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# LESSONS LEARNED USING AI TO IMPROVE NETWORK PERFORMANCE & SECURITY

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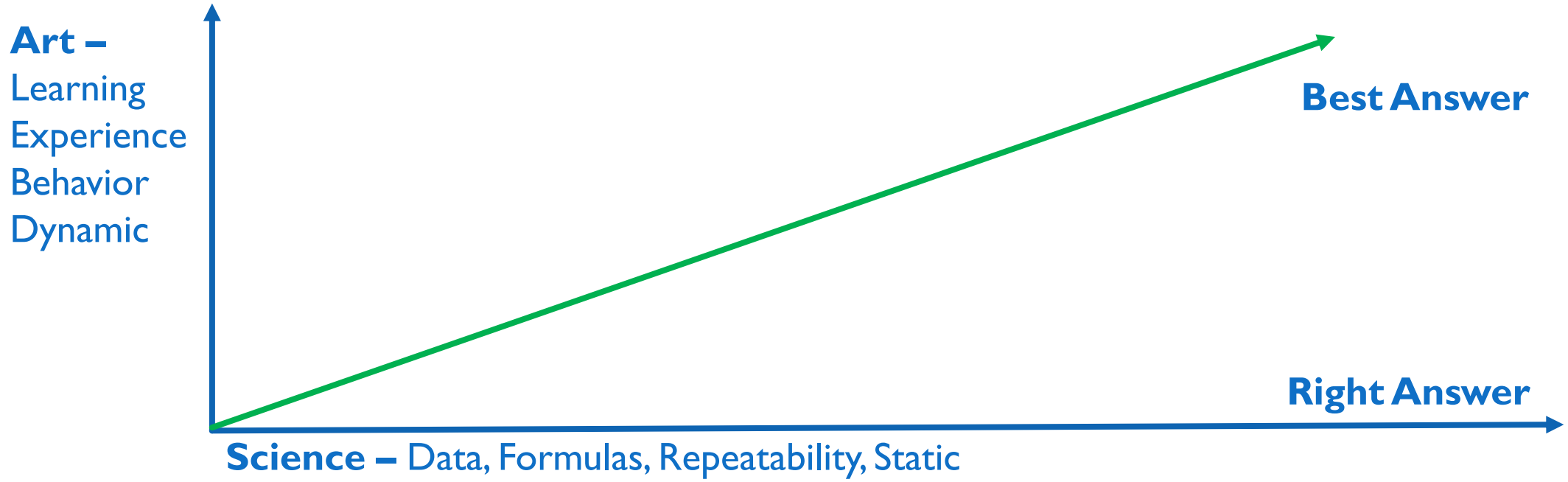
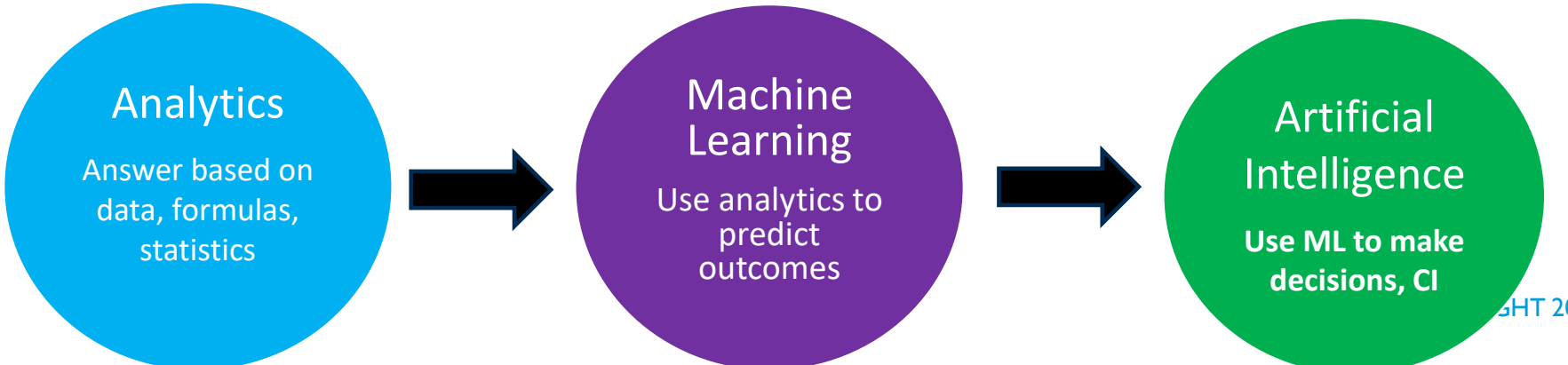
# AI LEVEL SET – THE RIGHT ANSWER VERSUS THE BEST ANSWER



# LESSON #1 – USE AI TO DO THE BASICS WELL

**Use Case:** Global Manufacture Needing Additional Operational Technology (OT) Security

**Business Drivers:** Cyber-security risk management and keeping cyber-insurance costs in-line which had gone from $20M to $30M in the past year

**Process:** Bring in 3rd party consultants/experts, gather requirements, go to RFP, select vendor, pilot, rollout, and continuously improve including measuring and managing results.

**Why AI** – Dynamic environment with limited resources so needed a system to help prioritize projects and keep the enterprise risk score up to date in near real-time.

**Lessons Learned:** While AI-Ops and SOC are maturing, using AI to do foundational work such as building an active inventory and real-time risk assessment still has a ways to go. If you do not do the basics well, the fancy stuff and the value are minimized.



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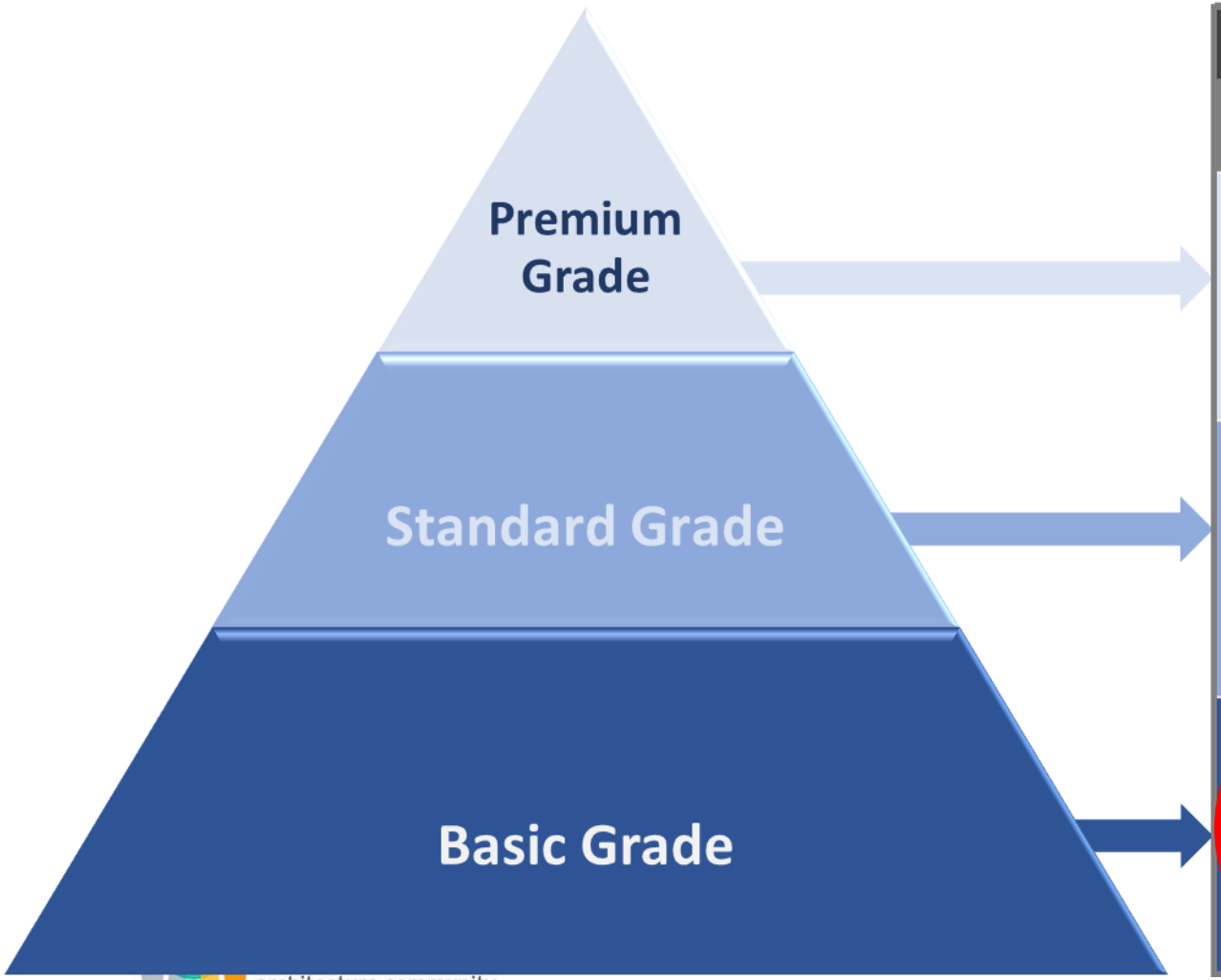
# LESSON #1 – USE AI TO DO THE BASICS WELL - CONTINUED




| Characteristics for each Security Tier | | | | | |
|---|---|---|---|---|---|
| Inventory | Network | UTM | SPAN | IAM | SIEM |
| LPA | Zero Trust | Proxy, DLP | Active | MFA (6x) | AI/ML Baseline, Anomaly Detection |
| Dynamic | Micro-Segments | IPS | Passive E-W | NAC | Event ID, Classifica-tion |
| Static | OT Segment | Firewall | Passive N-S | MAC | Logging |



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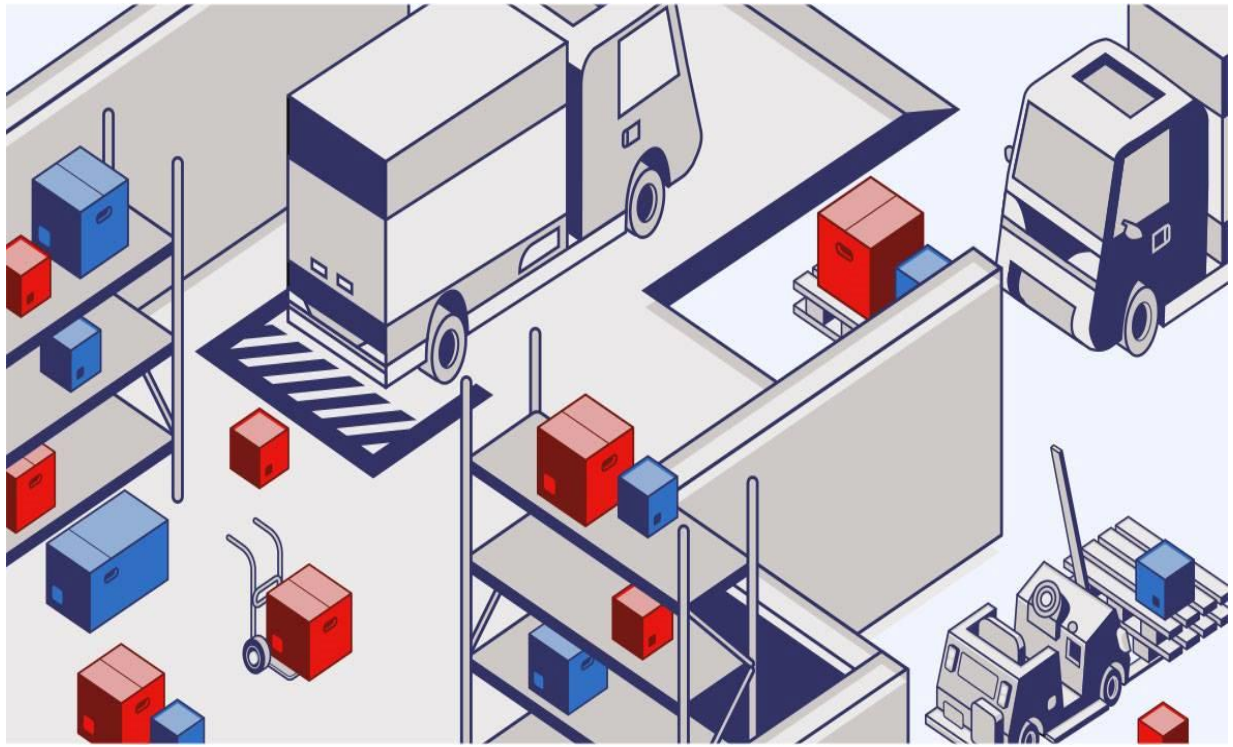
# LESSON #1 – USE AI TO DO THE BASICS WELL - CONTINUED

## Inventory Management

1) **Identify everything connected**
   a) Device manufacture & function
   b) OS and patch version
   c) Protocols used
   d) Criticality
2) **Sort who is talking to what**
   a) IP addresses and TCP/UDP Ports
   b) Sessions and volumes
3) **Identity and access management**
   a) Local
   b) Remote
4) **Risk Score**





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# LESSON #1 – USE AI TO DO THE BASICS WELL - CONTINUED

**Detect insider threats**

- Analyze behavior of users with access to sensitive data
- Detect unusual activities

**Natural next step in threat detection**

- Signatures → Correlation → ML
- All are needed to mitigate modern threats

**Higher fidelity risk scoring**

- Risk assignment based on deviation instead of static rules or event count

**Intuitive analysis of alarms**

- Generalized behavior profiles enable rapid response
- Alarms natively include user and entity context



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# LESSON #2 – UPGRADE TO PRECISION TIME PROTOCOL

**Use Case:** Large Financial Institution Driving Down Fraud

**Business Drivers:** Cyber-security thieves are getting smarter and the amount they are stealing is growing by double digits per year.

**Process:** Bring in 3rd party consultants/experts, gather requirements, go to RFP, select vendor, pilot, rollout, and continuously improve including measuring and managing results.

**Why AI** – The ability to tracking a transaction across 100+ systems and identify anomalies and risks in near-real time and automatically keep tuning to minimize false positives.

**Lessons Learned:** When dealing with applications that span hundreds of systems, upgrading from Network Time Protocol (NTP) which is accurate to 20-30ms to Precision Time Protocol which is accurate to 10-15 micro-seconds helps with event correlation and shotgun attacks.





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# LESSON #3 – CORRELATION BETWEEN SYSTEMS YIELDS RESULTS

**Use Case:** Large U.S. Retailer

**Business Drivers:** Improve WiFi experience for shoppers and track their behavior within a physical store while also helping reducing theft

**Process:** Bring in 3rd party consultants/experts as a trusted advisor to help optimize investment

**Why AI** – Merging video data with network data provided business insights not seen before.

**Lessons Learned:** Tons of data and being able to anonymize the data while also tracking patters could predict things like flash theft in ways not see before. End-to-end monitoring provided a more consistent end user experience.





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# LESSON #4 – ITS ALL ABOUT THE DATA

**Use Case:** All clients that I have worked with in the past few years

**Business Drivers:** Better return on technology investment to help drive measurable business results in a dynamic digital economy.

**Process:** Bring in 3rd party consultants/experts as a trusted advisor to help optimize investment

**Why AI** – The next evolution in processing data

**Lessons Learned:** Tons of data and being able to anonymize the data while driving outcomes is half science and half art. It is amazing how much data can be collected.





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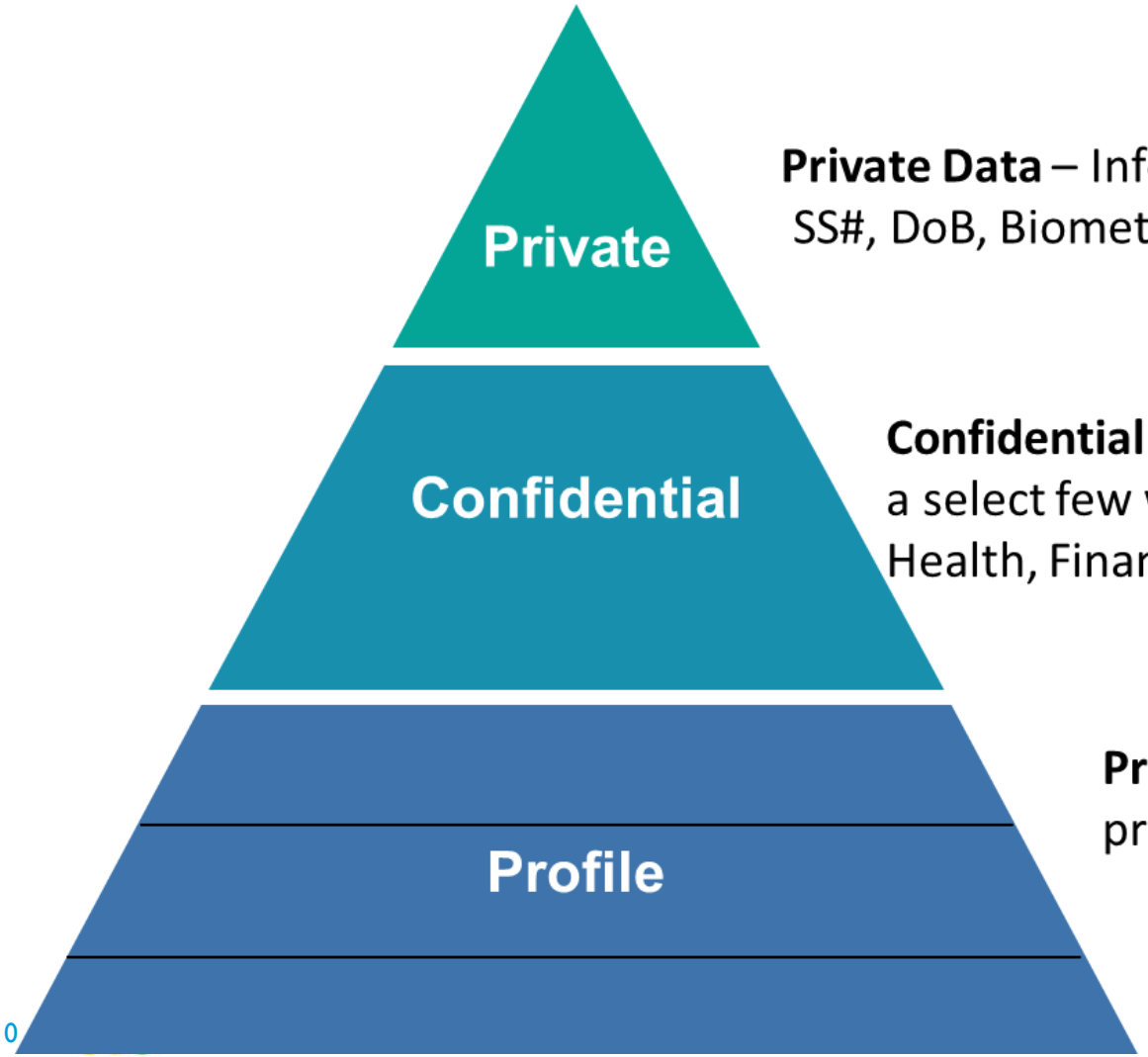
# LESSON #4 – DATA CONTINUED – DATA CLASSIFICATION




**Private Data** – Information used to personally identify someone.
SS#, DoB, Biometrics, Username/password

**Confidential Data** – Information that is secret, yet shared with a select few with express consent of the individual.
Health, Financial, Legal

**Profile Data** – Information about someone's preferences, location, history, connections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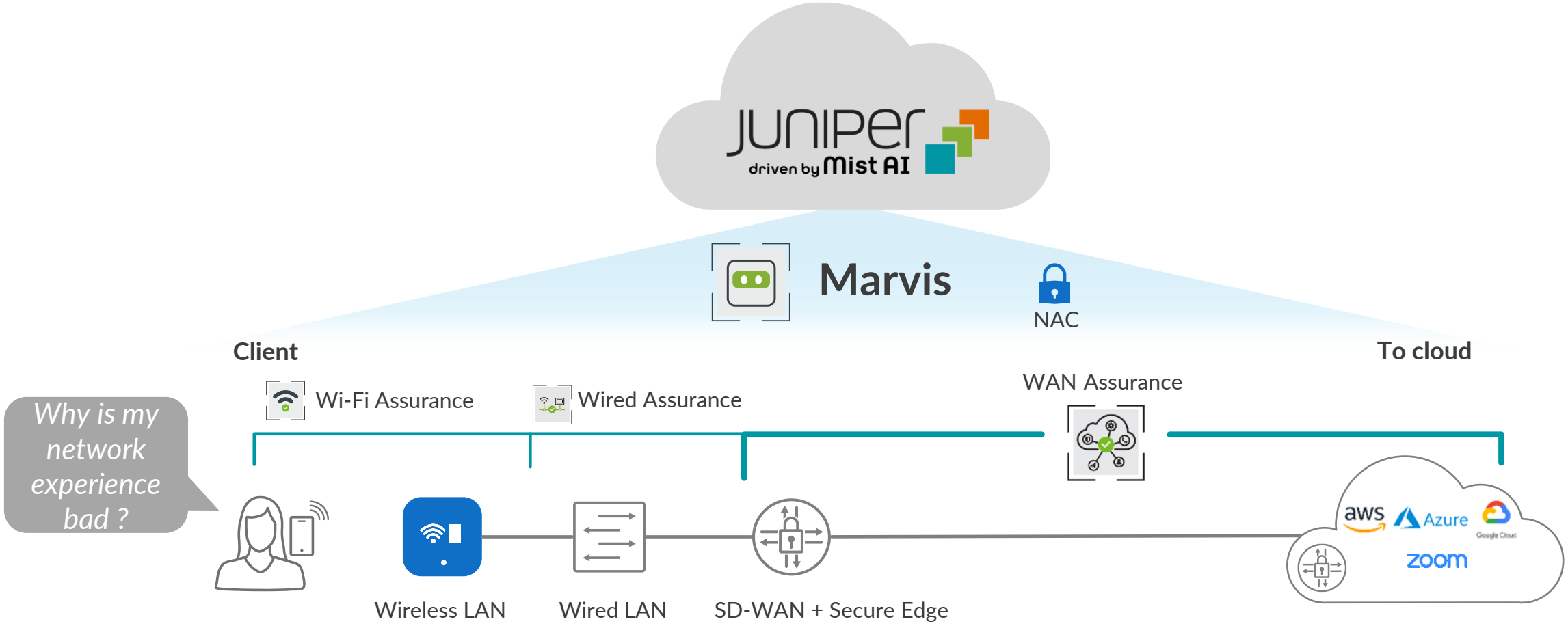
# MY JOURNEY WITH AI – STARTED WITH JUNIPER MIST



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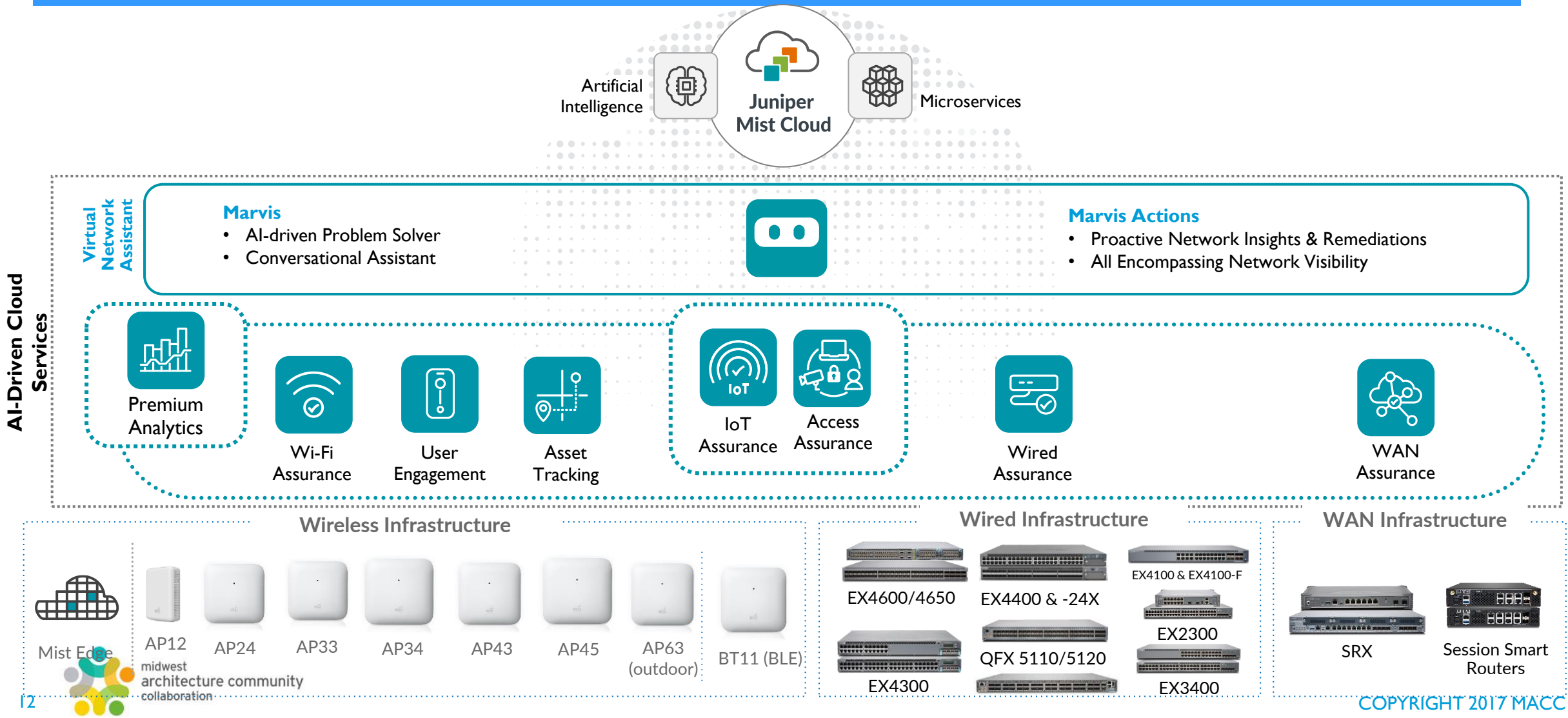


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# MY JOURNEY WITH AI – STARTED WITH JUNIPER MIST - CONTINUED

Marvis Client: Android, Windows

3rd Party

Graph DB

WAN-Marvis

Graph ML

NLP/ NLU

*(natural language processing/understanding)*

User Sentiment

WAN Self Healing

WAN Self Optimization

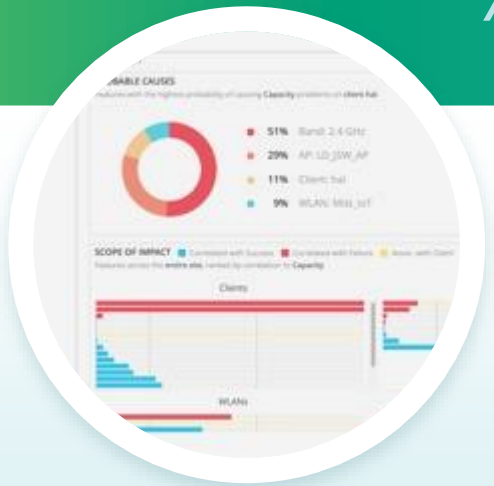
Data

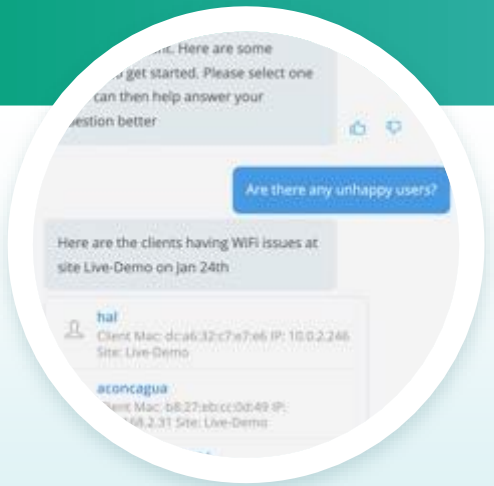
AI Primitives Event Timeline

Data Science Toolbox

Conversational Assistant

Self Driving Action Framework





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# WHAT IS NEXT? – USING AI AS A COACH & AUTOMATE CONFIGS

AI is automation that can do tasks on par with human domain experts that requires cognitive skills.

## DEEP LEARNING

**LSTM- Neural Network**
Time Series Anomaly Detection, NLP, Geo-Spatial Analysis.

**Unsupervised Learning**
Location

**GAI / LLM / Transformer**
Marvis Conversational Assistant.

**Shapley**
Feature assessment.

**Reinforcement Learning**
RRMv

## ARTIFICIAL INTELLIGENCE

## MACHINE LEARNING

**K-Means Clustering**
Environment Learning.

**XGBoost / Decision Tree**
Throughput Prediction.

**Domain Expertise Classification**
Service Level Metrics, Event Timeline.

**Decision Tree**
AP / Switch Health, DHCP Health, Coverage Hole, bad cable.

**Probabilistic Graphical Models**
Root Cause Analysis.

**Mutual Information**
Feature Discovery.

**Online ARIMA**
Time Series Anomaly.

**Logistic Regression**
AP / Switch Health.

**Temporal Correlation**
Root Cause Analysis.

**Bayesian Inference**
Persistently Failing Clients, Auto Placement of AP.



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