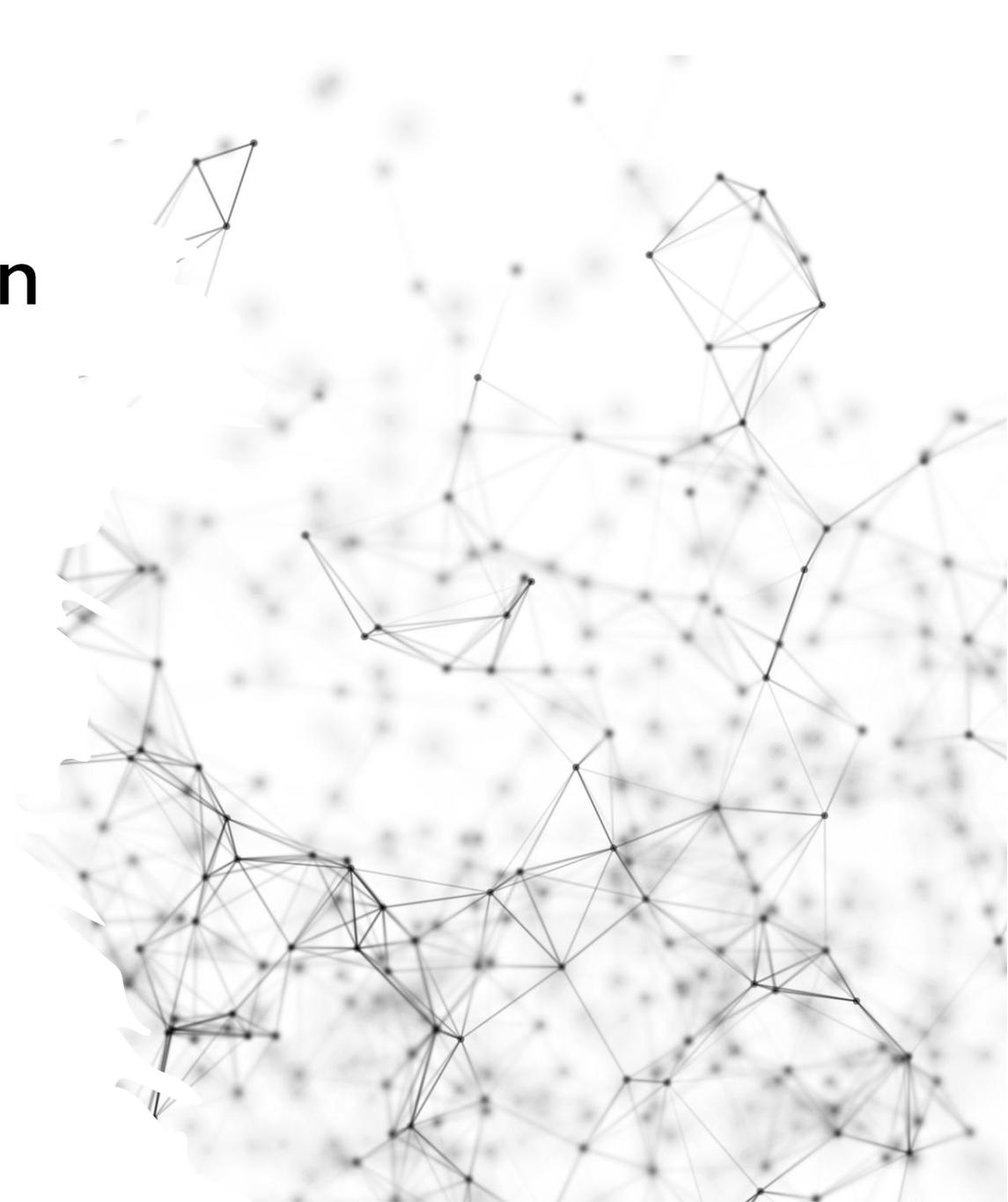


# Digitalization & Cyber Security in O&G value chain: Role of data and analytics

*Dr Abul Fahimuddin*

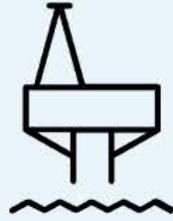
18. October 2023



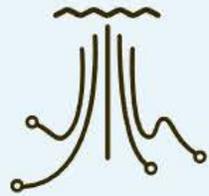


**12+** years of experience from Oil & Gas industry

Director Strategic Accounts, Cognite  
(formerly at **Equinor** and **Royal Dutch Shell**)



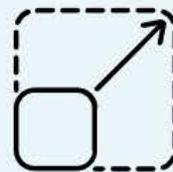
Computational mathematician & Geo-scientist



Subsurface software development (AI/ML)



Commercial mindset with P&L responsibilities



Scaling digital initiatives through cloud technologies



K

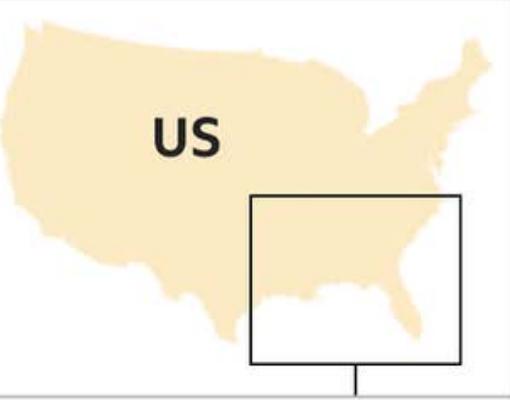
CIRCLE K

Wash Wash CAR WASH



# Colonial Pipeline system map

-  Pipeline system
-  Sublines
-  Main weekend delivery locations



Google

Source: Colonial Pipeline Company

01100 01100001 01111010 01111001 00100000 01100100 01101  
00111 01110100 01101000 01100101 00100000 01110001 01110  
10100 01101000 01100101 00100000 01110001 01110101 01101  
00011 01101011 00100000 01100010 01100101 01101111 01110  
01110 00100000 01100110 01101111 01111000 00100000 01101  
10101 01101101 01110000 01100000 00100000 01101111 01110  
00101 01110010 00100000 01110101 01101000 01100101 00100  
01100 01100001 01111010 01111000 00100000 01100100 01101  
00111 01110100 01101000 01100000 01110001 01110  
10100 01101000 01100101 01110001 01110101 01101  
00011 01101011 00100000 01110010 01101111 01110  
01110 00100000 01100111 01111000 00100000 01101  
10101 01101101 01110000 01100000 01101111 01110



**RANSOMWARE**

00111 01110100 01101000 01100101 00100000 01110001 01110  
10100 01101011 01100101 00100000 01110001 01110101 01101  
00011 01101011 01101000 01100000 01110010 01101111 01110



### Exploration

1. Exploring for oil and gas onshore and offshore

### Development and extraction

2. Developing onshore and offshore fields
3. Producing conventional, deep-water and shale oil and gas
4. Capturing carbon dioxide and storing it safely underground
5. Extracting bitumen

### Manufacturing and energy production

6. Upgrading bitumen
7. Refining oil into fuels and lubricants
8. Producing gas-to-liquids (GTL) products
9. Producing petrochemicals
10. Producing biofuels
11. Generating renewable power
12. Producing liquefied natural gas (LNG)

### Transport and trading

13. Shipping gas to where it is needed
14. Shipping oil to where it is needed
15. Trading oil and gas
16. Supply and distribution of LNG for transport applications
17. Regasifying LNG
18. Trading power

### Sales and marketing

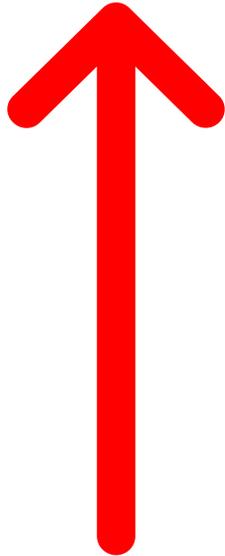
19. Supplying domestic electricity
20. Supplying products to businesses, including gas for cooking, heating and electrical power
21. Progressing electric vehicle and hydrogen refuelling infrastructure
22. Providing mobility solutions for customers, including fuels and lubricants
23. Supplying aviation fuel

### Technical and business services

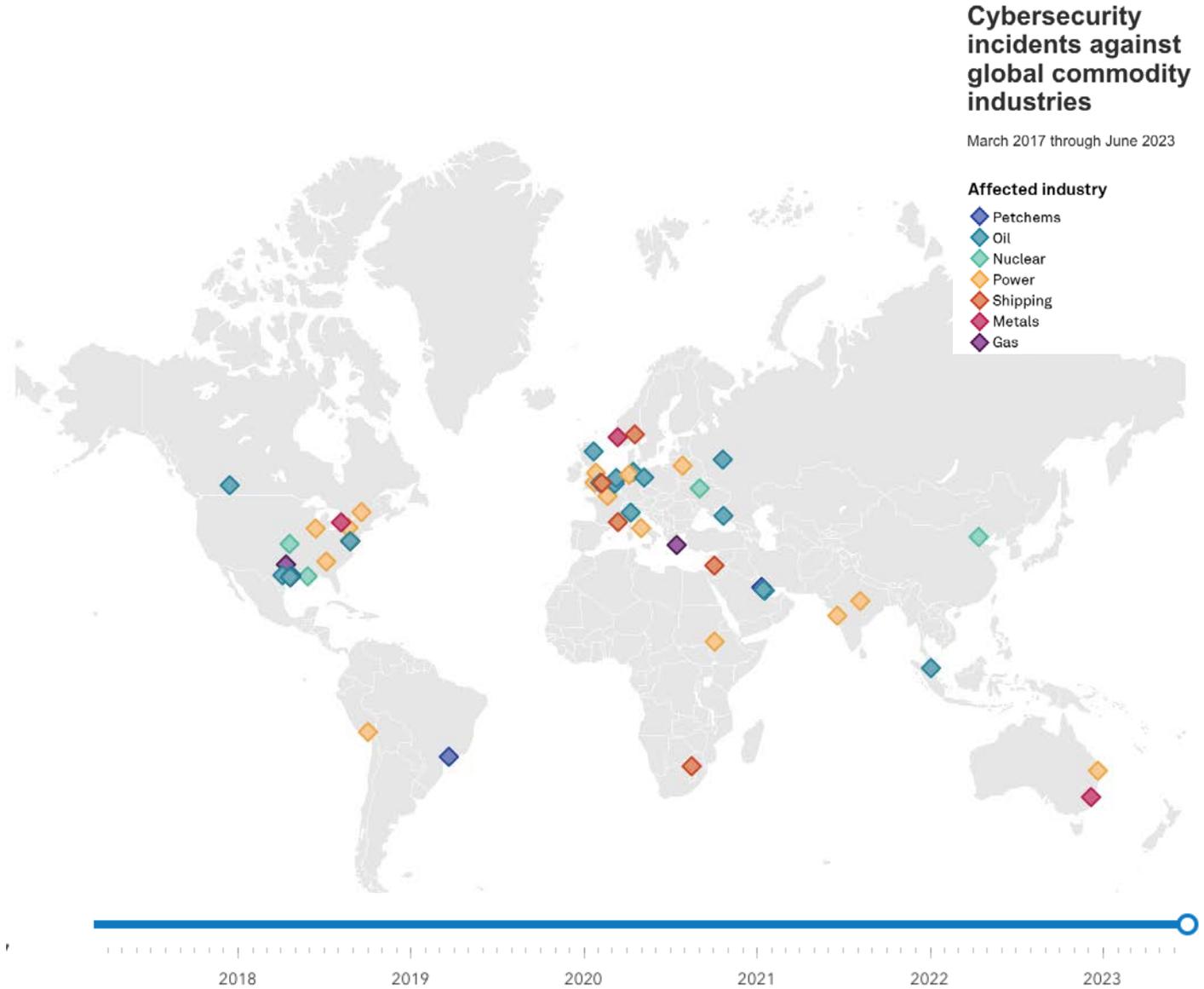
24. Researching and developing new technology solutions
25. Managing the delivery of major projects
26. Providing technical and supporting services

# Complex & Connected

network of data & computational IT infrastructures, spread all over the world



**87 %** increase in ransomware attacks on industrial infrastructure in 2022 (vs 2021)



# Digitalization exposes previously unexposed systems

Cyber-physical security will become top priority for Oil & Gas industry ensuring a safe digital transformation and will become essential for human safety and operational availability \*

Yesterday

Siloed systems with little or no connectivity



Cyber-physical security risk: **LOW**

Today

Digitalization journey begins

Increased connectivity  
Starting to expose systems  
Typically one-way communication



Cyber-physical security risk: **MEDIUM**

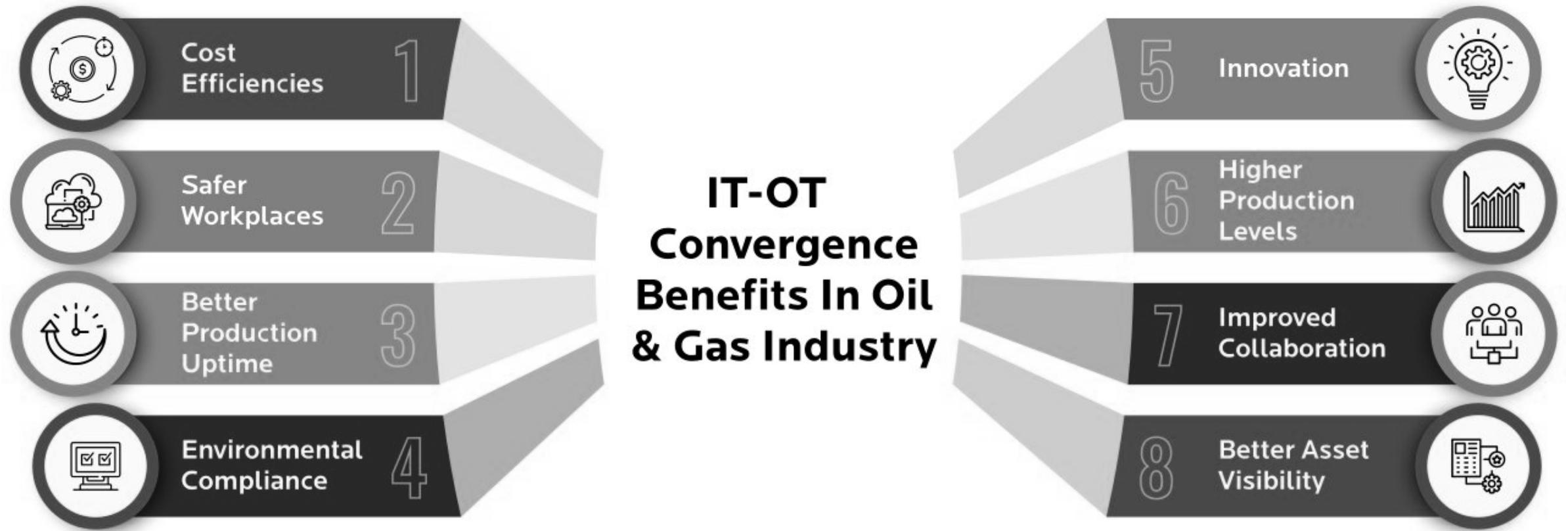
Tomorrow

Future systems

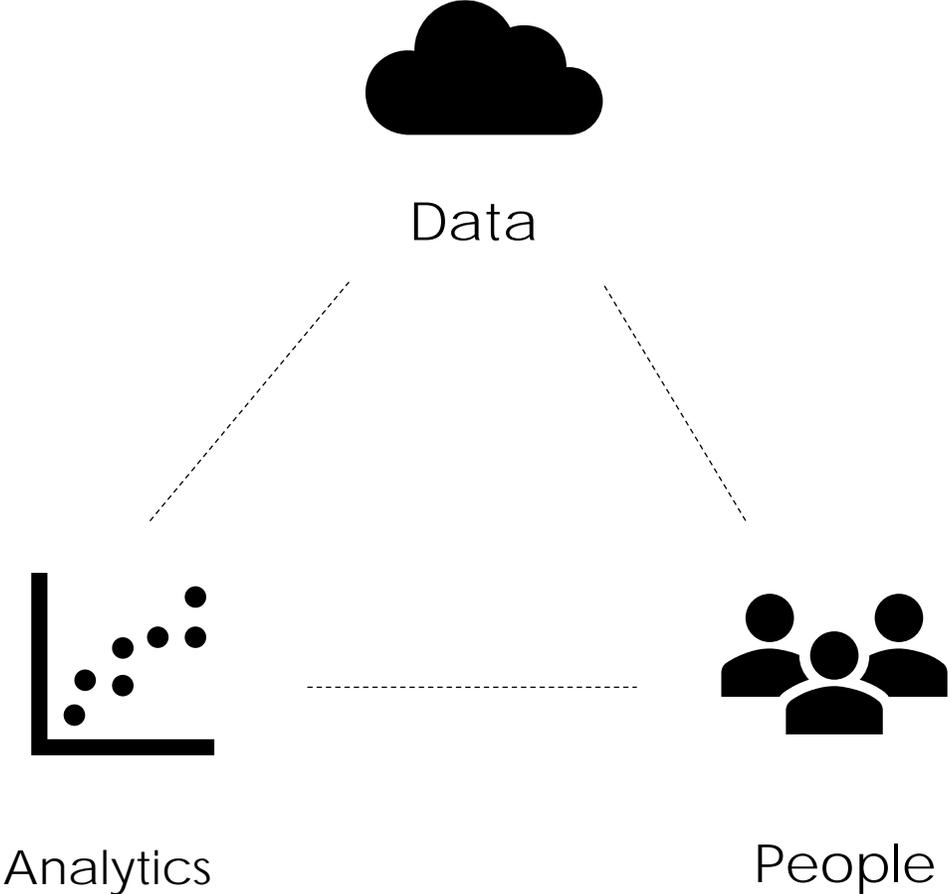
Interconnected system and processes  
Remote environments  
Two-way communication



Cyber-physical security risk: **HIGH**



# Addressing OT & IT convergence risks



Cyber secured operations

# Challenge

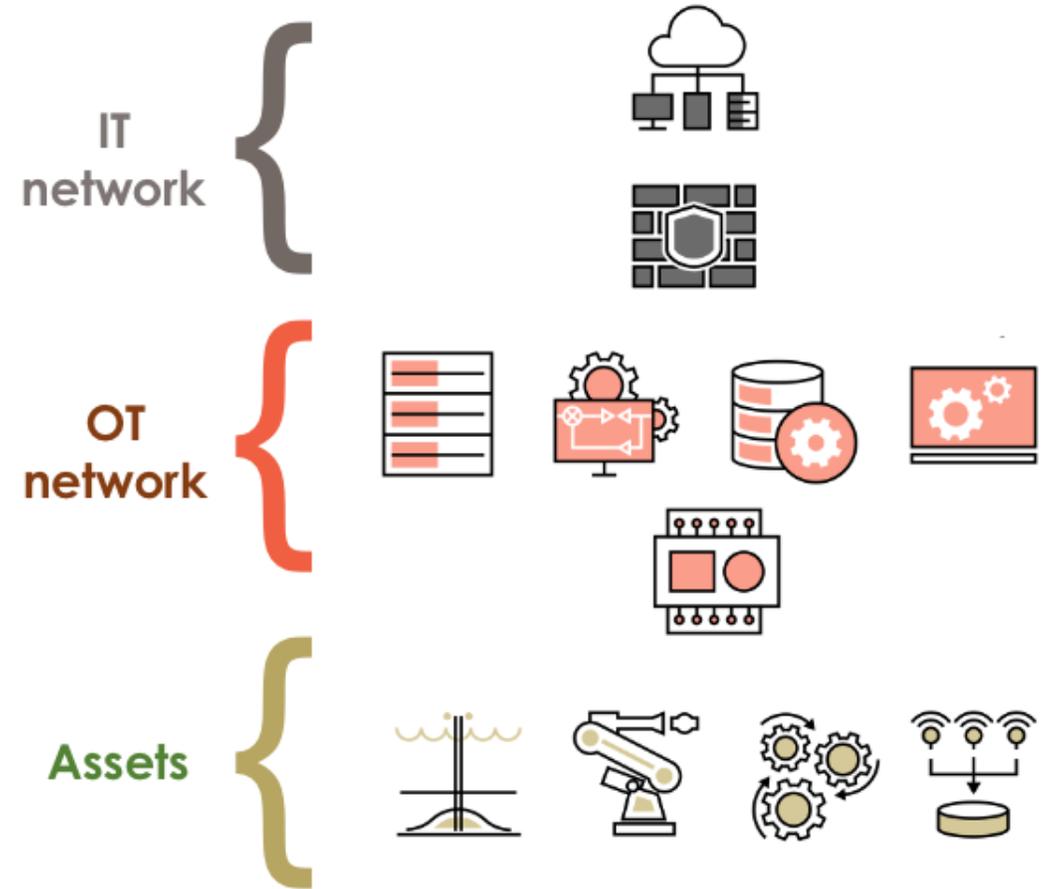
Connect the cyber security of industrial control systems to business risk and potential operational consequences.

Current approach

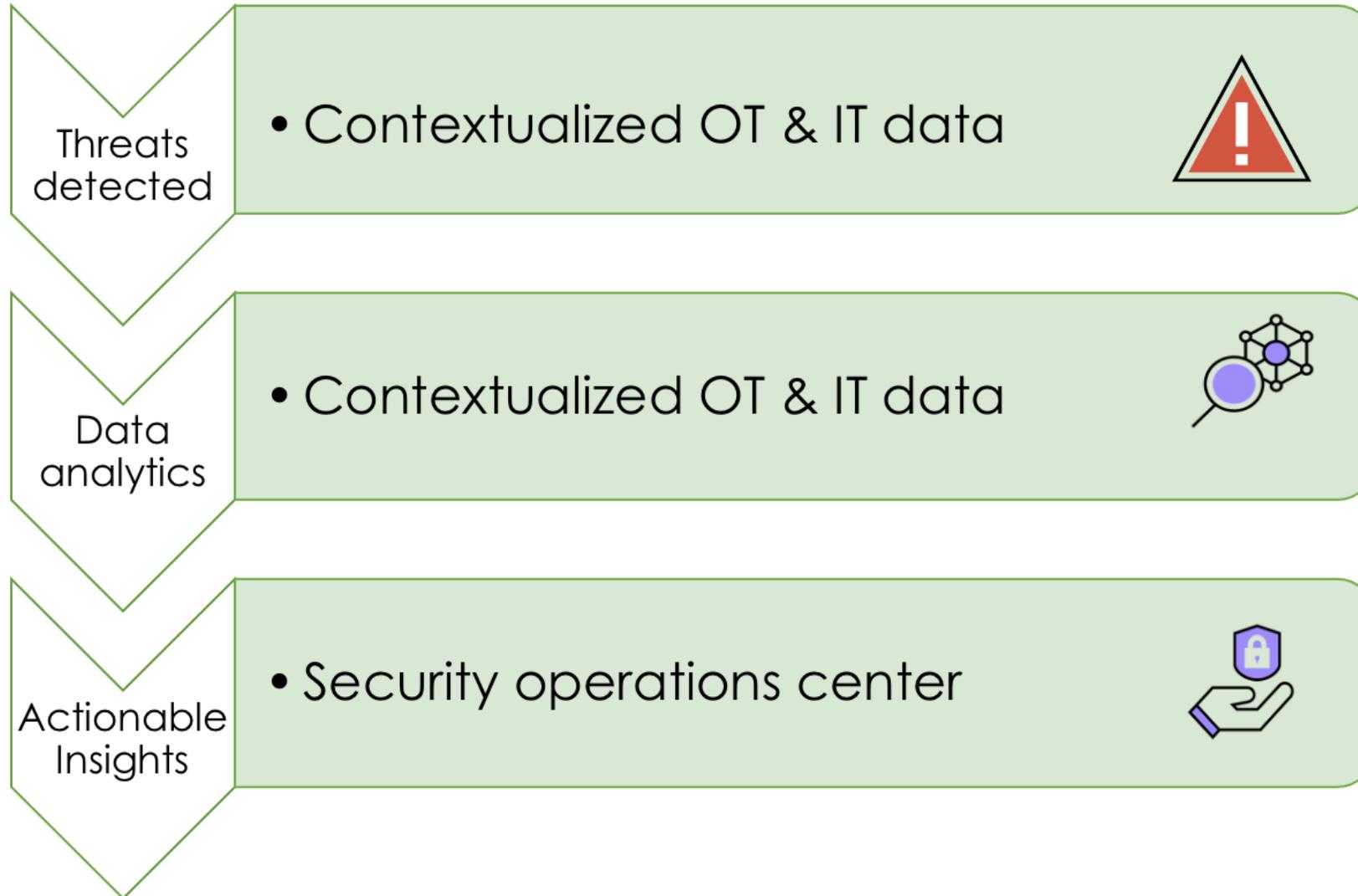
**OT network** monitoring, which does not answer how events relate to **connected assets** and business operations.

Current asset owner **challenges:**

- *Inaccurate* risk assessment and management
- Security Operations Centre experience *alarm fatigue*, lack of alarm priority and limited understanding of business impact



# Data driven security operations center



*Thank You  
for your  
attention!*

