Mastering Real-Time Intelligence

Edge Decisioning

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CONNECT
2023 AUSTIN

Purpose:

Share how edge decisioning simplifies and speeds up decision-making to deliver real time benefits

Agenda

- Why edge ML

- Considerations when designing an edge decisioning solution
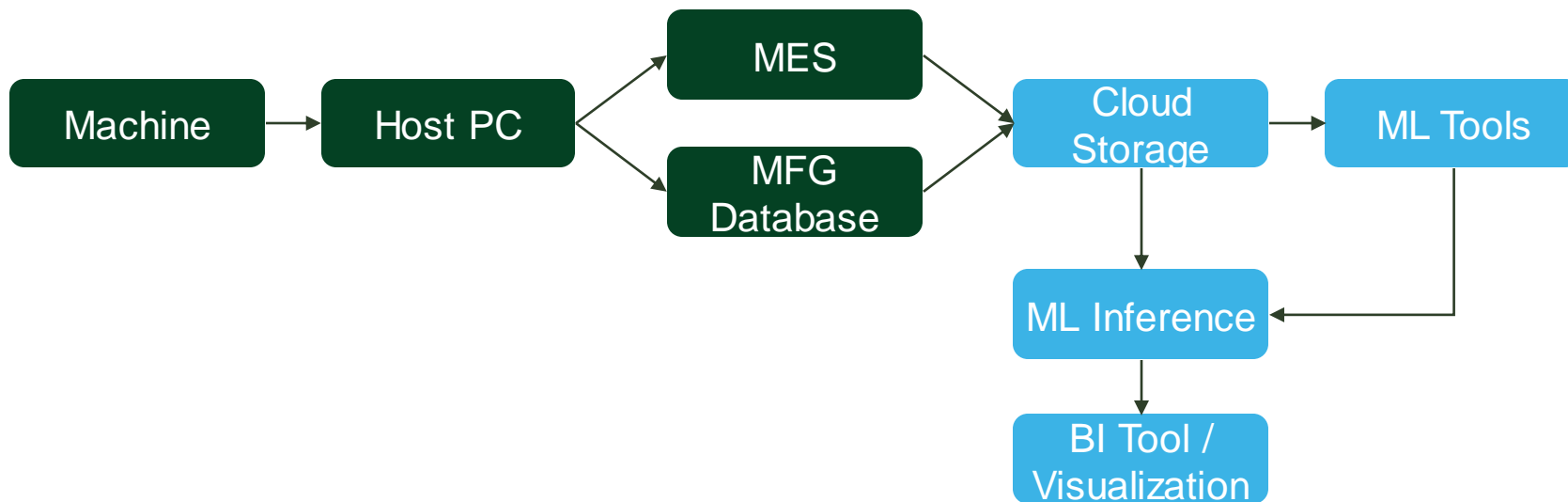
- Example use cases

Outcome

Determine fit and define upcoming actions and next steps

Current State of ML

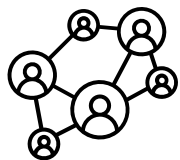Focus is on creation, not deployment (and usually then into the Cloud)

Current Edge solutions are difficult to create and have high latencies
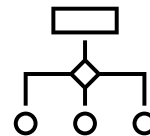
Why do you need Edge ML?

Requirements:

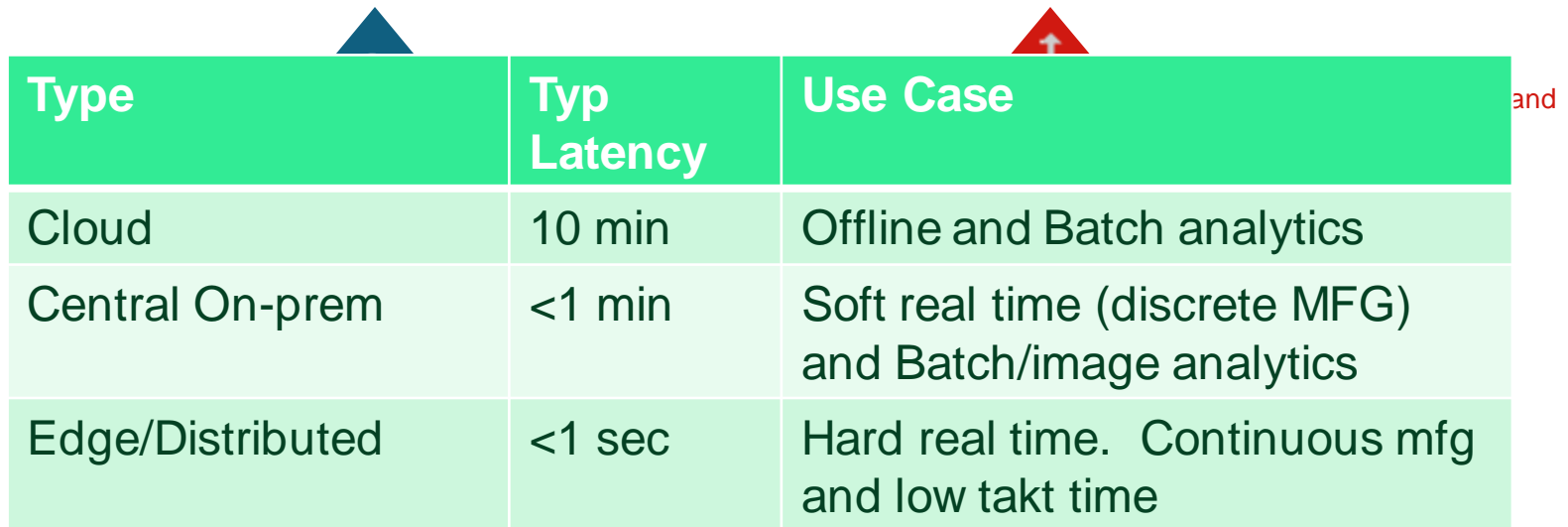| Data harmonization | Low Latency Edge Compute | Feedback Mechanism | Cross-Operation/Process |

ML Architectures and Latencies

Type	Typ Latency	Use Case
Cloud	10 min	Offline and Batch analytics
Central On-prem	<1 min	Soft real time (discrete MFG) and Batch/image analytics
Edge/Distributed	<1 sec	Hard real time. Continuous mfg and low takt time

Considerations When Designing Edge Decisioning Solution

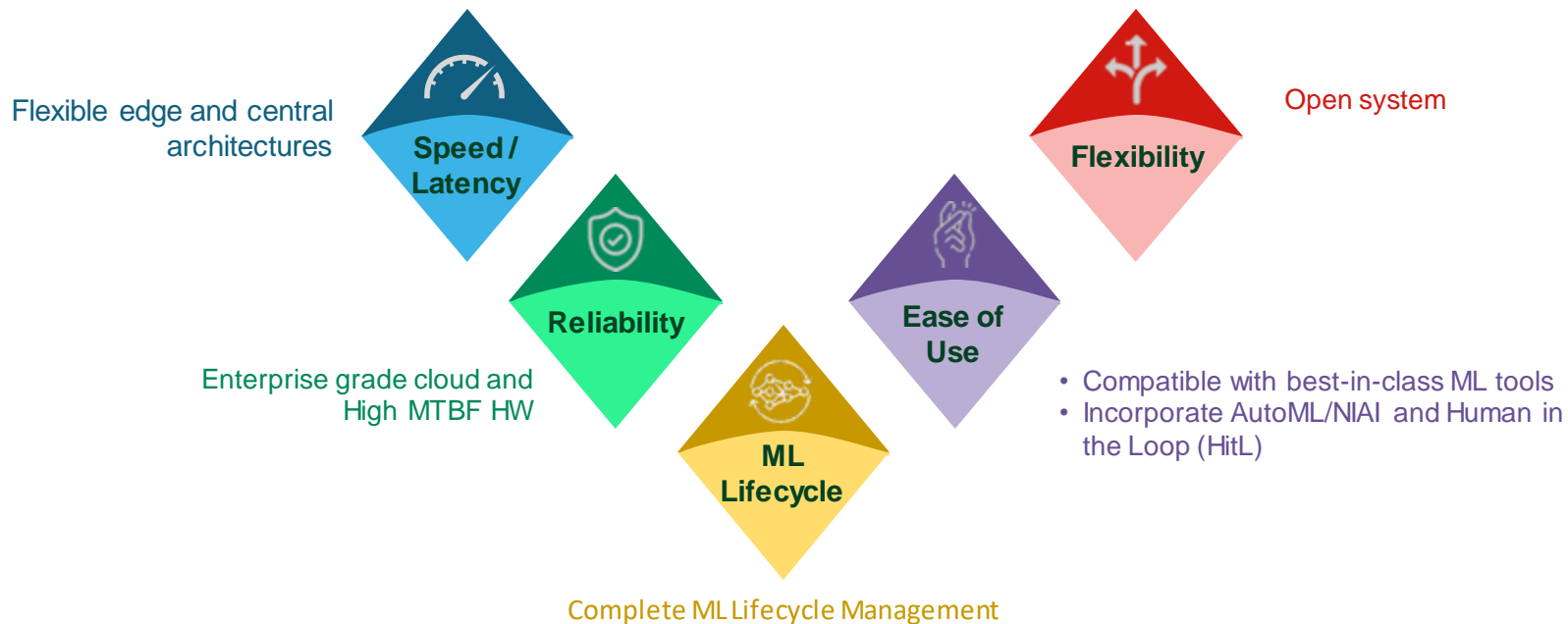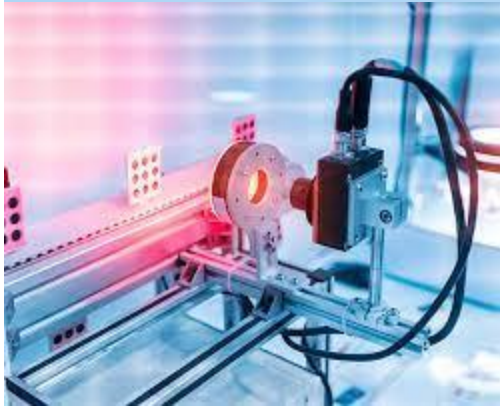| Type	Typ Latency	Use Case
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and

Complete ML Lifecycle Management with external tool integration

NI's Answer: Decisioning at the Edge[SM]

Flexible edge and central architectures

Speed / Latency

Enterprise grade cloud and High MTBF HW

Reliability

ML Lifecycle

Complete ML Lifecycle Management

Ease of Use

Flexibility

Open system

- Compatible with best-in-class ML tools
- Incorporate AutoML/NIAI and Human in the Loop (HitL)

Example Use Cases and Expected Benefits/ROI

VISION INSPECTION

Challenge:
- Inconsistent manual inspection results
- Inconsistent training for manual inspection
- Extremely difficult to modify and deploy algorithms

Results:
- *>80%* reduction in manual inspection
- *40%* improvement in scrap reduction YOY
- *100%* human control (HITL); deploy new models in "shadow mode"

CONTINUOUS MFG

Challenge:
- Difficult to make real time determinations if parts are good or not
- Difficult to update edge software and/or algorithms

Results:
- *Sub 100ms* decisioning
- *>98% accuracy*
- Vastly simplified creation, deployment & management of algorithms to the edge devices
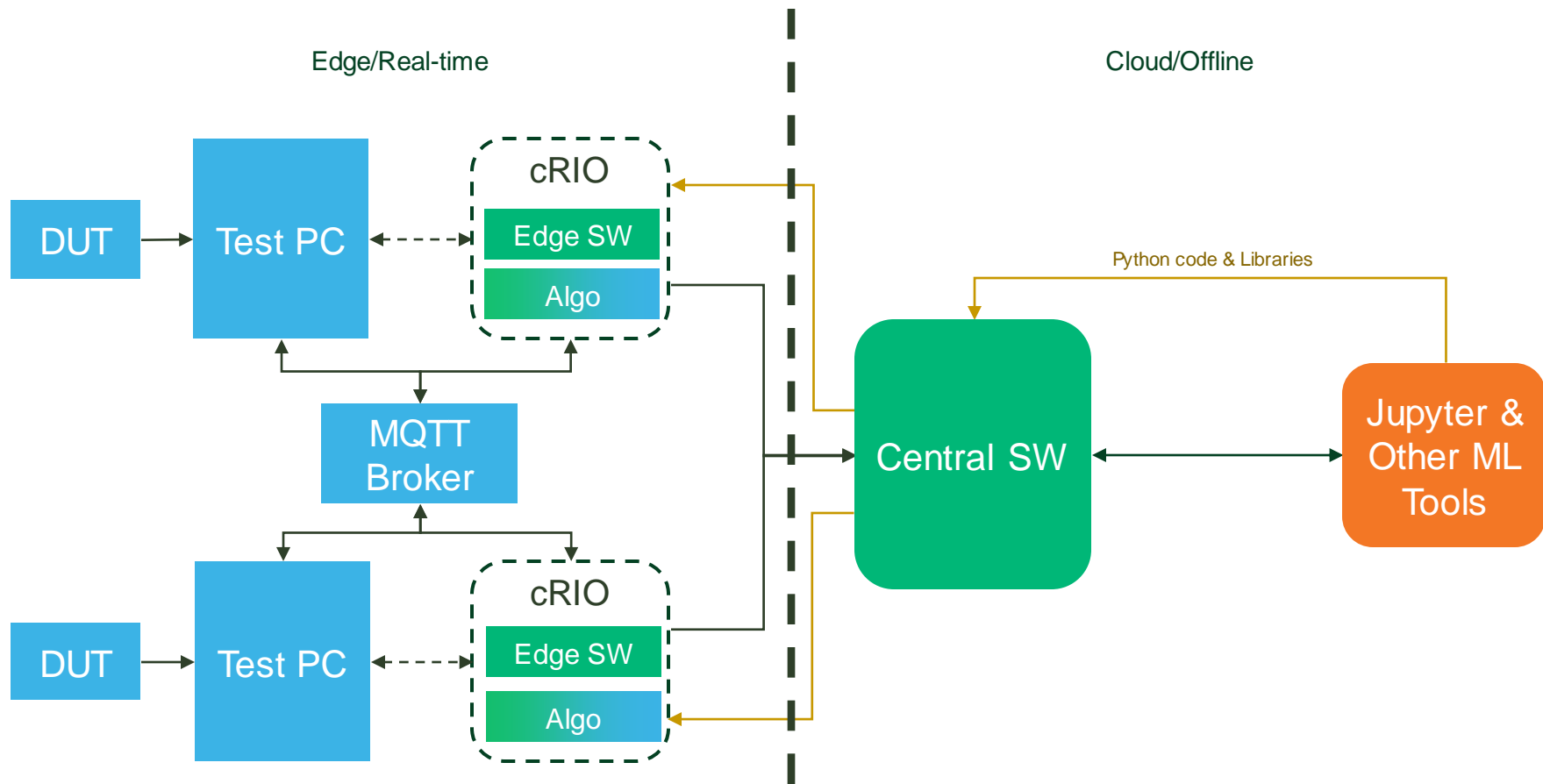
TEST OPTIMIZATION

Challenge:
- Difficult to create, deploy and manage edge ML algorithms
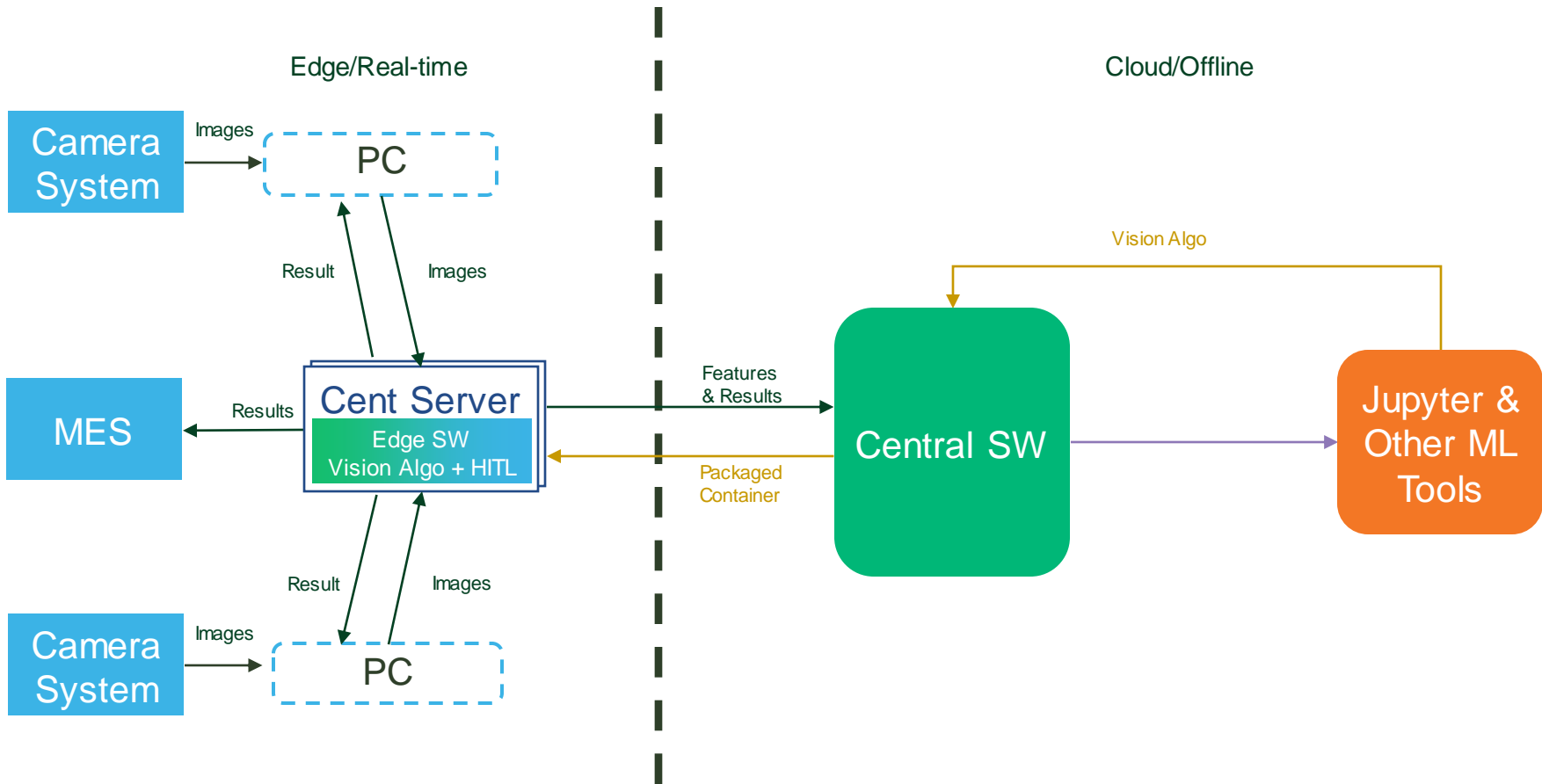- No able to stop long running tests early if likely to fail in order to increase throughput

Results:
- Increased test throughput
- Reduced capital expenditures
- Optimize test sequences (VST use case #)

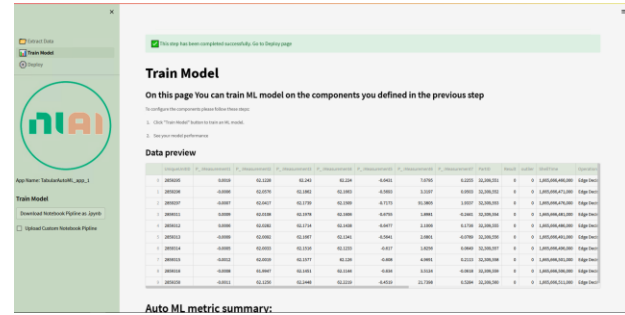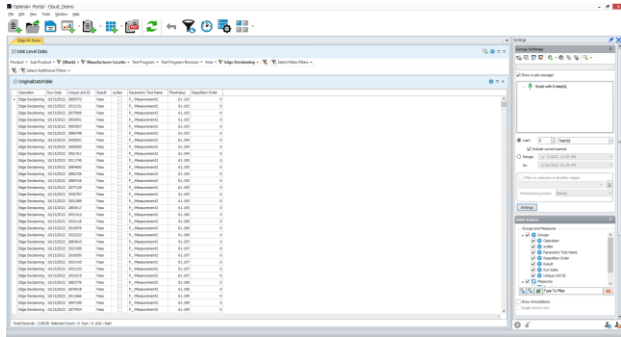# Example Distributed Edge Solution Architecture

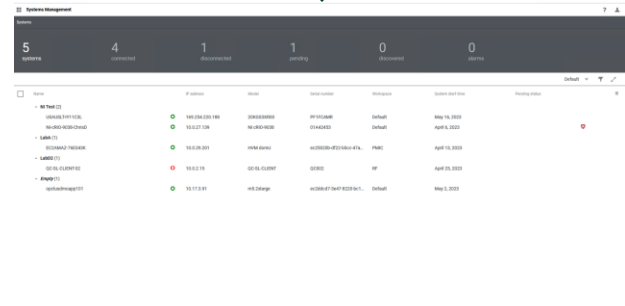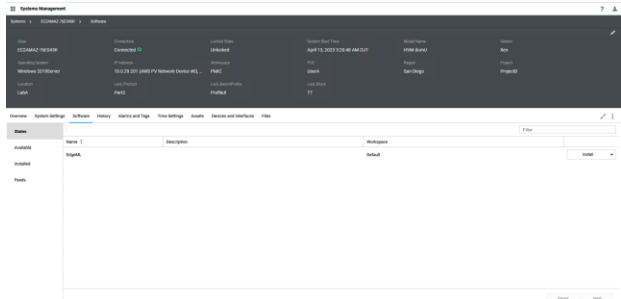# Example Centralized Edge Architecture (Vision)

Edge/Real-time

Cloud/Offline

Camera System → Images → **PC**

Result ↑ / Images ↓

MES ← Results ← **Cent Server**
Edge SW
Vision Algo + HITL

Features & Results →

Packaged Container ←

Central SW

Vision Algo →

Jupyter & Other ML Tools

Result ↑ / Images ↓
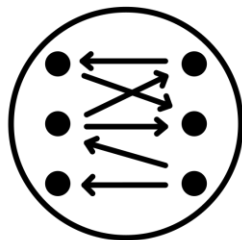
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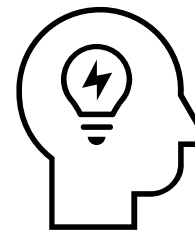
Simple ML Lifecycle Management

Democratizing Analytics and ML

Seamless Edge ML Lifecycle Management

Flexible Platform for any data or architecture

Work smarter not harder

Come see the Demo at the Product Analytics booth in the Main Hall

For more information, contact:

Your Account Manager

Technical questions:
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General offering questions:
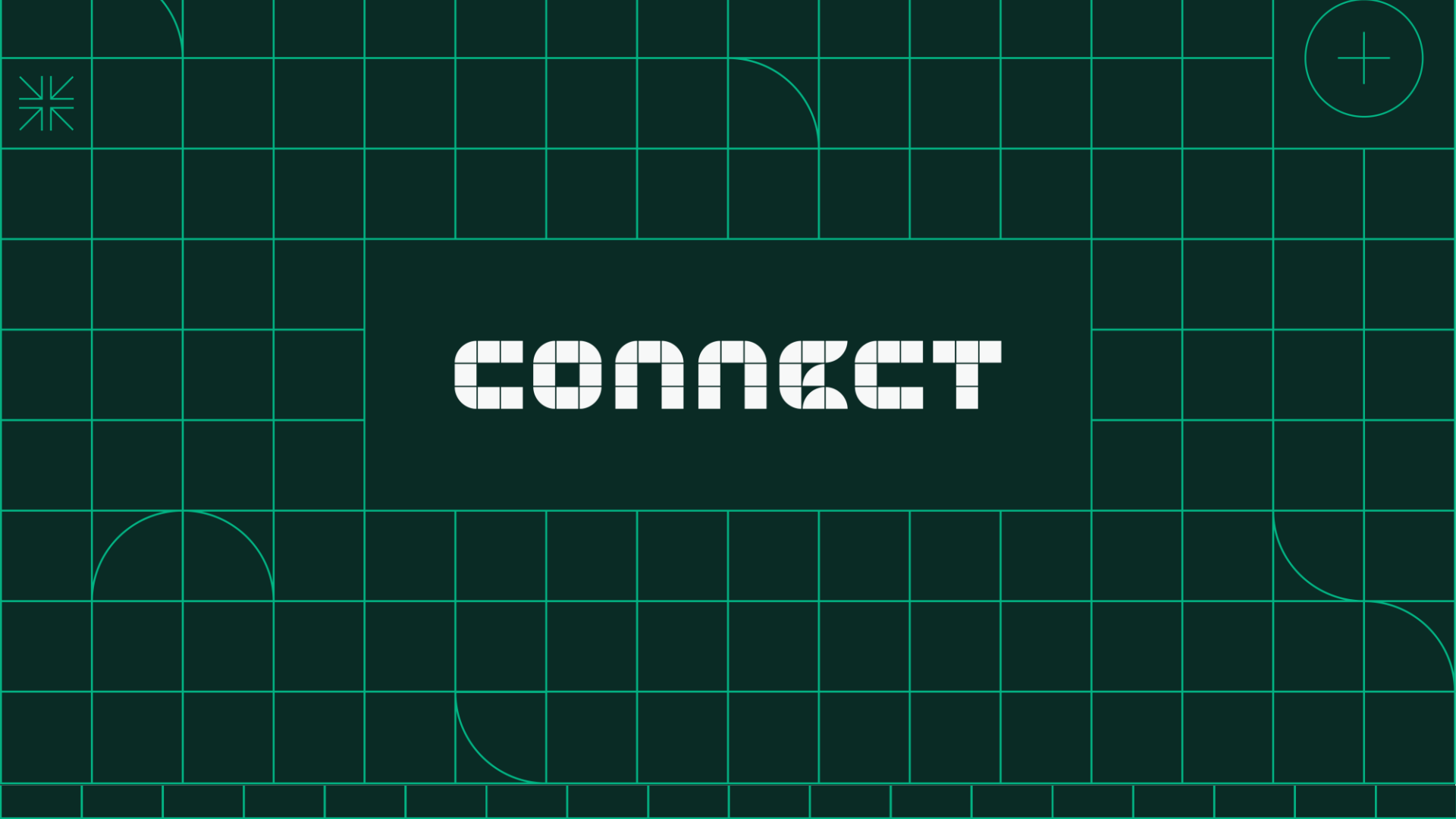Penny Merian
Director Offering Management,
Product Analytics
penny.merian@ni.com
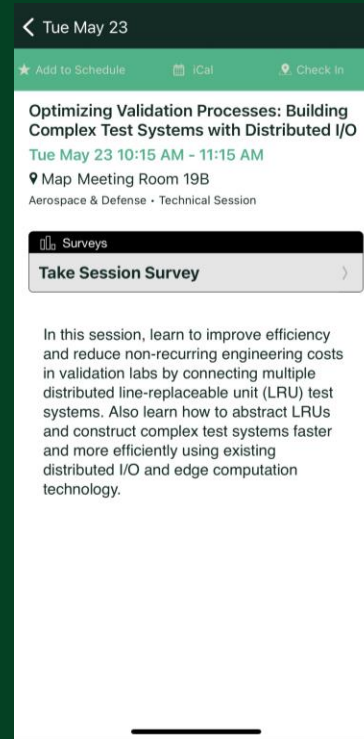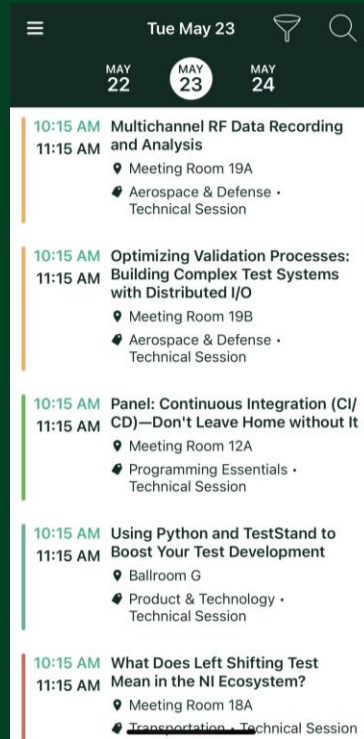
Stop by the demo floor

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