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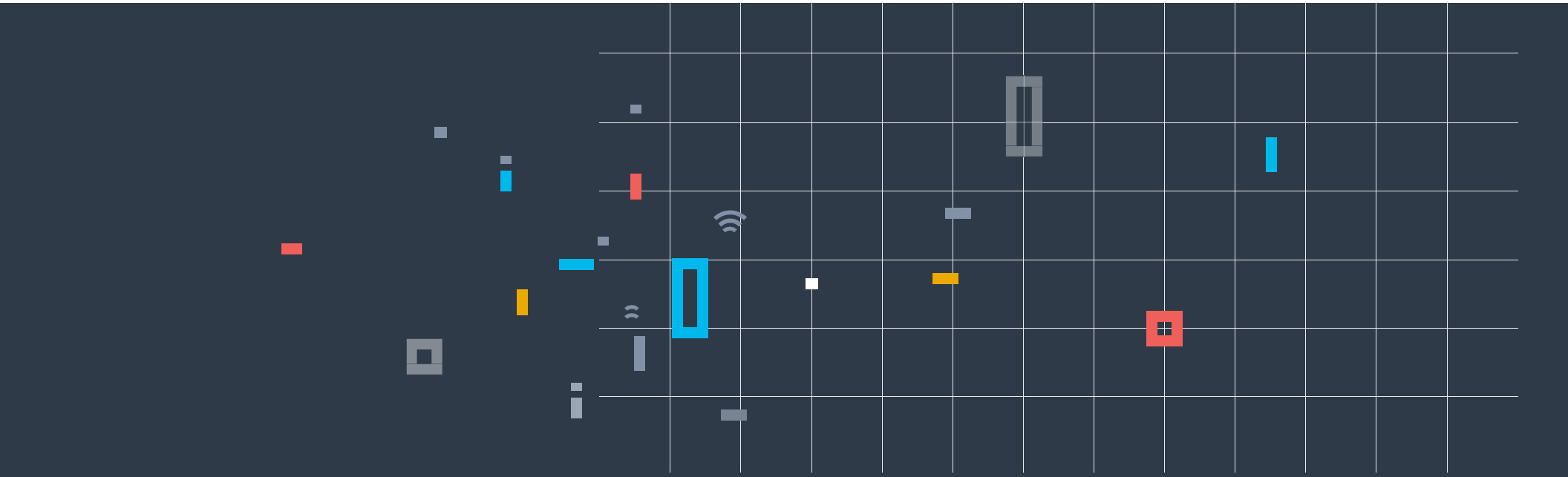
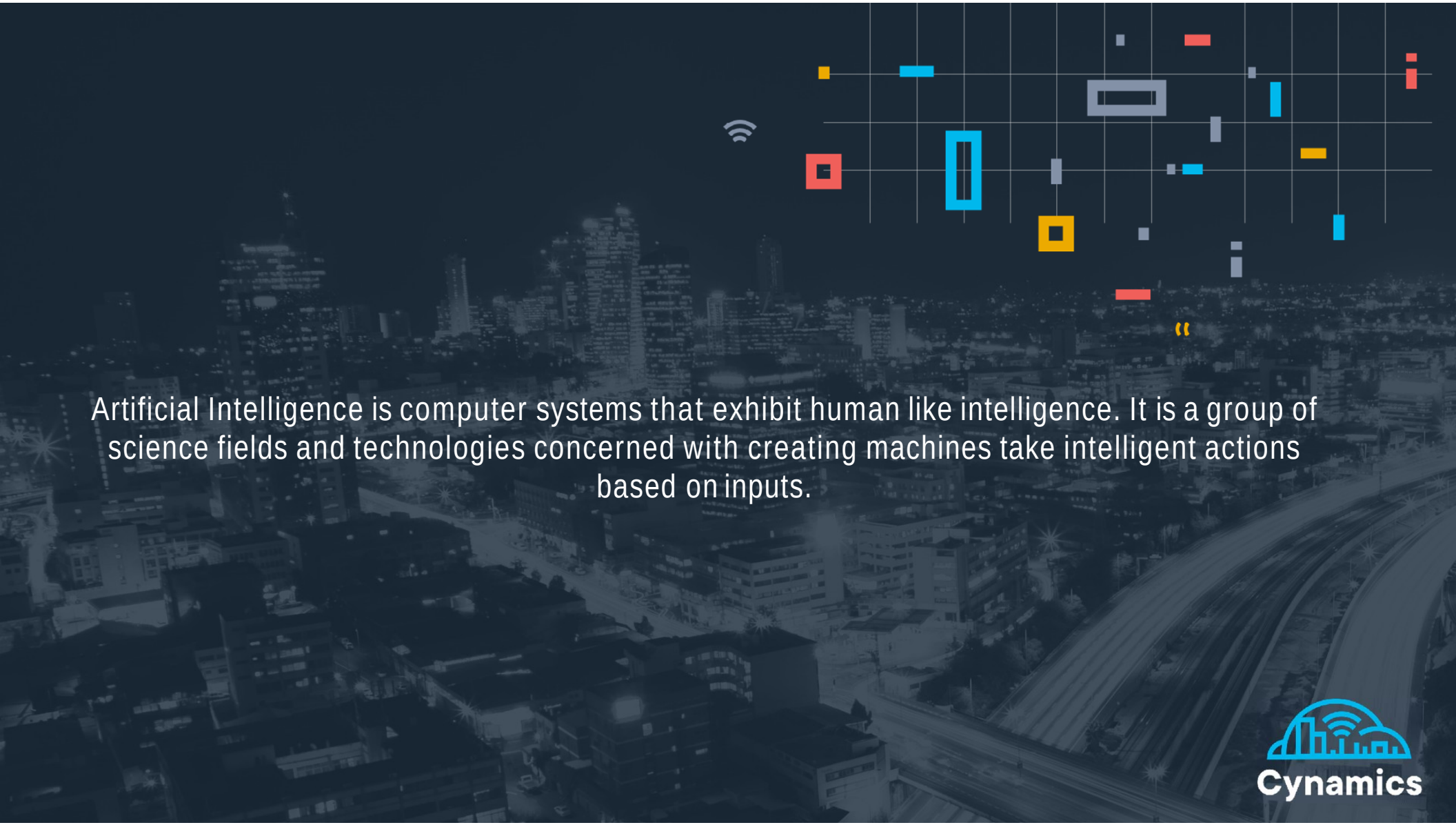
Emerging Technology Forum

Cybersecurity of Tomorrow
From Detection to Prediction

October 8th, 2019



Artificial Intelligence


Artificial Intelligence is computer systems that exhibit human like intelligence. It is a group of science fields and technologies concerned with creating machines take intelligent actions based on inputs.
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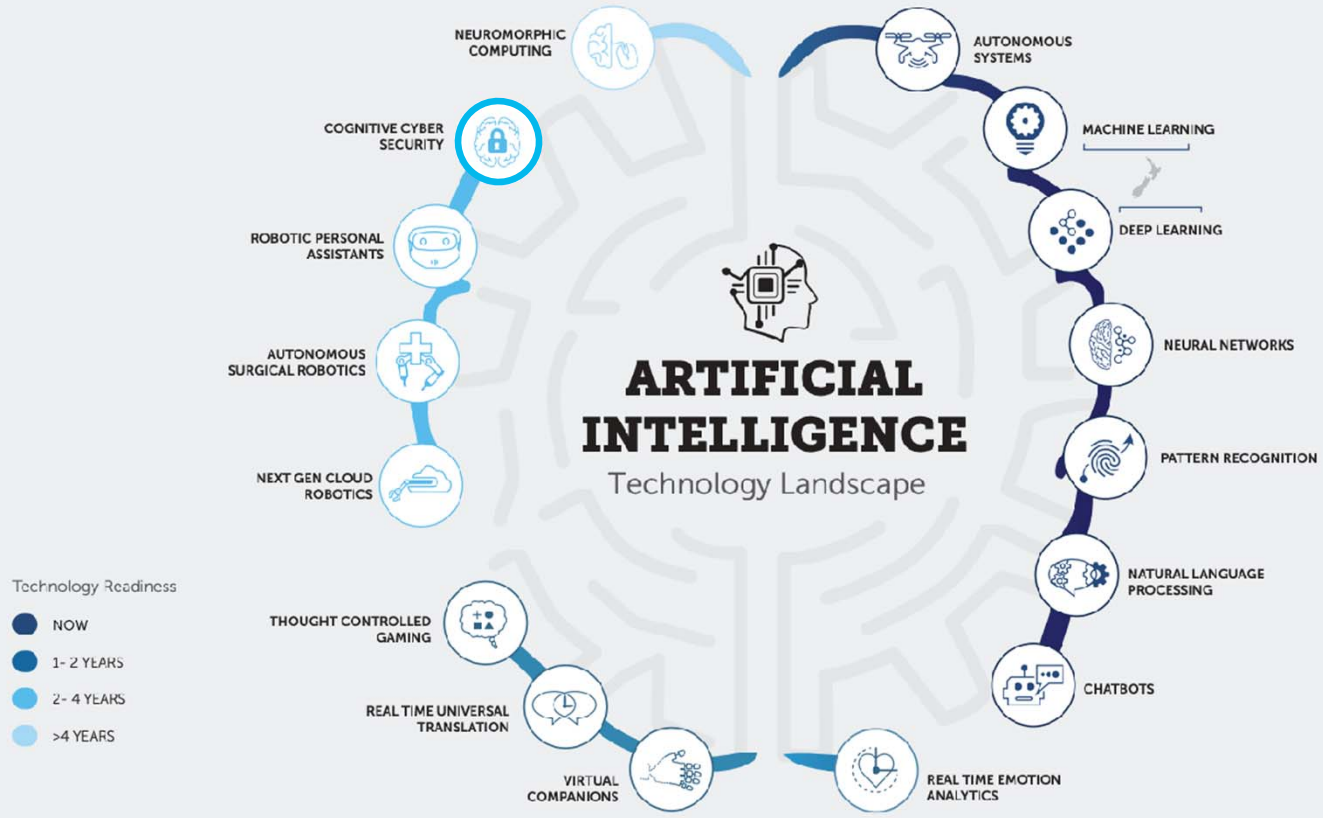
Where?



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Examples

DEEP LEARNING

A high powered type of Machine learning algorithms that uses a cascade of many computing layers. Each layer uses the input from the previous later as input.

Enabled by Neural networks. Given big data sets, Deep Learning algorithms are great at pattern recognition, and enable things like, speech recognition, image recognition, natural language processing. The combination of neural networks (enabled by the cloud), machine learning technology, and massive data sets (the internet), has made Deep Learning one of the most exciting AI sub-fields recently.

EXAMPLES: Google's DeepMind beating the best human at the game "Go"

MACHINE LEARNING

Algorithms that can learn from and make predictions on data. Overlaps with Computational Statistics. Overlaps with Bayesian Statistics. Underpins Predictive Analytics. Underpins Data Mining.

Three subgroups:

- Supervised learning the system is presented with example inputs and known desired outputs and learns how to map inputs to outputs
- Unsupervised learning The system finds patterns without requiring example inputs and outputs.
- Reinforcement learning The system is "rewarded" when it gets something right and learns as a result.

EXAMPLES: Recommender systems (Like NZ's own Movio which recommends movies)

Xero uses Machine Learning for automated processes (like automated cost-coding)

WEKA at the University of Waikato

JV between Goat Ventures and Minter Ellison for legal AI

AUTONOMOUS SYSTEMS

Autonomous robots, self-driving vehicles, drones, all enabled by AI.

EXAMPLES: HMI Technologies (trial at Chch Airport)

PATTERN RECOGNITION

A branch of Machine Learning and Deep Learning which focusses on recognition of patterns in data.

EXAMPLES: DeepFace, (Facebook)

NATURAL LANGUAGE PROCESSING

Technologies that enable computer systems to interact seamlessly with human languages.

Includes:

- from written language and speech recognition),
- sentiment analysis (understanding the sentiment underneath what is being said)
- translation
- understanding meaning within text/speech
- language generation

Note - experts believe that another technological breakthrough is required before systems can truly interact seamlessly with human languages.

EXAMPLES: Siri, Alexa, Cortana

NZer Mark Sagar's new company Soul Machines

NZ company Entopix (Natural Language Processing consultancy)

NZ Company Booktrack

THOUGHT CONTROLLED GAMING

The application of AI, wearable technology, and brain computing interface technology to enable seamless interaction with social gaming environments in real-time, through avatars without the need for joystick type devices.

EXAMPLES: Emotiv, Games Research Lab (Columbia Uni)

VIRTUAL COMPANIONS

Cloud connected, Virtual Reality based avatars powered by AI engines that can behave and interact just as a human would.

EXAMPLES: Digital companions that provide caregiving companionship for the elderly.

REAL TIME EMOTION ANALYTICS

The application of AI to analyse brain signals, voice and facial expression to detect human emotions.

EXAMPLES: Emotiv

REAL TIME UNIVERSAL TRANSLATION

The application of Natural Language Processing to enable two humans (with no common language) to understand each other in real-time

EXAMPLES: Microsoft Translator

NEXT GEN CLOUD ROBOTICS

Convergence of AI, Big Data, Cloud and the as-a-Service model will enable a cloud based robotic brain that robots can use for high powered intelligent and intuitive collaboration with humans

EXAMPLES: Cloud Minds

AUTONOMOUS SURGICAL ROBOTICS

Cloud based AI platforms can help robotic surgeons to perform precise surgeries by learning from large historical surgical data sets (like video)

EXAMPLES: Imperial College of London, MIT

COGNITIVE CYBER SECURITY

Cloud-based AI systems trained on historical cyber threat data, capable of mitigating real-time cyber threats

EXAMPLES: Cynamics

ROBOTIC PERSONAL ASSISTANTS

Cloud base AI learns from Big Data to enable human-like social robots that can perform usefully as personal assistants

EXAMPLES: Kuka Robotics Boston Dynamics

NEUROMORPHIC COMPUTING

Future generation computing hardware that mimics the function of the human brain in silicon chips.

EXAMPLES: The Human Brain Project

IBM's TrueNorth processor chip

NZ's Professor Simon Brown at University of Canterbury

CHATBOTS

A software robot that interacts with humans online receiving and sending conversational text with the aim of emulating the way a human communicates. An example of Natural Language Processing.

EXAMPLES: Kiwi start-up Jude.ai (an AI based financial advisor)

Kiwi company Wine Searcher

NEURAL NETWORKS

Computing systems that organises the computing elements in a layered way that is loosely modelled on the human brain. Enables Deep Learning.

EXAMPLES: The computing system that sits behind Baby X at Auckland Uni

NZ's Professor Kasabov at AUT (Neucube)

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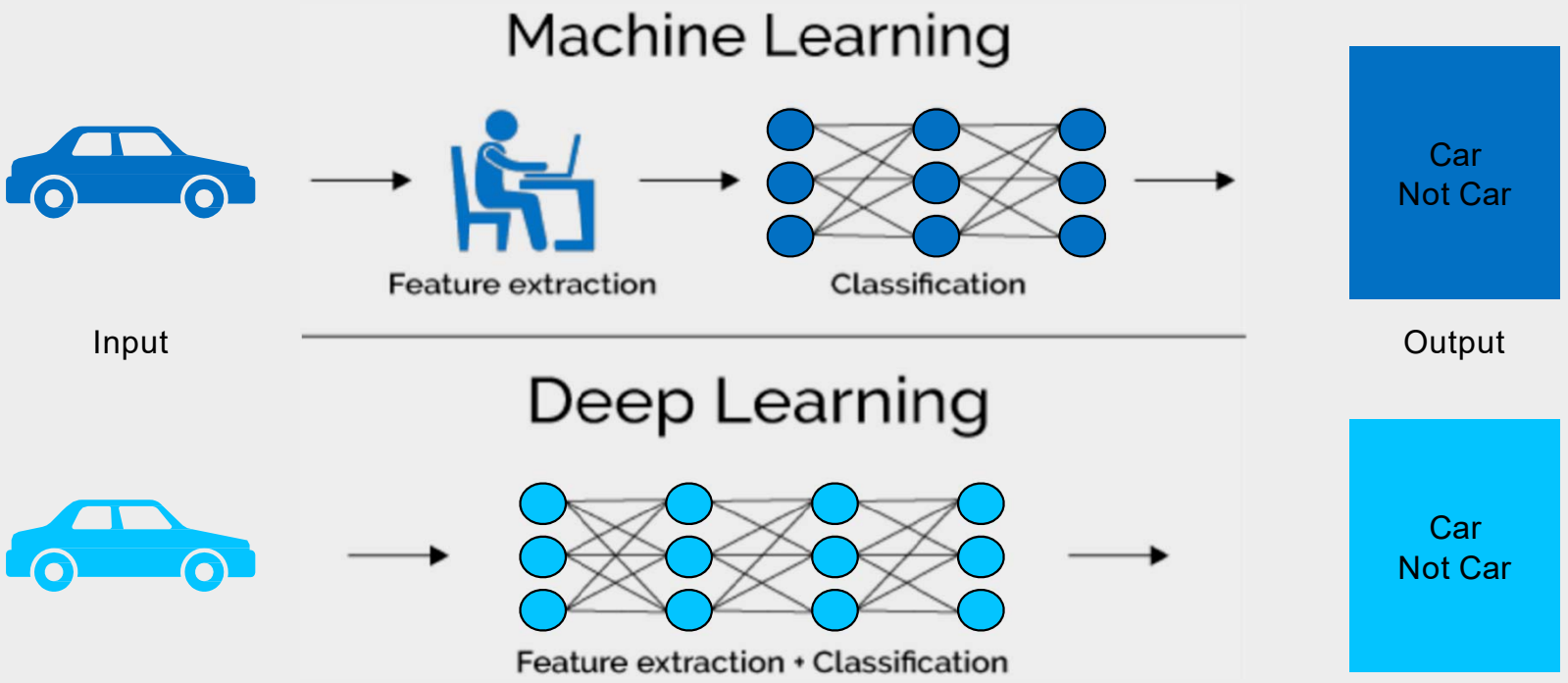
ML - DL



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Cybersecurity & Artificial Intelligence ?

Building the impossible...

AI, learns with each interaction to connect the dots between threats and provide actionable insights.
The result: You can respond to threats with greater confidence and speed.

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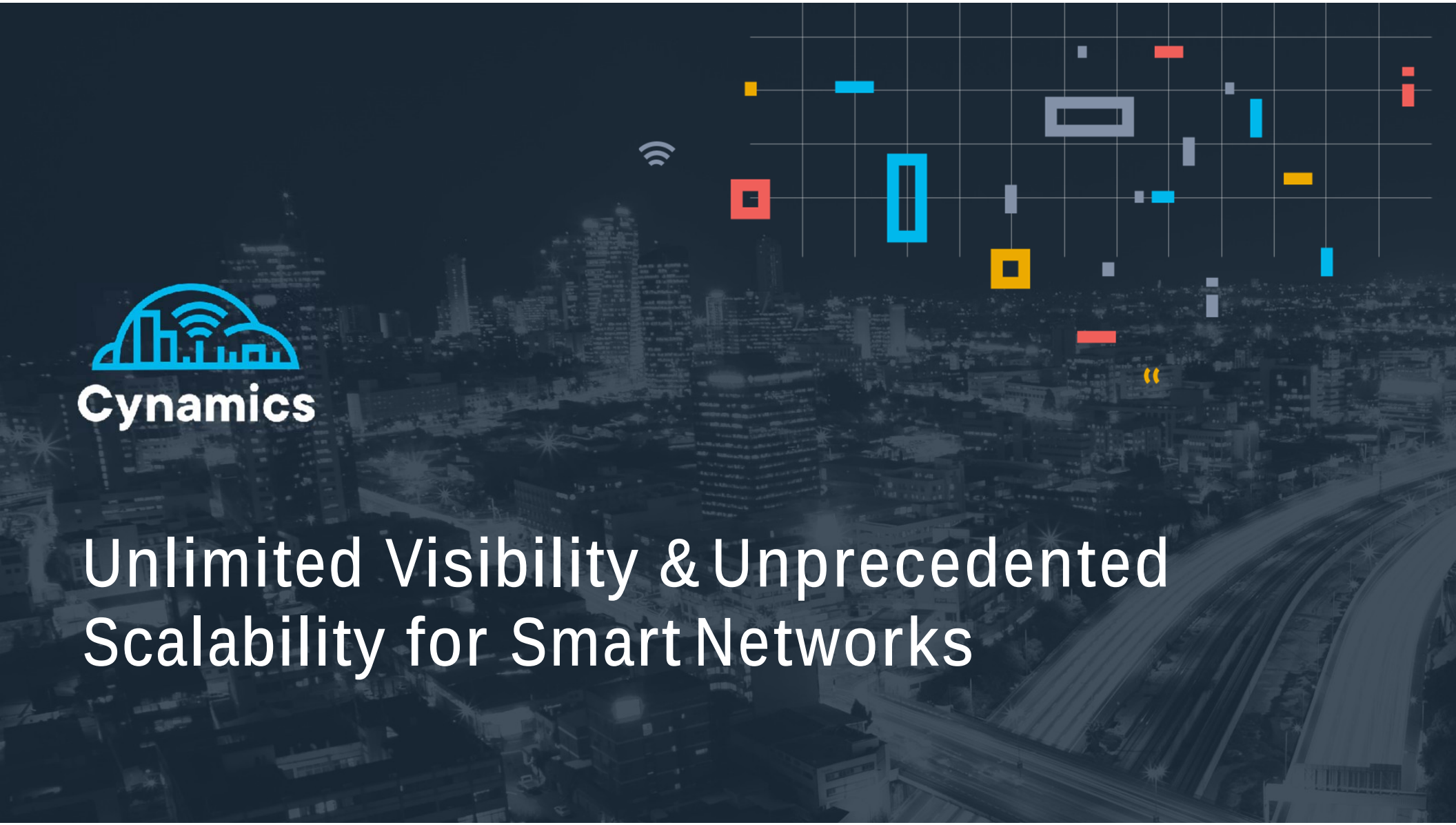
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Unlimited Visibility & Unprecedented Scalability for Smart Networks

Smart Cities

Smart cities are comprised of diverse and interconnected components constantly exchanging data from various endpoints and through various networks.

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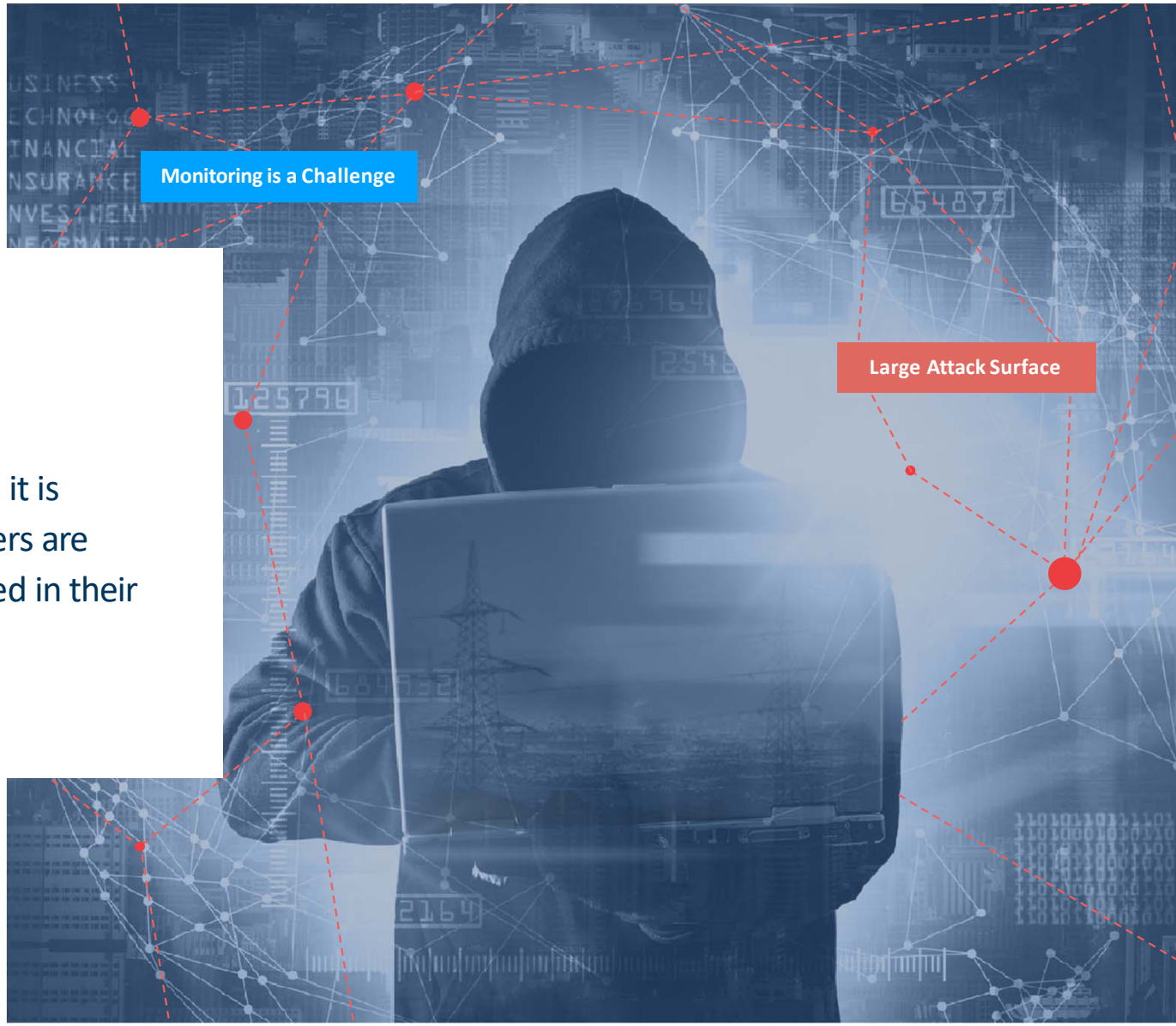
Utility Sector

The grid becomes more connected it is opening new lines of attacks. Hackers are becoming increasingly sophisticated in their attempts to disrupt electric grids.



Public Safety

NG9–1–1 will allow Public Safety Answering Points (PSAPs) to accept and process a range of information from responders and the public, including text, images, video, and voice calls. These new capabilities introduce several different backdoors for cyber criminals to exploit.

BENEFITS

NG9–1–1 will enhance response capabilities

- Enable receipt of data (e.g., video, text) from the public over a variety of networks
- Enable cal transfer and data sharing among PSAPs
- Improve location data
- Allow for virtual PSAPs for survivability

RISKS

NG9–1–1 is different from traditional systems

- Requires standardised identity management and credentialing across systems
- Allows for potentials attacks to quickly escalate or proliferate across systems
- Introduces new attack vectors

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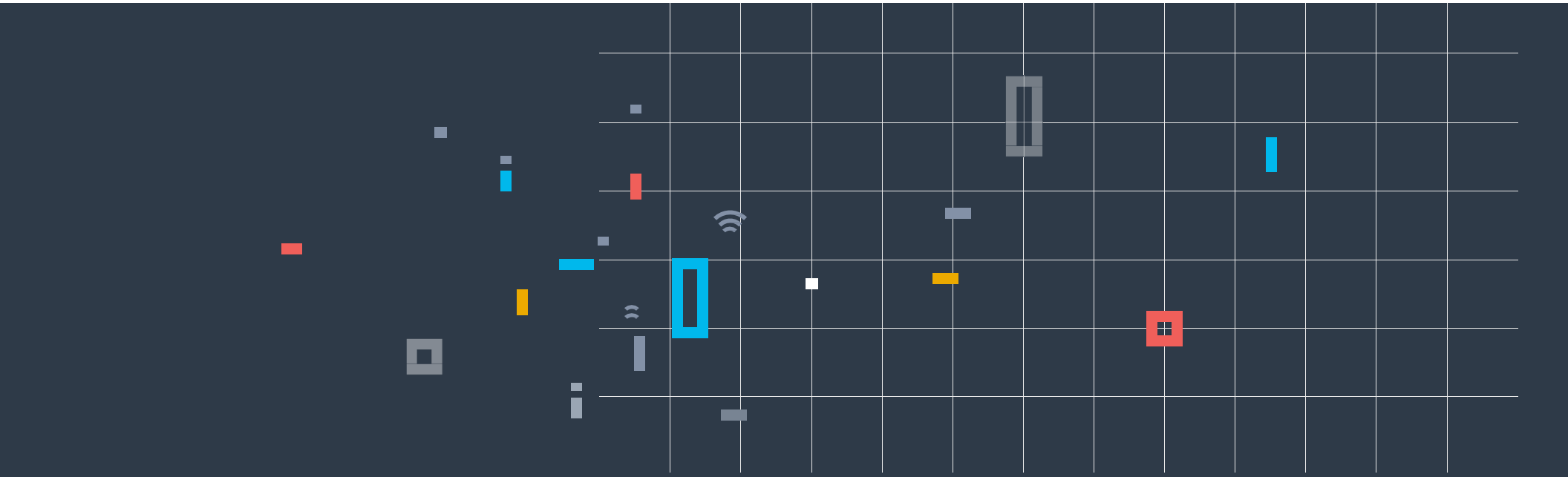
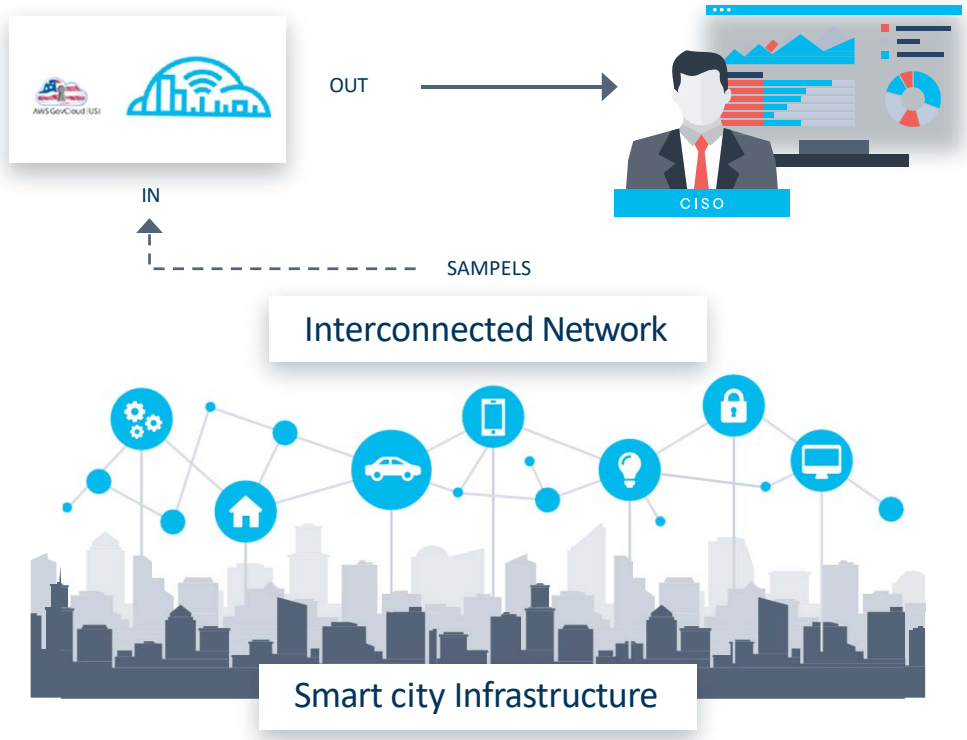


A.I Technology

AI Based Network Visibility

100% network visibility from 1% traffic samples



An advance solution using a unique AI technologies to infer complete network visibility from small traffic samples and able to fast and accurately detect attacks and network anomalies

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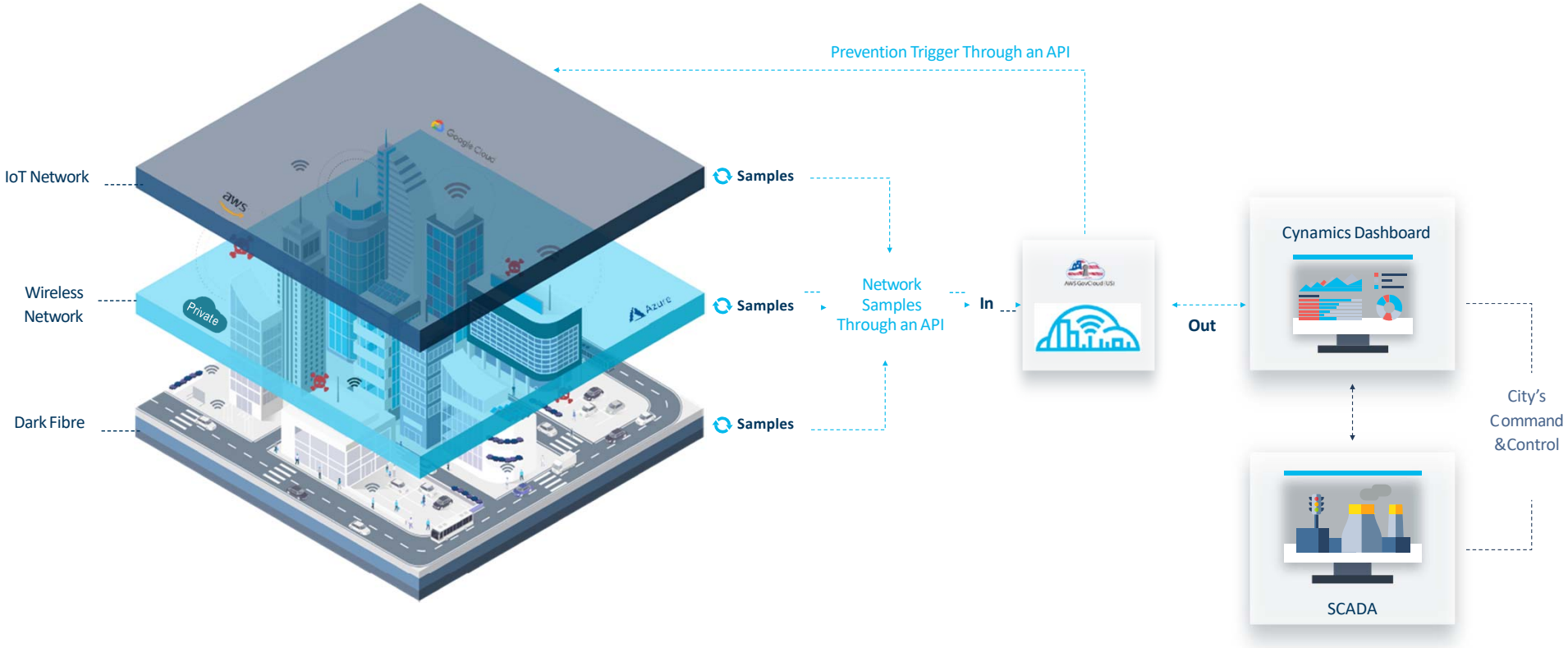
Architecture



Dashboard

The dashboard enables:

- Attacks and anomalies detection
- Security forensics and analysis
- Continuous real-time network monitoring, analytics and stats
- Creating user-defined notifications

Query across dozens of data fields, multiple groups-by dimension, metrics, and filters:

- Drill down on specific aspects
- Results in seconds

Wide variety of performance, traffic and network metrics:

- Volume stats (average Mb/sec, min, max, top flows)
- Number of flows
- Number of packets

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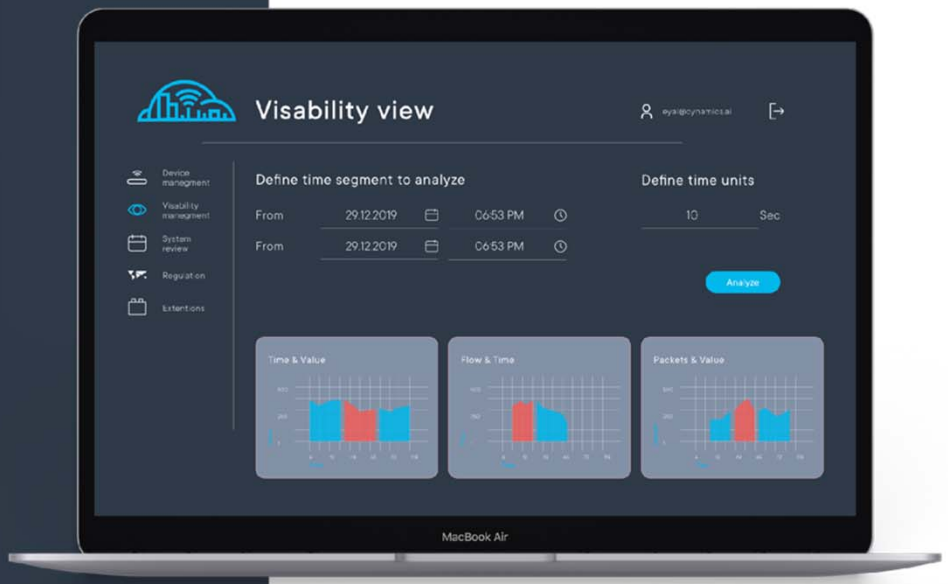

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Value Proposition

- No Network Modification
- SaaS Based Solution
- No Agent Installation
- Cost Effective
- View Multiple Networks
- Rapid Setup

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Thank You!

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