



# Expecting Your IoT Data to Arrive at the Doorstep - Fundamental Importance of Secure Connectivity in IoT Industry 4.0 in Practice, Tallinn

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- Living life at the peak of the hype cycle
- If data is the new oil, how to drill the "IoT deposit"?
- The I in IoT stands for Internet
- Samples of applying ML/AI

Living life at the peak of the  
hype cycle

# Interesting times, indeed

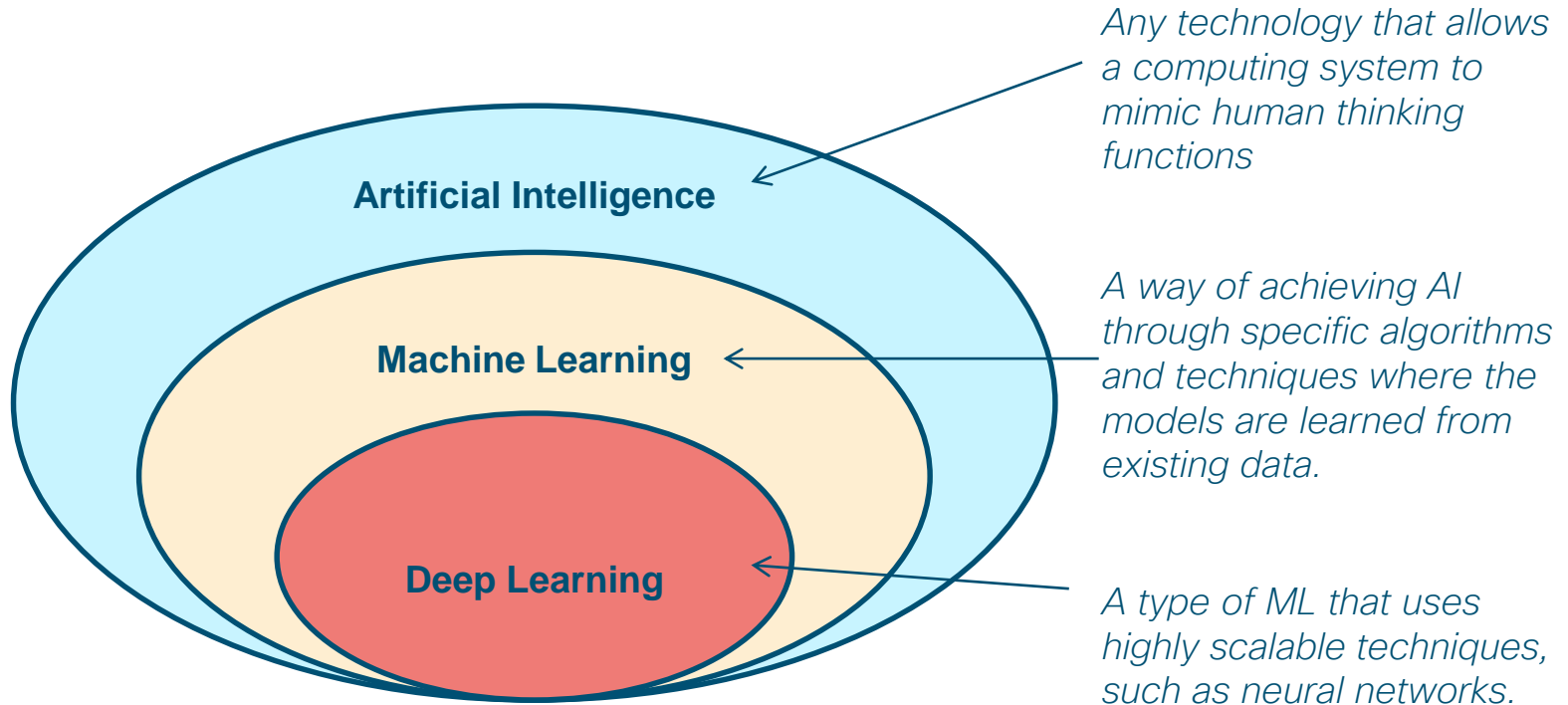
## Technology buzzword bingo

Artificial Intelligence	Cloud-first	Internet of Things
Disruptive	Big Data	Machine Learning
Digital transformation	Hyper-converged	Blockchain

*"What a time to be alive!"*

-Abraham Lincoln, professional buzzword bingo player

# Some definitions



# Or, one of my favorites



**Mat Velloso**  
@matvelloso



Difference between machine learning and AI:

If it is written in Python, it's probably machine learning

If it is written in PowerPoint, it's probably AI

3:25 AM · Nov 23, 2018 · [Twitter Web Client](#)

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**8.3K** Retweets   **23.2K** Likes

**Machine learning** is a type of artificial intelligence (AI) that provides computers with the ability to learn without being explicitly programmed. ...

# Nothing new under the sun?

The hype cycle is actually quite long...



“Perceptron”  
Rosenblatt  
**1958**

“MCP Neuron” /  
Threshold logic  
unit  
McCulloch &  
Pitts **1943**

“Mathematical  
limitations...” ->  
~ can't really  
learn  
Minsky & Papert  
**1969**

CS &  
statistics  
merge  
GPUs  
emerge  
**1990s**

Big  
data is  
THE  
thing  
**2000s**

IoT &  
Social  
Media  
**2010s**

?

1940 1950 1960 1970 1980 1990 2000 2010 2020



# Machine Learning revolution



Data "tsunami"  
Learning

Supervised  
Learning

Develop pre  
models

## Why now?



Computing power

Regression

Linear  
Regression

Neural  
Networks

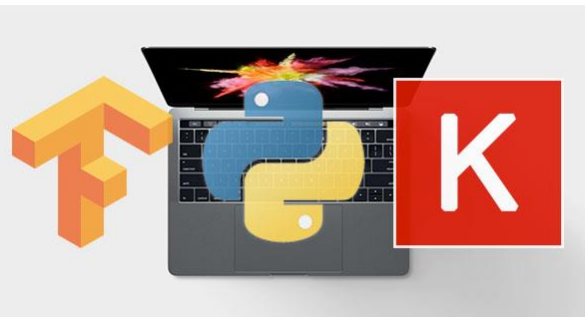
Decision  
Trees

Deep  
Learning

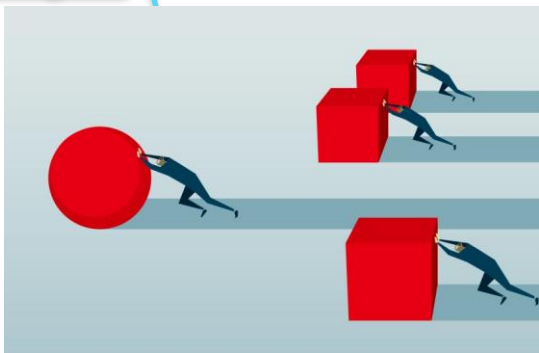
ANN

Clustering

K-Means



Availability of tools







Insatiable desire for efficiency / productivity

# Is it real, then? At least for us it is










## Reinvent the Network

-  Cisco DNA
-  ETA
-  Network Early Warning
-  SD-WAN



## Security is Foundational

-  AMP
-  Cloudlock
-  Cognitive Threat Analytics
-  NGFW
-  Stealthwatch
-  Talos
-  Umbrella






## Power a Multicloud World

-  Hyperflex
-  Intersight
-  UCS








## Unlock the Power of Data

-  AppDynamics
-  Kinetic
-  Tetration

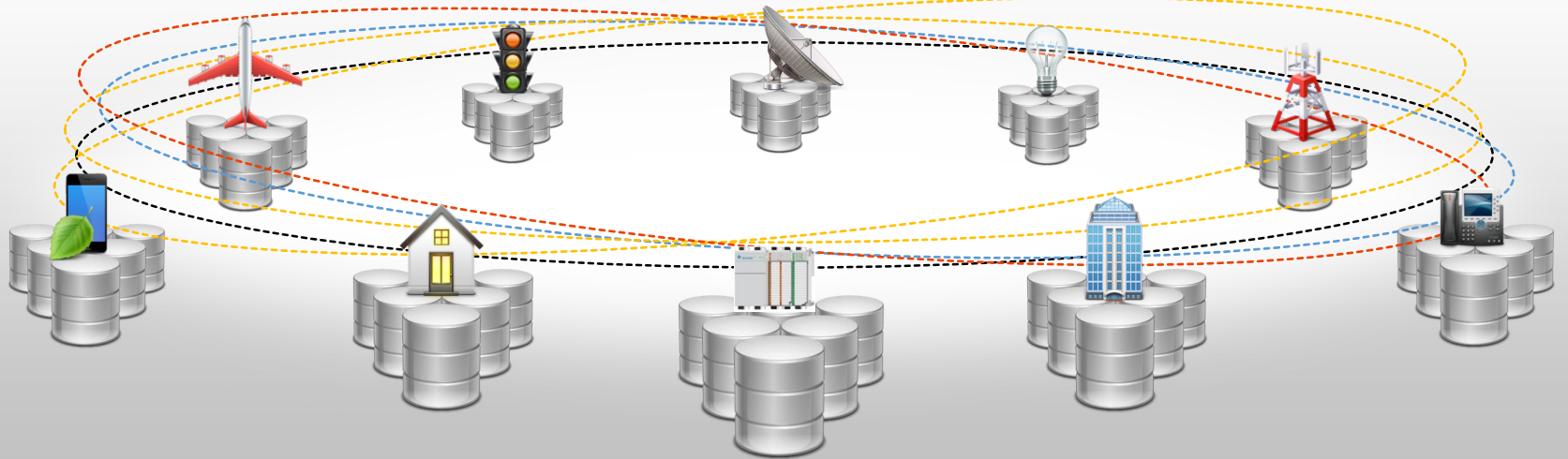


## Create Meaningful Experiences

-  Accompany
-  Computer Vision
-  Meraki
-  MindMeld
-  Talent Trends
-  Webex

# What about IoT, and how it relates to ML/AI?

## IoT ~ Leverage Machine Generated Data and Networking for Business Benefit

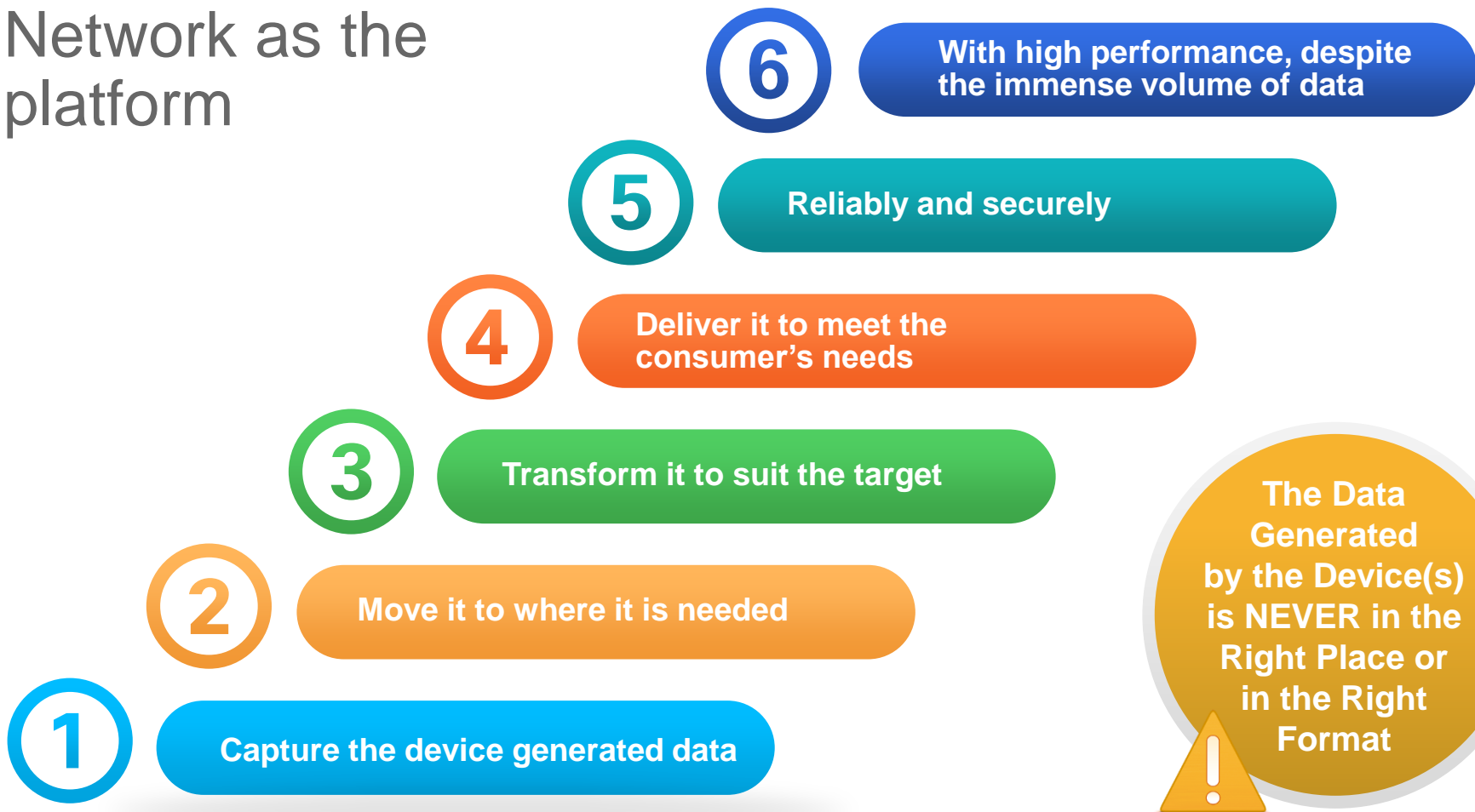


*In IoT, Machine Learning is a foundational tool that can make sense of Big Data and lead to Digital Transformation*

**BINGO!**

If data is the new oil, how to  
drill the "IoT deposit"?

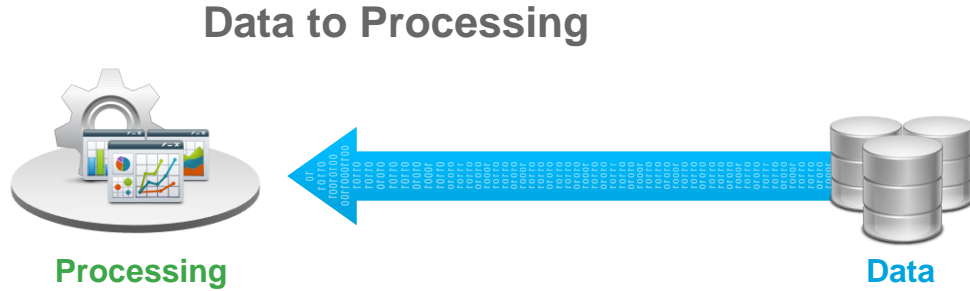
# Network as the platform



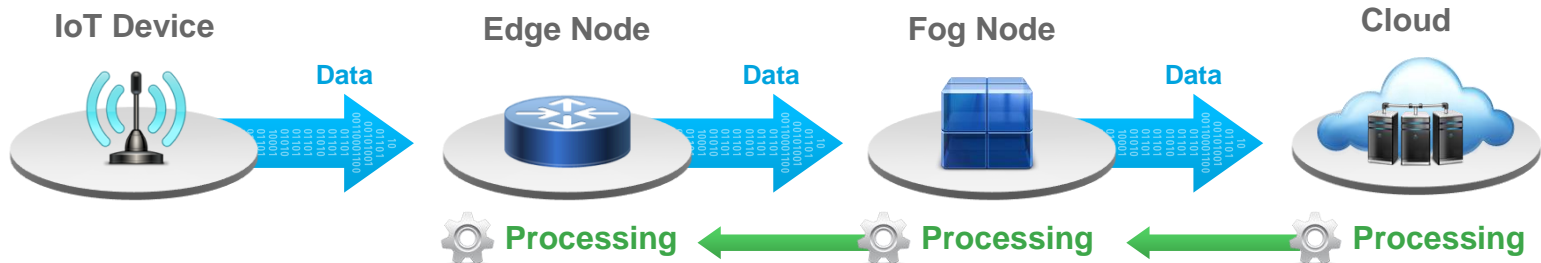
# The IoT Data Fabric

IoT  
Computing  
is a New  
Computing  
Paradigm

- Cloud
- Big Data
- Analytics
- Applications



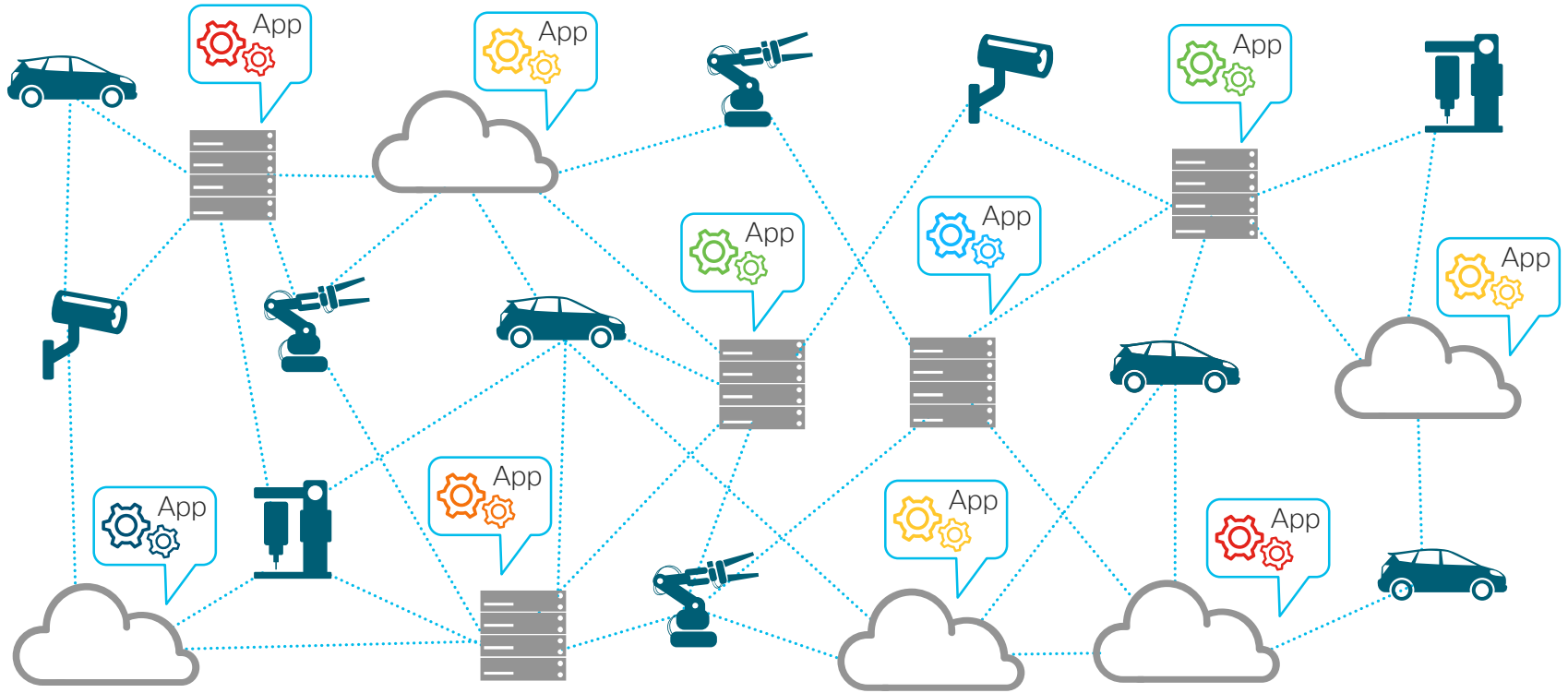
## Processing to Data



The I in IoT stands for  
Internet



“...in IoT, everyone expects their data to arrive at the doorsteps...”



# We have been enabling the Internet (of Things) for a long time

Catalyst 2955 Ruggedized Fast Ethernet switches (2003)



Industrial Ethernet 3000 Switches (launched 2009, still sold today!)



Widening portfolio of IE switches throughout the decade (1k, 2k, 3k, 4k, 5k)

Launch of new Catalyst IE 3x00 switches with modular IOS-XE operating system



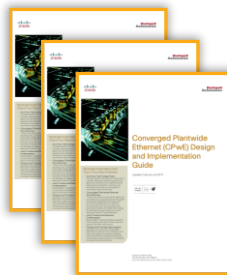
2000

2010

2020



Cisco & Rockwell Automation partnership for Converged plantwide Ethernet



Constantly updated Cisco Validated Designs to reflect the changing requirements & ongoing innovation

Cisco participation in industry standardization efforts (e.g., TSN) & adding Cisco innovation to the mix (e.g., MUD)



Cisco Industrial Automation CVD

Enabling more than **50,000 customers** and growing



CISCO

IoT

Internet of Things

# Why to emphasize the network?

- It is needed
- But it is not trivial to build, scale, and secure
- ...but it is possible (we can help)

It enables the industries to apply ML/AI to the IoT data  
which helps with digital transformation,  
which is a must to survive and thrive  
– do not neglect it!

# Case Study: Turku Energia



## Unifying IT and OT networks to drive threat protection


Over 200,000 Finnish citizens rely on Turku Energia for electricity and heat. Cisco's Extended Enterprise solution helped the company connect its IT and OT networks for an end-to-end infrastructure. With its optimized network, Turku Energia can more effectively supply dependable power across the region.


Watch video


Read case study


- Refreshing the IT and OT networks allowed customer to to:
  - Enable a machine learning solution (Cisco Stealthwatch) for detecting anomalies and malicious events across their network
  - Install a future-proof network that not only serves as a connectivity platform, but also as a distributed computing fabric across the OT network
  - Further information: <https://www.cisco.com/c/en/us/about/case-studies-customer-success-stories/turku-energia.html>


# Get Machine Learning into work with your IoT data


 Complexity of connecting, securing and managing diverse devices


 Flexibility to compute data at the edge, data center and/or cloud

 Data remains locked inside its sources


 No programmatic way to move right data to right apps at right time


 No software control to enforce ownership, privacy & security

 Diverse devices are connected, securely and reliably


 Compute data at all places where it is valuable

 Extracts data and makes it usable

 Programmatically moves right data to right app at right time

 Executes policies to enforce data ownership, privacy and security

Samples of applying ML/AI



*“...and then we apply  
some AI and it takes  
care of the rest....”*



Cisco WebEx Meeting Center

Quick Start Meeting Info

Eric Chen's Personal Room

Meeting number: 344 717 178

Leave Meeting

Connected to Audio

Share Screen

Invite & Remind

Copy Meeting URL

Chat

Mute

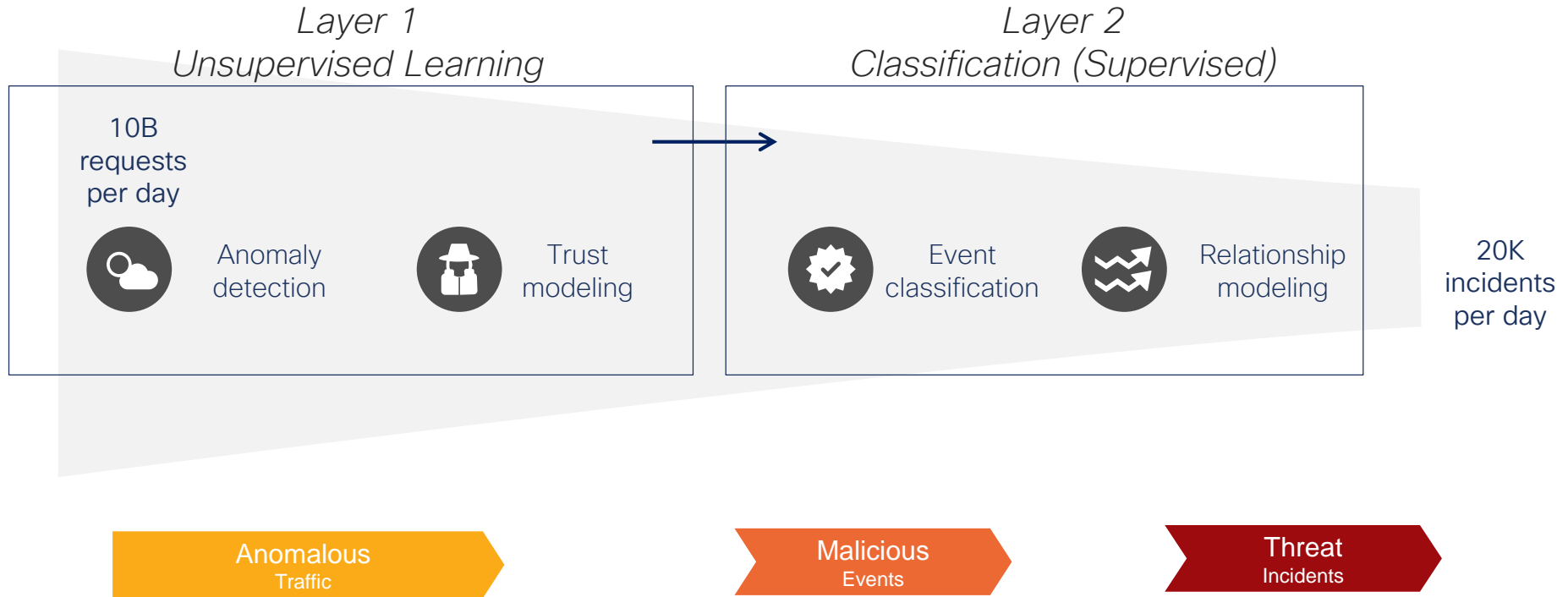
Disable noise detection

Guest (me)

Eric Chen (Host)

Connected

# Cisco Cognitive Threat Analytics



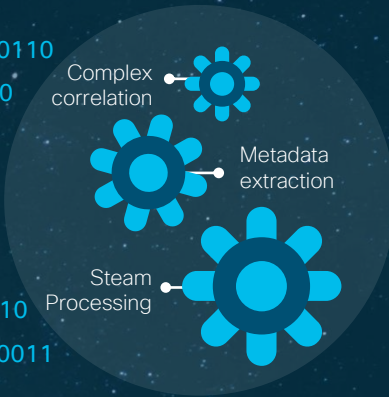
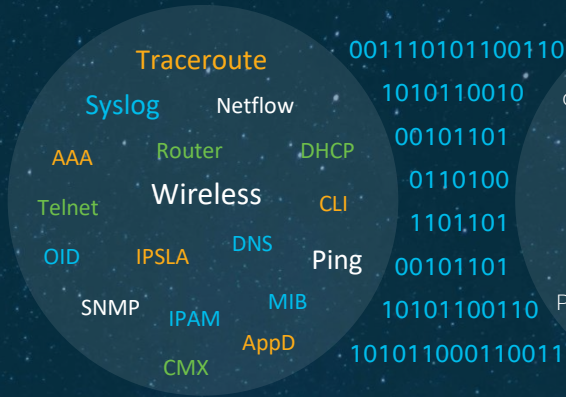
# How Does it All Work? Assurance

Network Telemetry  
Contextual Data

Correlation  
Complex Event  
Processing

Issues Insights

Guided  
Remediation



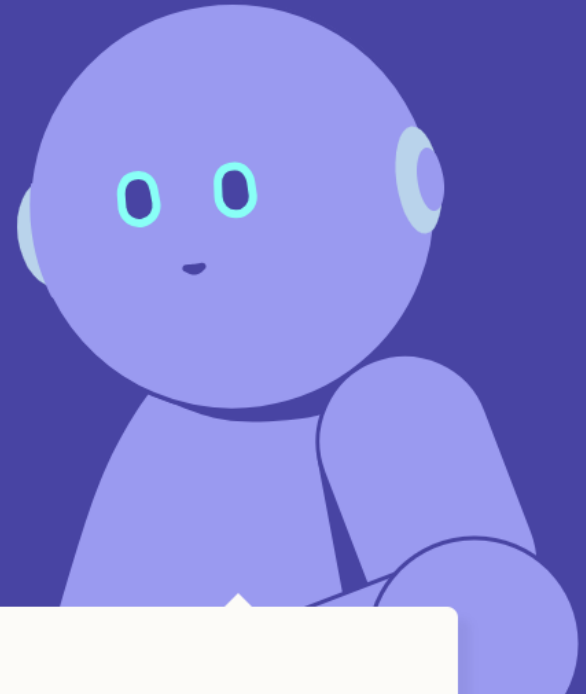
Everything as a Sensor

Over 100+ Actionable Insights

Client | Applications | Wireless | Switching | Routing

# Welcome to the Elements of artificial intelligence free online course

Start the course



- Do you wonder what AI really means?
- Are you thinking about the kind of impact AI might have on your job or life?
- Do you want to understand how AI will develop and affect us in the coming years?

**Then this is the course for you!**

Reaktor



UNIVERSITY OF HELSINKI



Thank you!

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