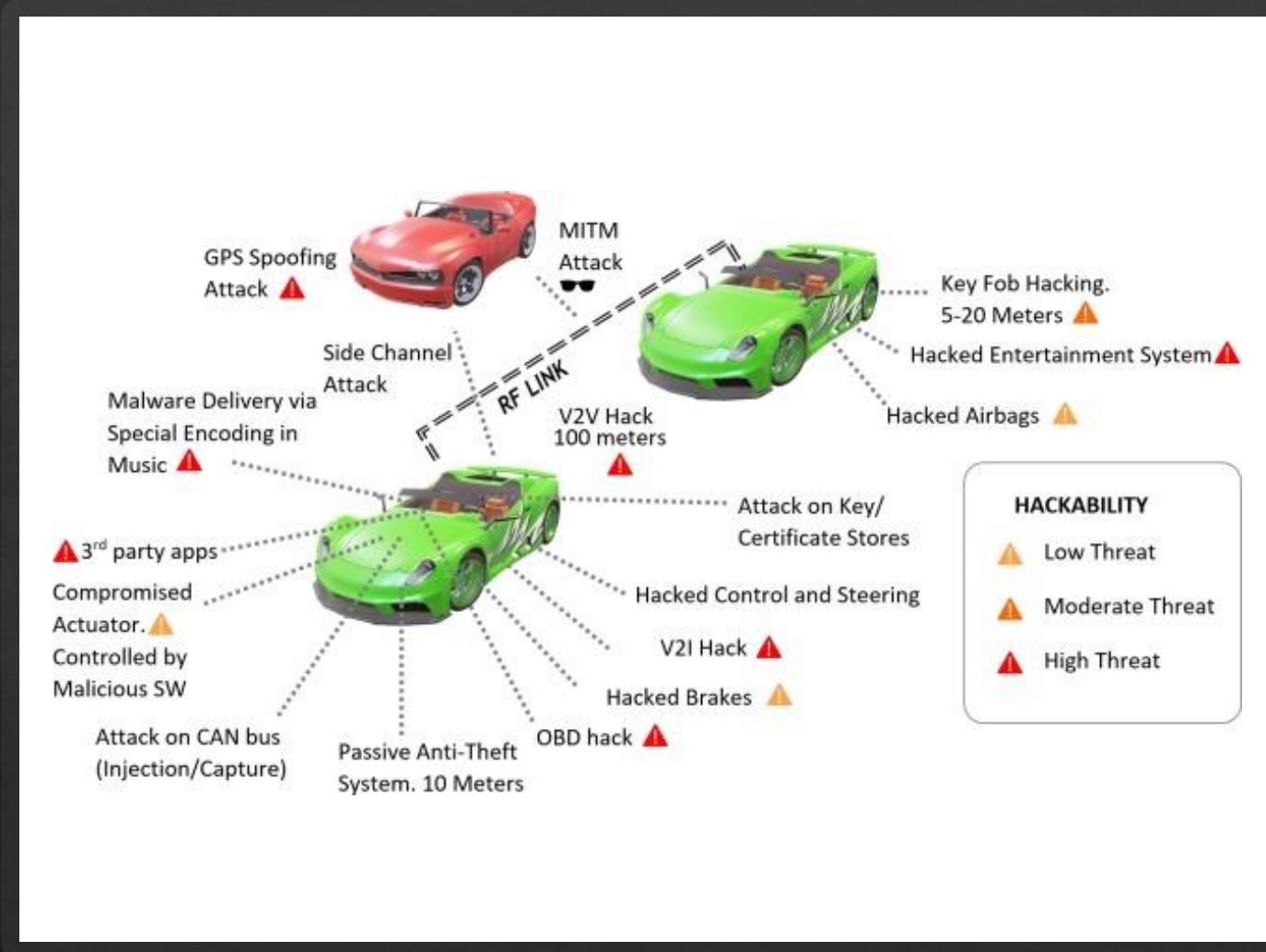
Vehicle Media Systems

① Application	Function Block	Function Block	Stream Service
② Presentation		Network Service Application Socket	
③ Session			
④ Transport		Network Service Basic Level	
⑤ Network			
⑥ Data Link		MOST Network Interface Controller	
⑦ Physical		Optical Physical Layer Electrical Physical Layer	



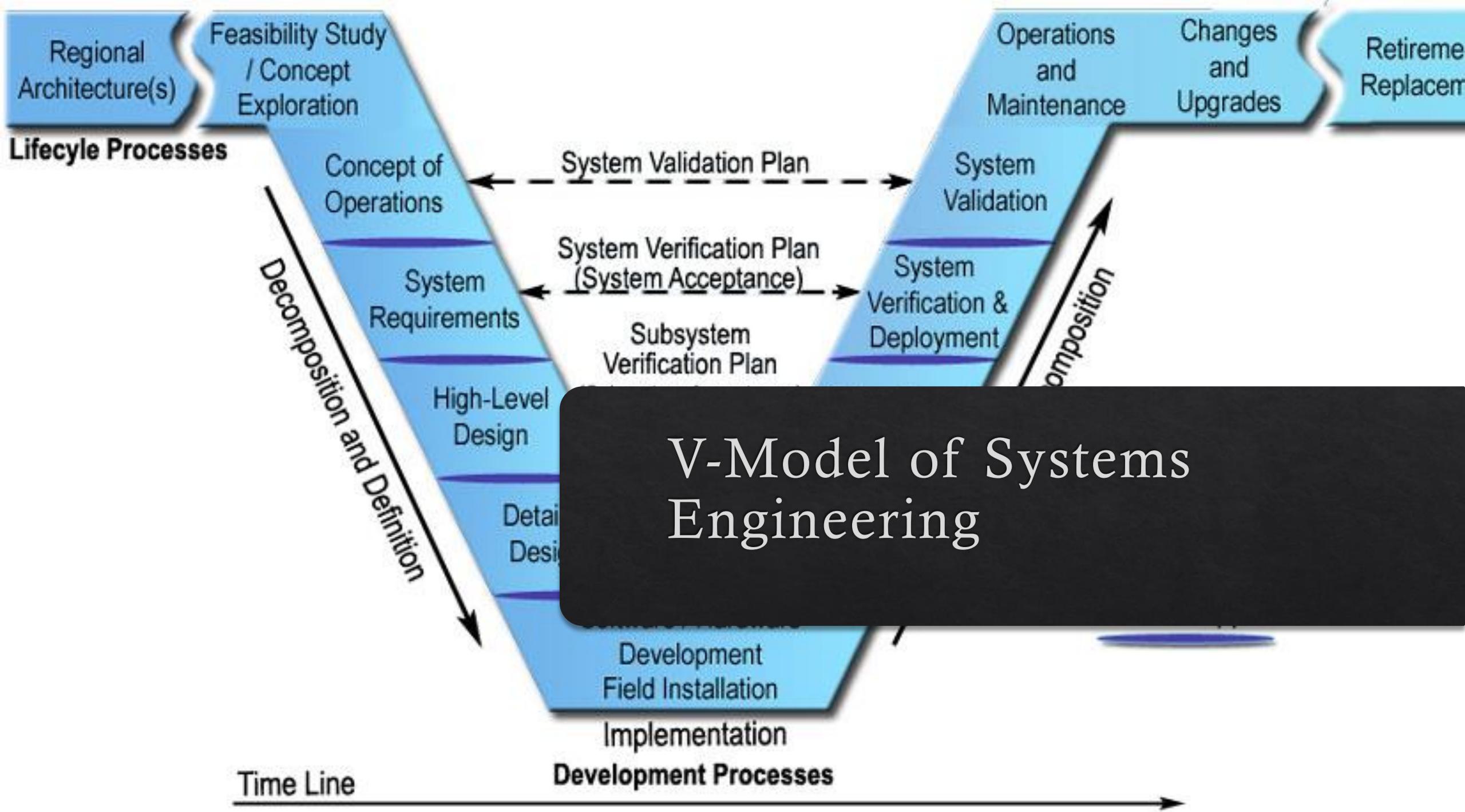
Car Software Attack Surface

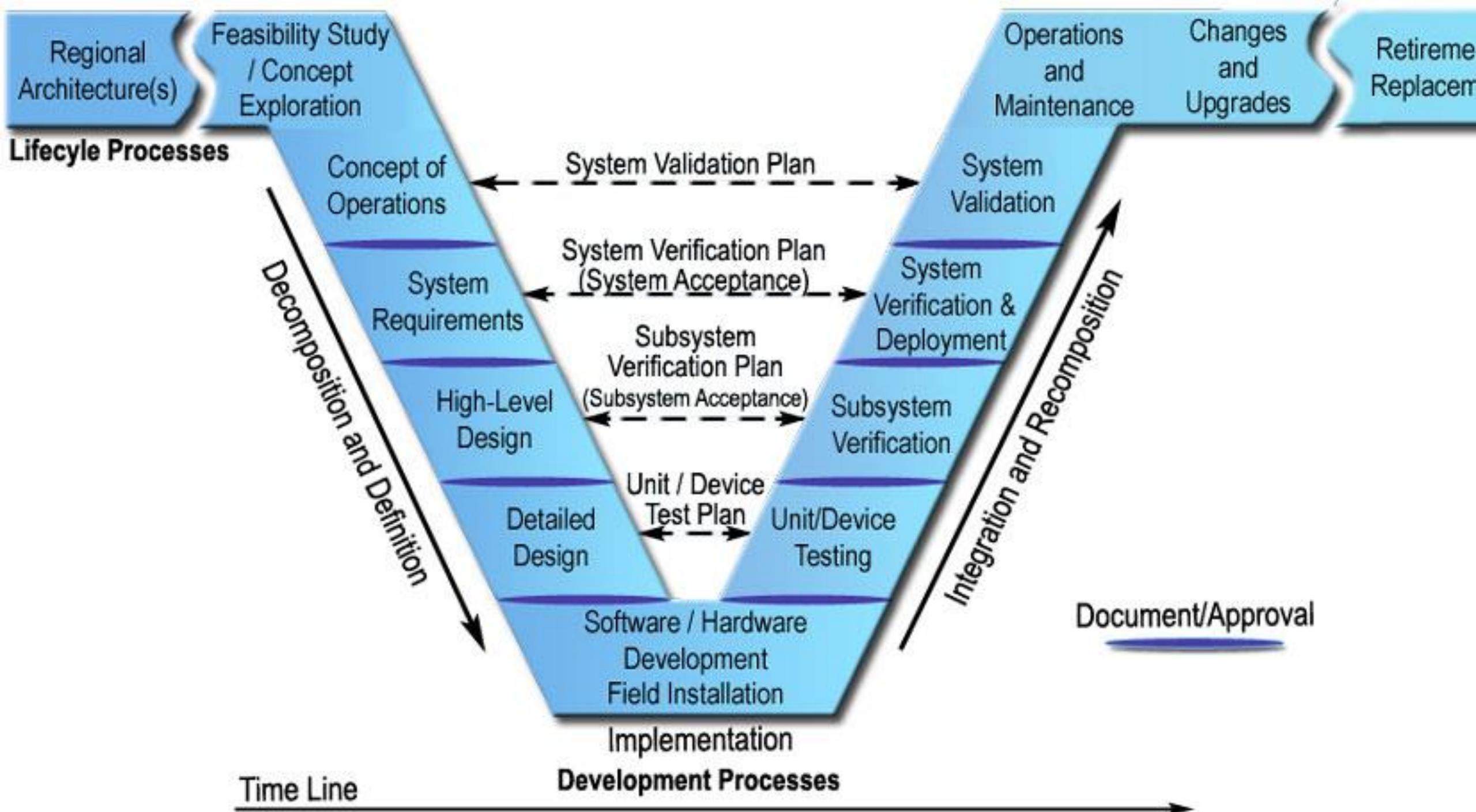
Popular Car Attack Surfaces



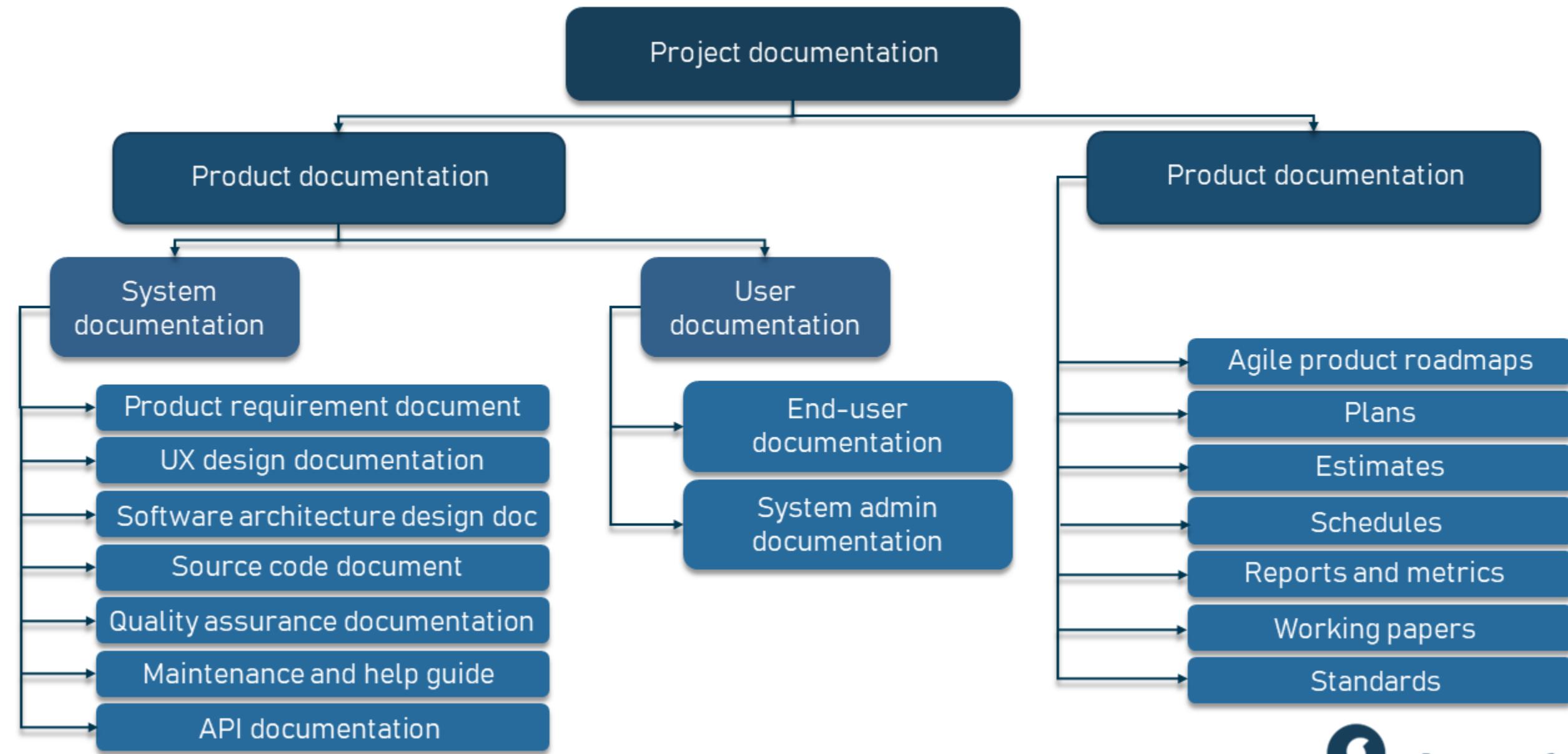
10 minute
break







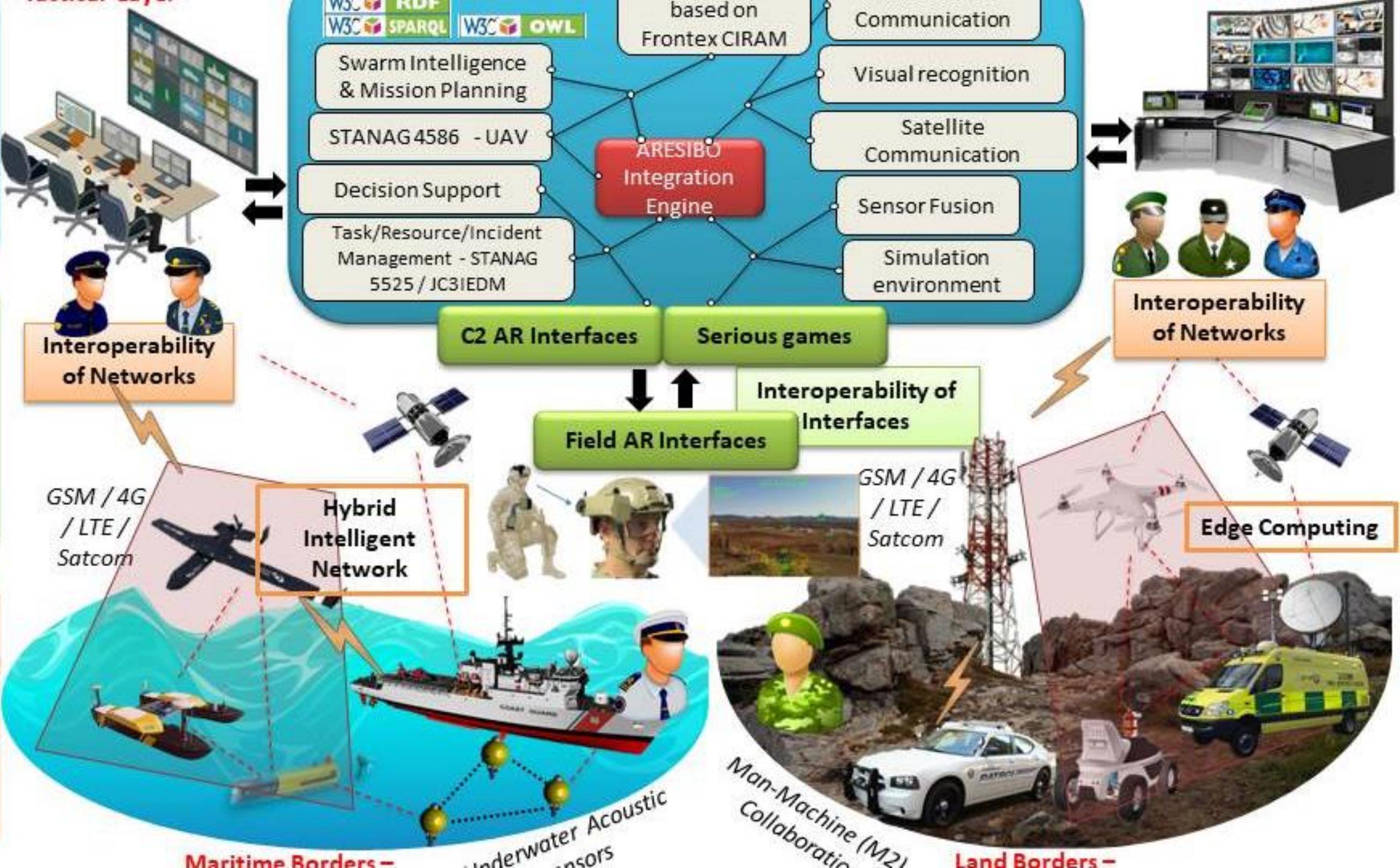
SOFTWARE DOCUMENTATION TYPES



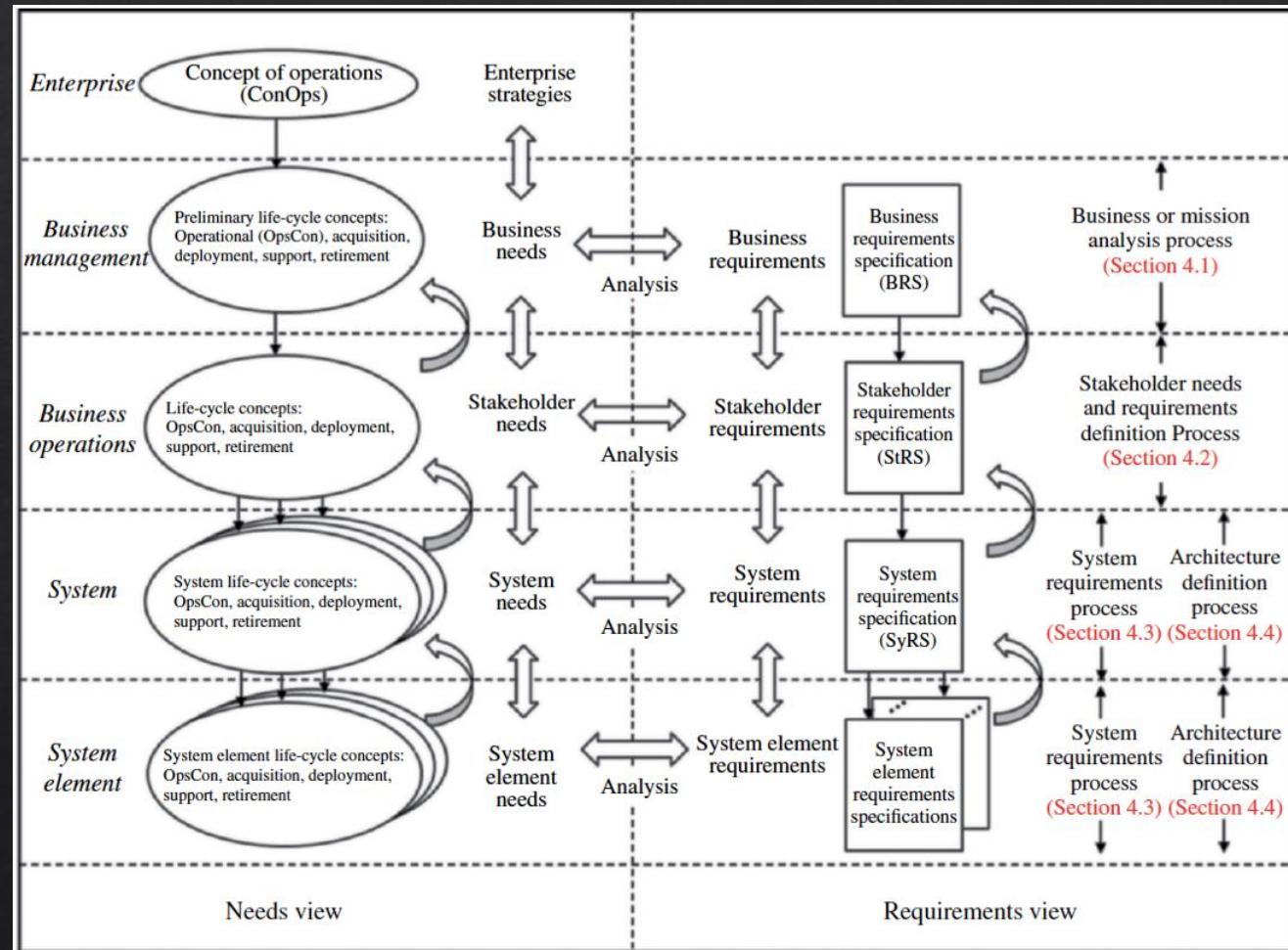
Tech Pillar 1 - WP3 Augmented Communication & Sensing

Tech Pillar 2 - WP5 Augmented Reality

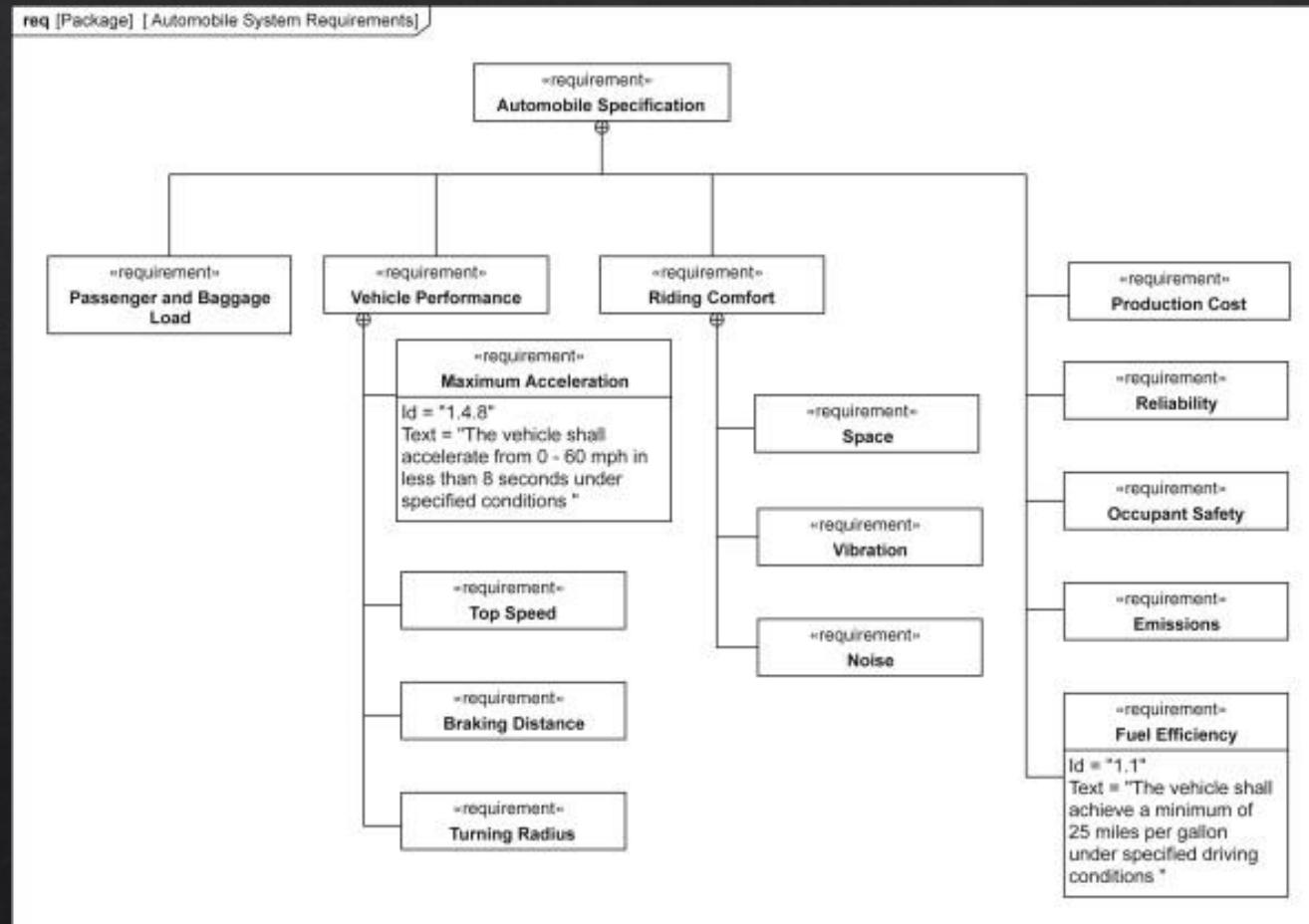
Tech Pillar 3 - WP4 Augmented Intelligence



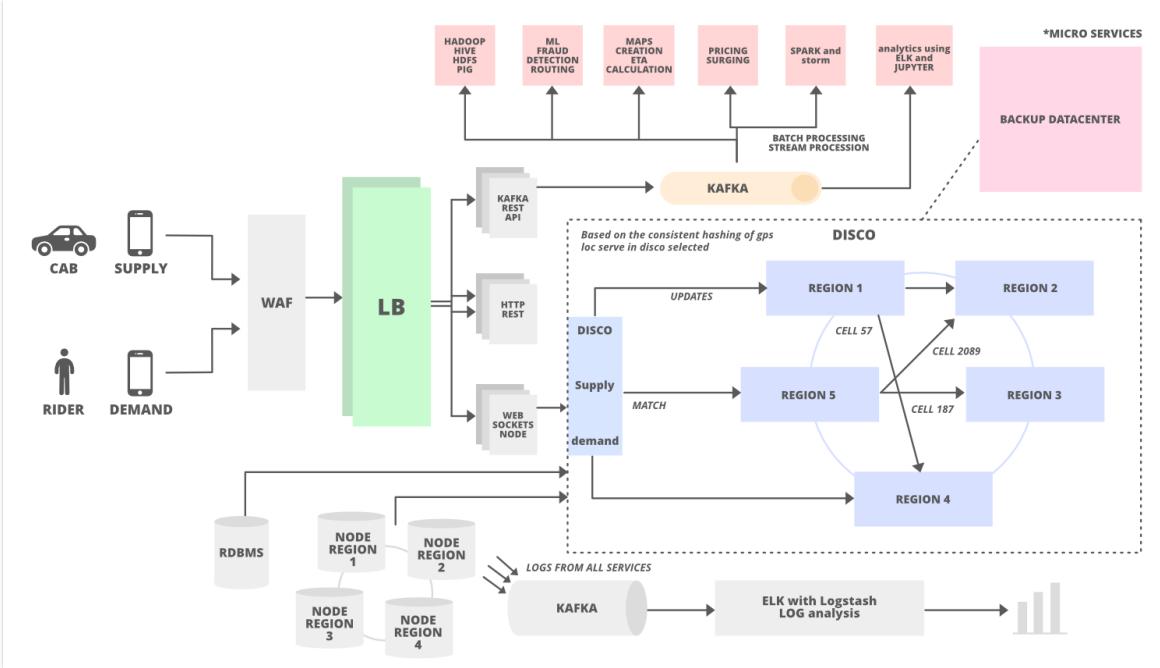
Concept of Operations (CONOP)



System Requirements Diagram

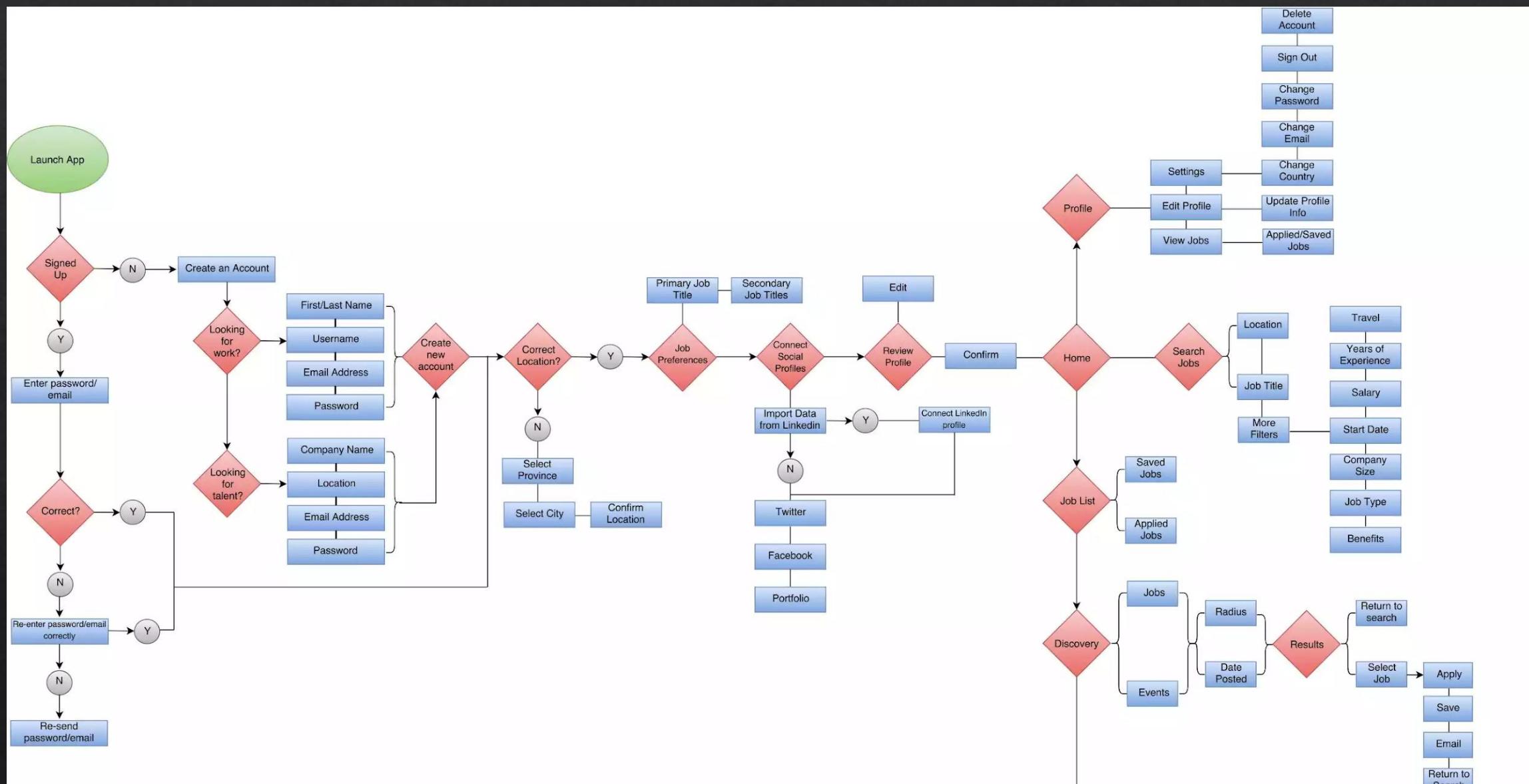


High-Level Design Documentation



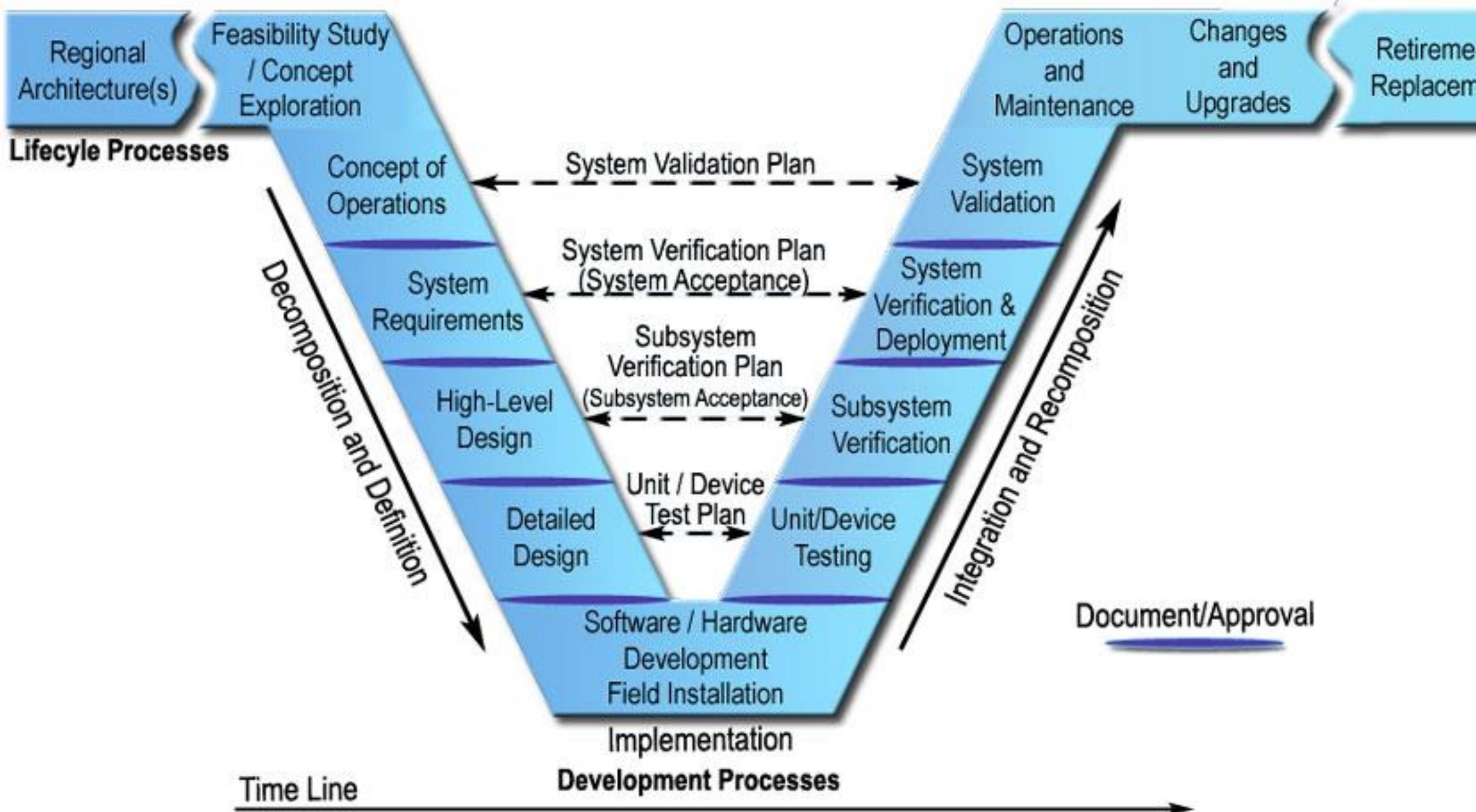
Detailed Architecture Design Documentation

- ❖ User flow diagram
- ❖ Site/product map
- ❖ User story map

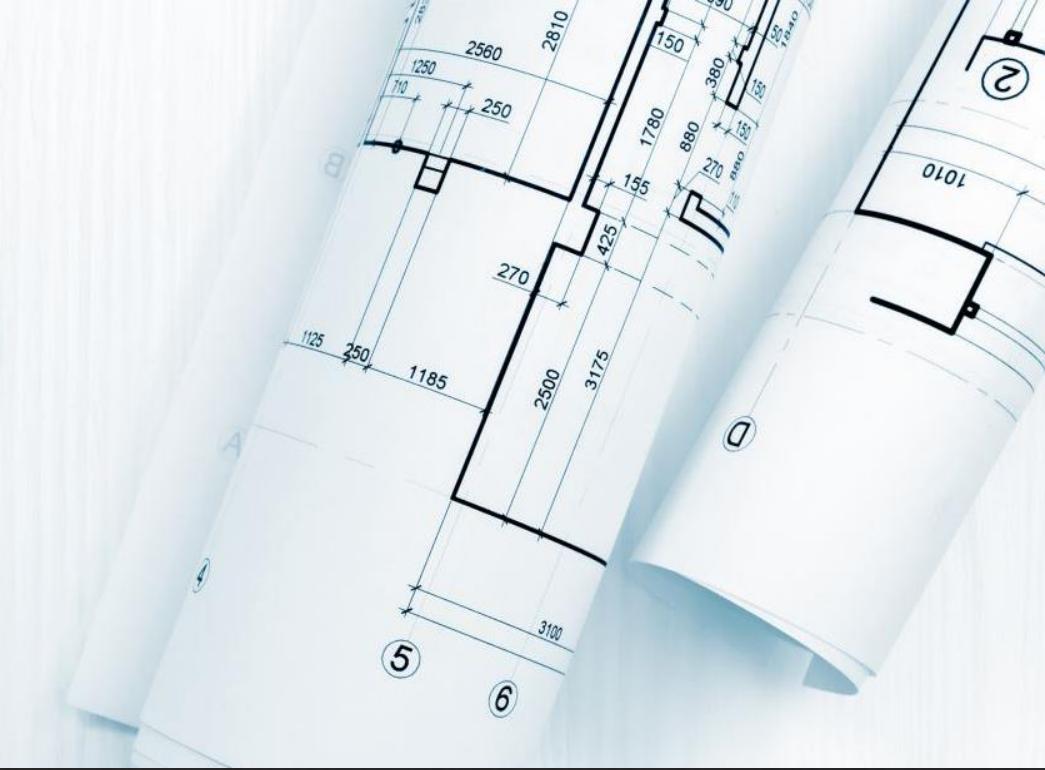


USER:

USER ACTIVITIES		Application and settings	Transactions	Additional info				
USER STORIES (backbone)		Interaction with application	Settings	Finance management	Bank product	Bank centers	Analytics	Bank news
USER TASKS		Manage the app from an iPhone	Get account details	Transfer money	Ask a question/request a service			
Release 1 (MVP)	Manage the app from a tablet			View transaction history				
	Manage the app from an Android device	Secure the account	Use transactions template	Take out a loan easily	Search for the nearest office	See loan payments analysis	Monitor currency rate	
Release 2	Manage accounts	Set up automatic payment	Form a bank statement	Manage deposits	Search for the nearest ATM	See deposit additions analysis		
	Find the app from the Marketplace	Customize notifications	Receive updates on banking device	Calculate deposit options			Estimate future expenses	Compare offers of competitors
Release 3	Set financial goals	Export information to PDF	Make third party payments	Be offered loyalty programs				

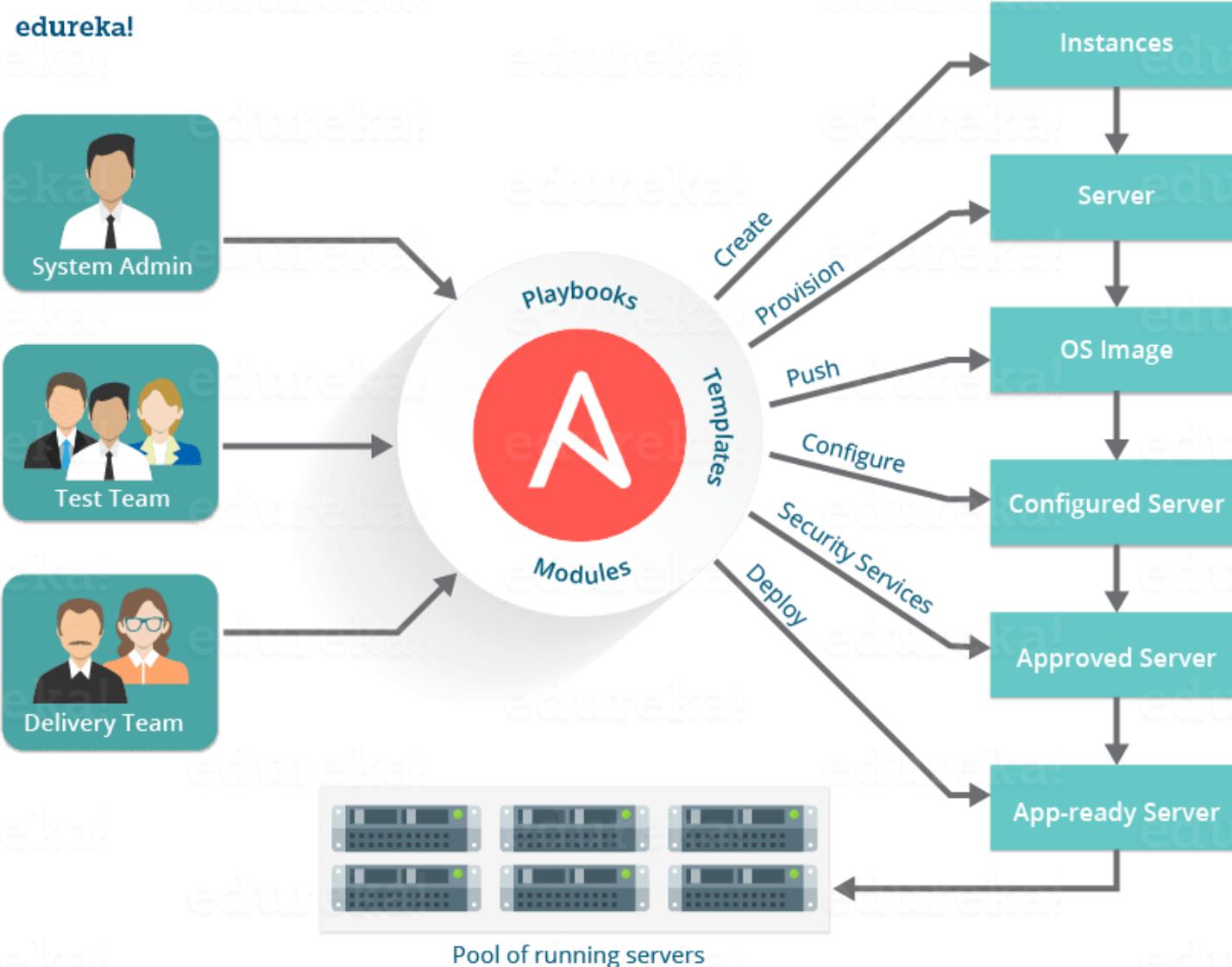


Operations & Maintenance



Automating Operations

- ❖ Environment/Deployment Automation
 - ❖ Jenkins
 - ❖ Chef
 - ❖ Ansible
- ❖ Pipeline building
- ❖ Changes & upgrades
 - ❖ Can be easily done with automation scripting!



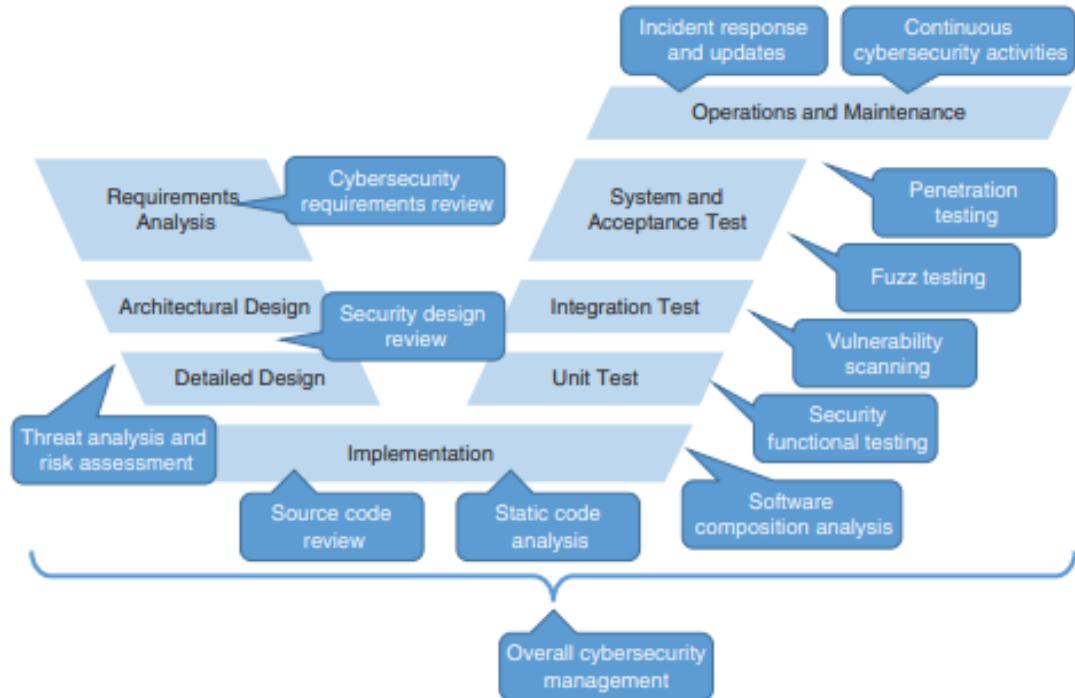


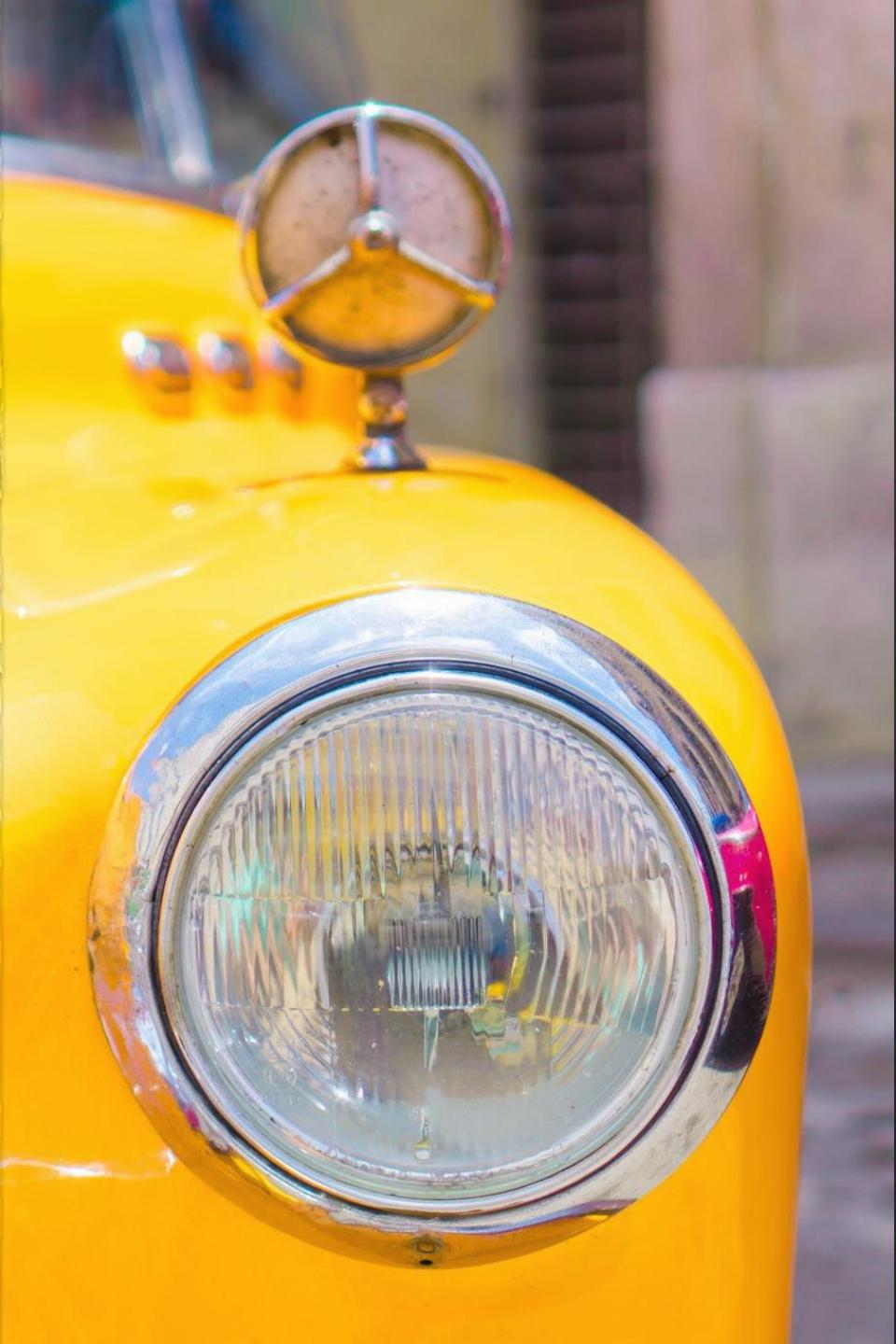
Retirement & Replacement

End of life considerations

- ❖ Can we actually afford to retire this system?
- ❖ What will replace it?
- ❖ Will this be transparent to users?
- ❖ Where will new users go?

V-Model for Car Engineering





References

- ◆ The Car Hackers Handbook: A Guide For The Penetration Tester by Craig Smith

Question or clarifications?



Review Day 3



A large, abstract graphic in the background consists of numerous overlapping triangles in shades of orange, yellow, and light brown, creating a sense of depth and motion.

Preview Week 3