



Deploying an AI/ML Hybrid Cisco and Azure Infrastructure for Advanced AI Use Cases

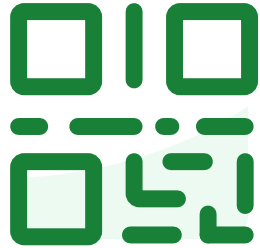
Jeff Teeter PhD - Sr. Solutions AI Architect
@JeffTeeter2
BRKCLD-2944

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#CL-Cisco-AI

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Webex App

Questions?

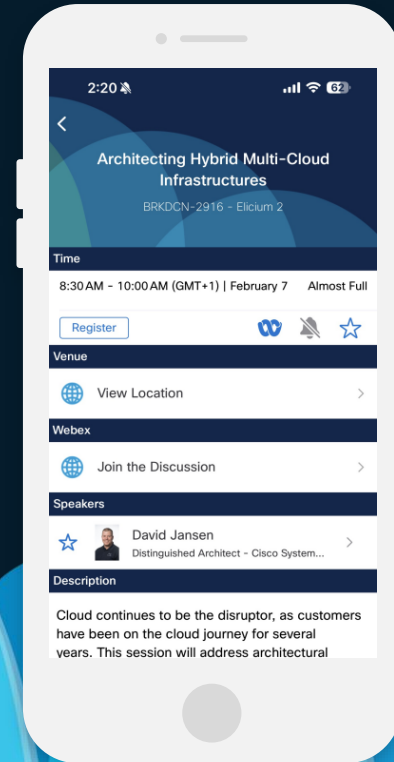
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Unlock **Enterprise Data** with the
power of **Cisco Platforms** and the
simplicity of **Cisco** and **Azure AI**



Agenda

- Introduction
- Cisco AI Data Bridge Suite
- Why It Matters
- Technical Overview
- Generative AI
- Machine Learning
- Conclusion

Cisco AI



Cisco AI



Cisco AI Data Bridge Project Suite



<https://github.com/APO-SRE/cisco-data-bridge-project-suite>

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INFRASTRUCTURE :



<https://github.com/APO-SRE/cisco-hybrid-ai-ml-azure-local>

AI AGENT :



<https://github.com/APO-SRE/cisco-data-bridge-ai-agent>

VECTOR DATABASES :



<https://github.com/APO-SRE/cisco-data-bridge-domain-index>

CONNECT :



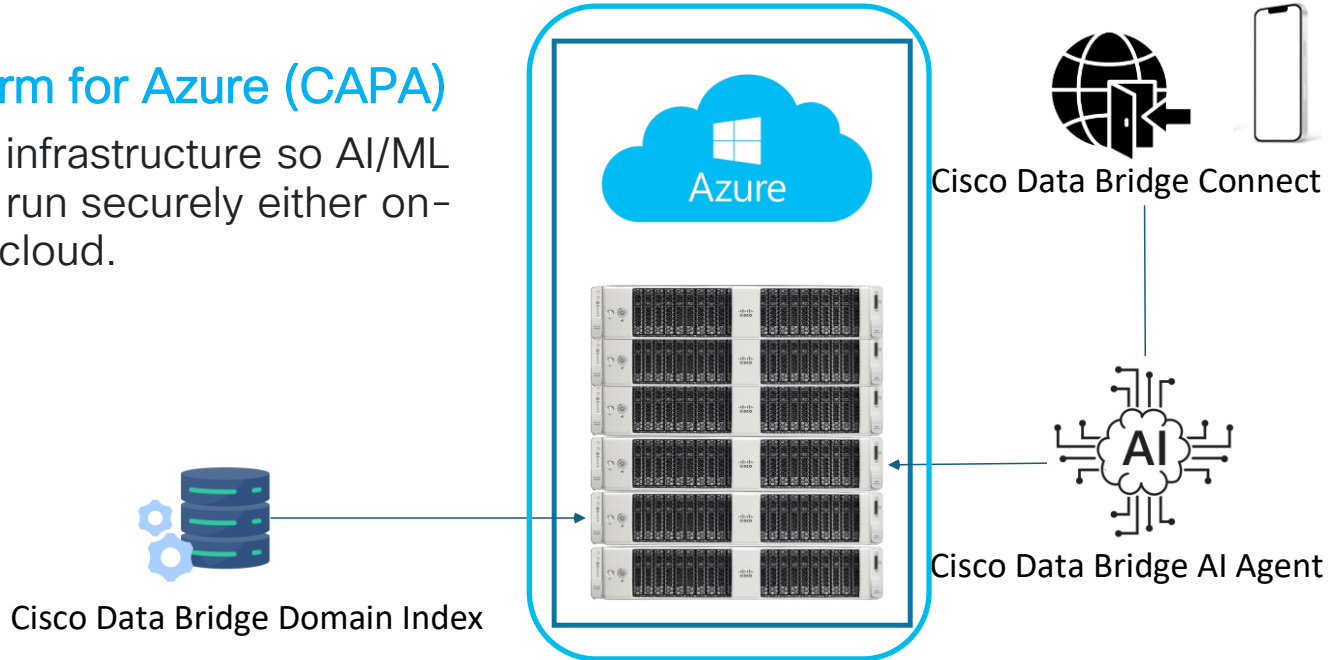
<https://github.com/APO-SRE/cisco-data-bridge-connect>

Cisco AI Data Bridge Project Suite

A comprehensive, enterprise-grade AI/ML solution.

1. Cisco AI Platform for Azure (CAPA)

Sets up hybrid infrastructure so AI/ML workloads can run securely either on-prem or in the cloud.



Cisco AI Platform for Azure (CAPA)

Infrastructure - Hybrid AI/ML Solution on Azure Local with Cisco UCS

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How familiar are you with Azure Local (formerly Azure Stack HCI)?

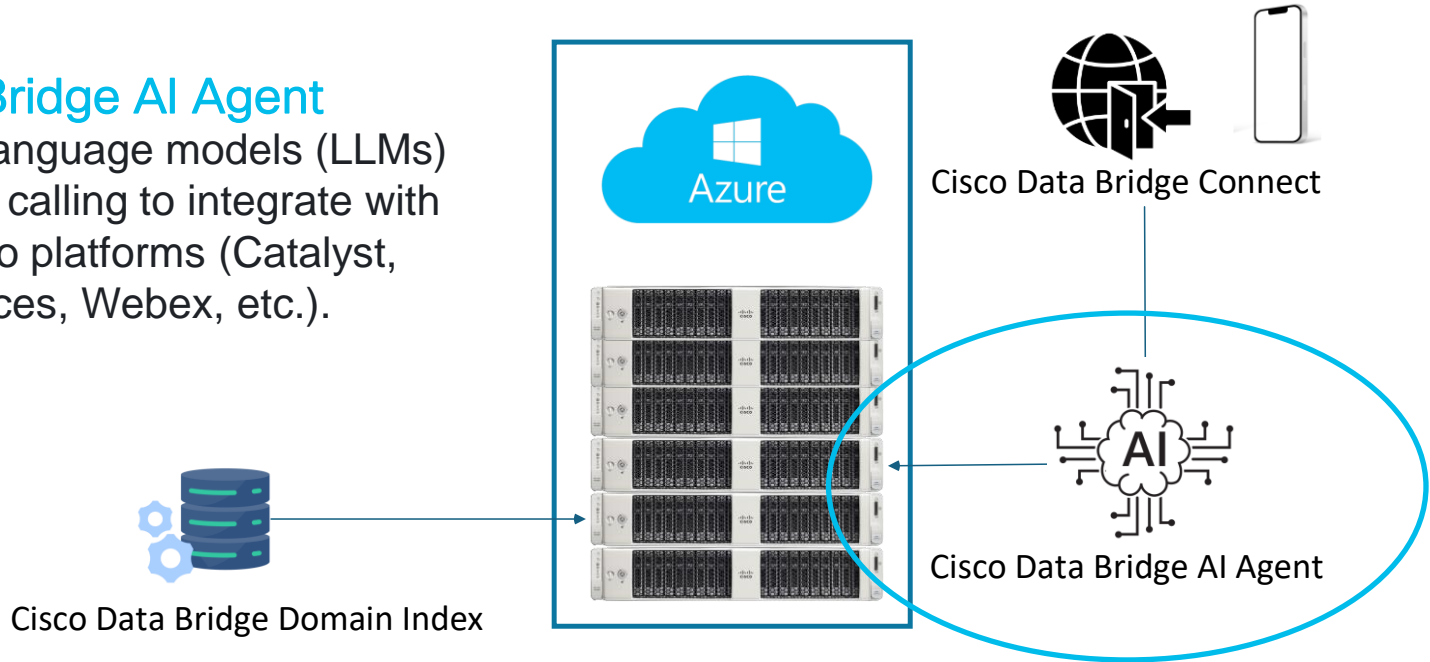
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Cisco AI Data Bridge Project Suite

A comprehensive, enterprise-grade AI/ML solution.

2. Cisco Data Bridge AI Agent

Uses large language models (LLMs) and function calling to integrate with various Cisco platforms (Catalyst, Meraki, Spaces, Webex, etc.).



Cisco AI Platform for Azure (CAPA)

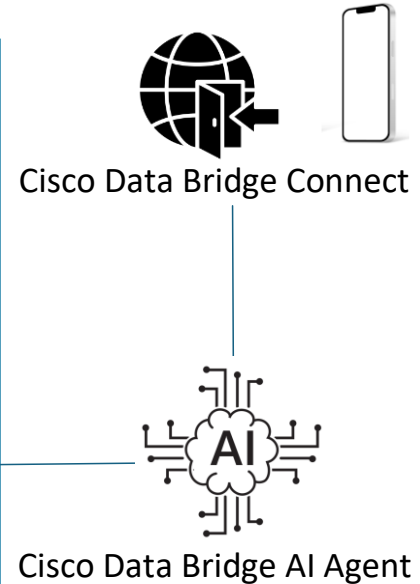
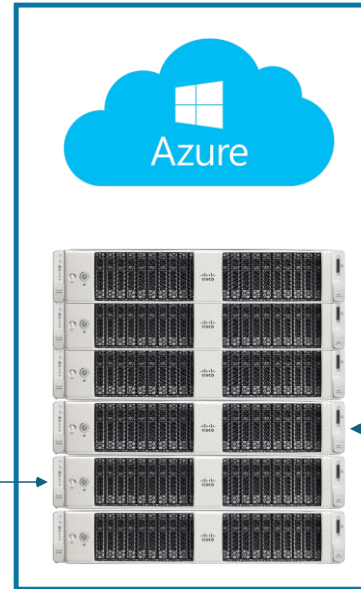
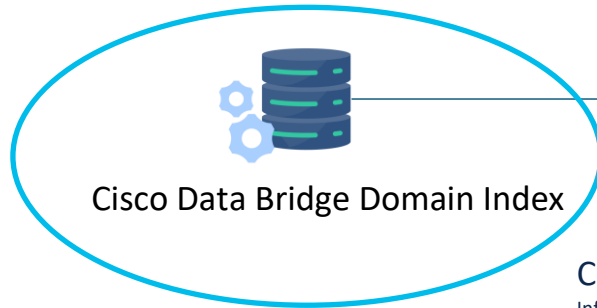
Infrastructure - Hybrid AI/ML Solution on Azure Local with Cisco UCS

Cisco AI Data Bridge Project Suite

A comprehensive, enterprise-grade AI/ML solution.

3. Cisco Data Bridge Domain Index

Builds vector databases for domain summaries and Cisco API docs, optimizing retrieval for the AI agent.



Cisco AI Platform for Azure (CAPA)

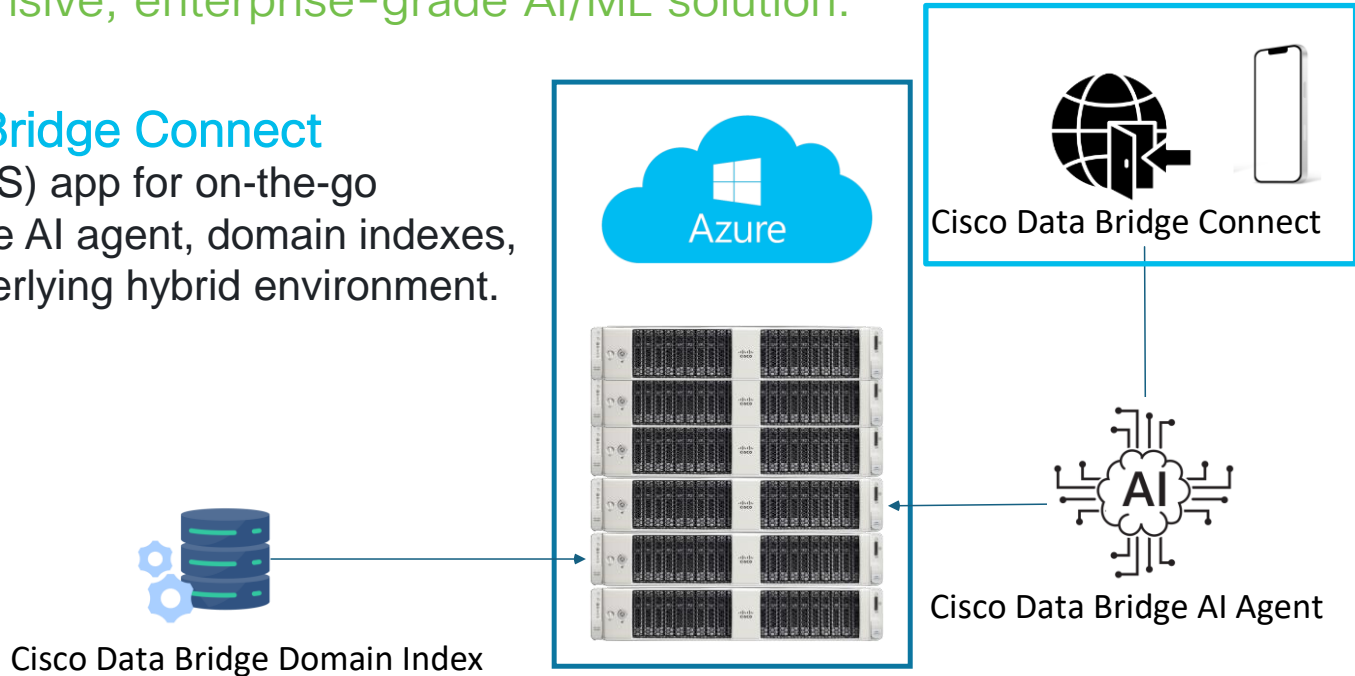
Infrastructure - Hybrid AI/ML Solution on Azure Local with Cisco UCS

Cisco AI Data Bridge Project Suite

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4. Cisco Data Bridge Connect

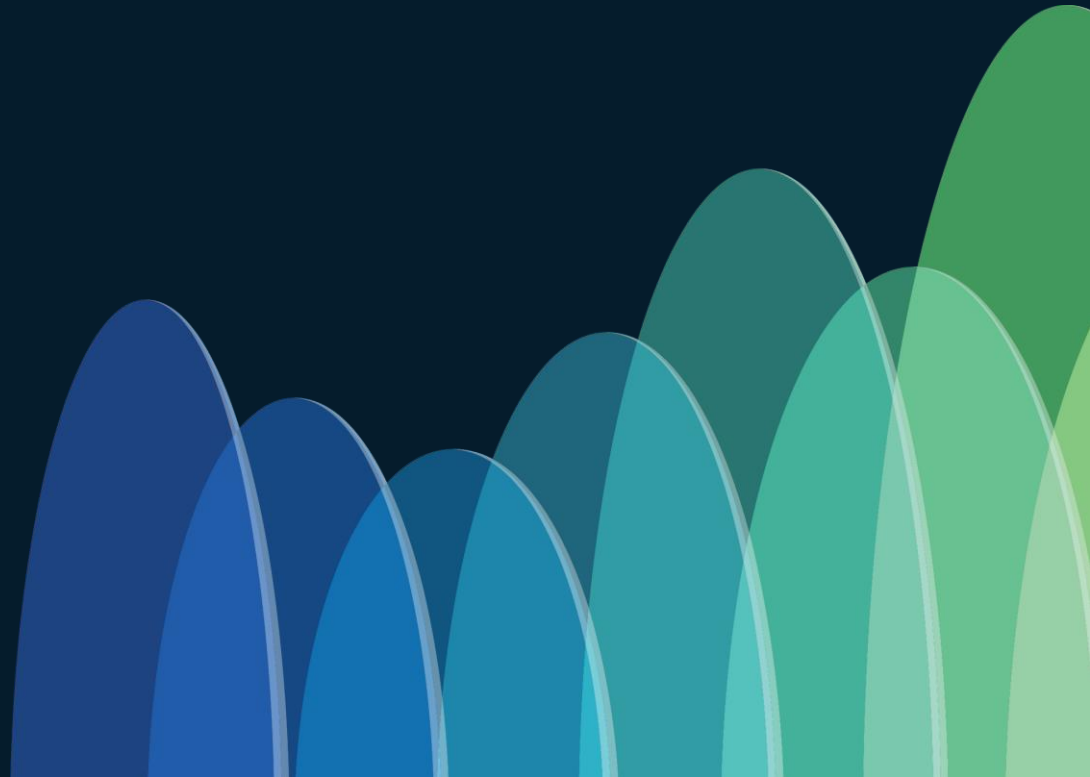
A mobile (iOS) app for on-the-go access to the AI agent, domain indexes, and the underlying hybrid environment.



Cisco AI Platform for Azure (CAPA)

Infrastructure - Hybrid AI/ML Solution on Azure Local with Cisco UCS

Why it Matters



Why it Matters

- **Stay Competitive**

Use AI/ML to drive innovation and leadership.

- **Solve Real-World Problems**

Tackle sustainability, safety, and efficiency challenges.

- **Secure and Scalable Innovation**

Enable hybrid AI/ML with robust data security.

- **Empower Transformation**

Optimize operations with generative AI.

- **Future-Proof Organizations**

Build scalable infrastructure for tomorrow's AI needs.

Key Use Cases

1. Hidden Data Discovery and Insights

Use Cisco platforms and Azure AI/ML to *uncover hidden data*, consolidate it for *advanced analytics*, and *enable smarter decisions*.

2. Seamless Hybrid Operations

Manage workloads across cloud and on-premises via the Azure Portal to *simplify operations*.

3. Repatriation of Cloud Workloads

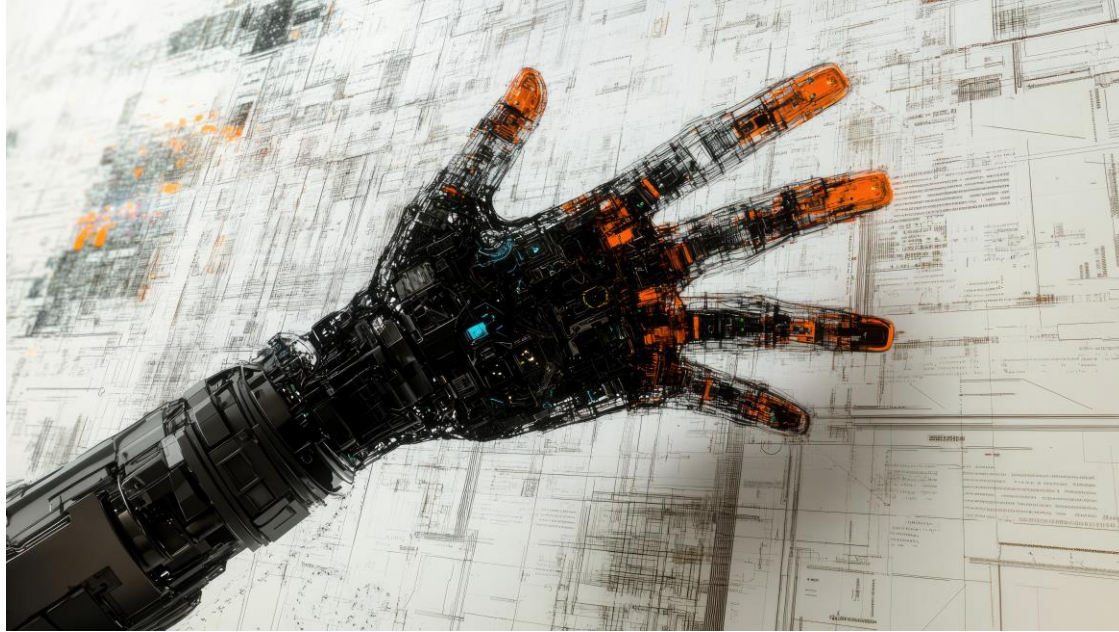
Bring workloads back on-premises to *optimize costs*, *improve control*, and *maintain cloud-like efficiency*.

4. Traditional Workloads Modernization

Run or migrate VMware VMs to *Hyper-V*, deploy scalable cloudlike *VDI with on-prem* low latency, and run *SQL Server* on-premises for high performance and low latency.



Cisco AI Data Bridge Project Suite



Technical Overview

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Have you worked with hybrid cloud architectures (Cisco + Azure) before

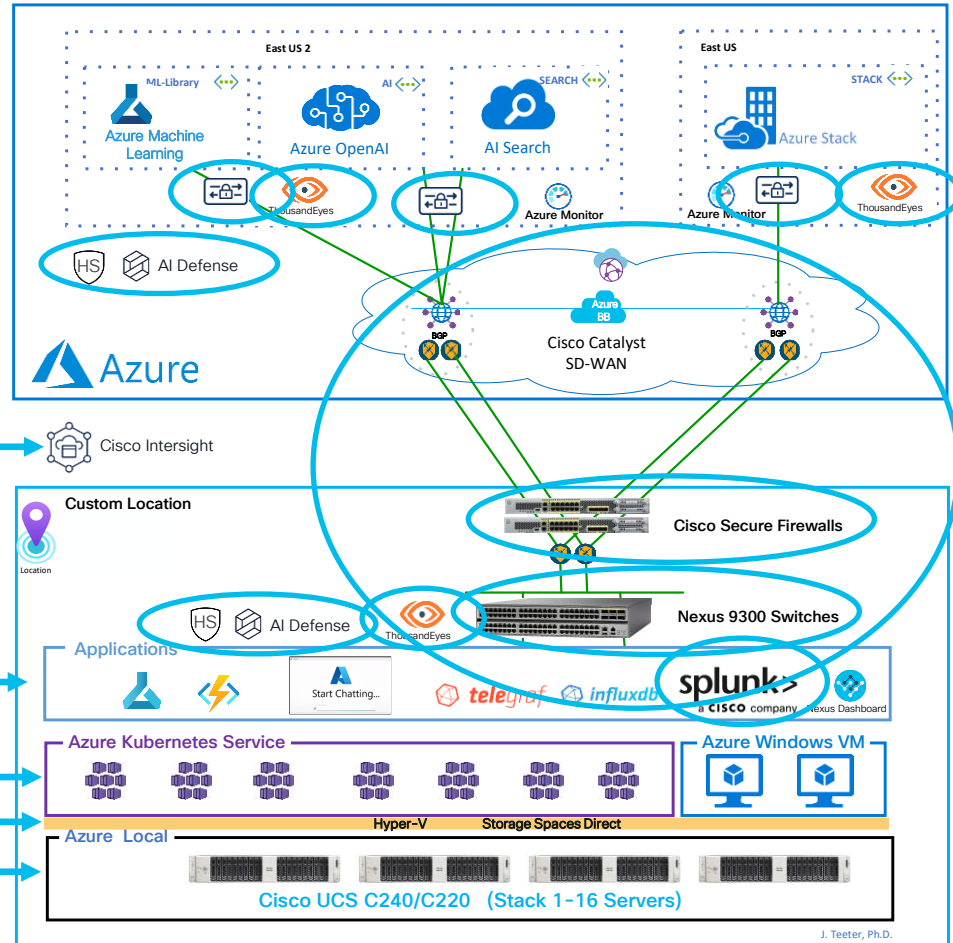
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1. Cisco AI Platform for Azure (CAPA)

Hybrid Cloud Solution Arch with Azure Control



- MultiCloud Defense/ Hypershield/ AI Defense
 - ThousandEyes
 - Cisco Intersight
 - Nexus 9300/ Cisco Secure Firewall/ Catalyst SD-WAN
 - Splunk
- ML/ Functions/ Logic Apps/ App Services
 - AKS/Azure VMs
 - Hyper-V/ Storage Spaces Direct
 - Cisco UCS – Azure Local



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Cisco AI Platform for Azure (CAPA)

Azure Local on Cisco UCS

- A **Hybrid AI/ML** approach for **multi-workload** environments, **not a purpose-built AI solution**.
- Significantly **Lower Entry Cost** for Easy Adoption.
- Designed for **Easy Use** by non-AI experts

2. Cisco Data Bridge AI Agent

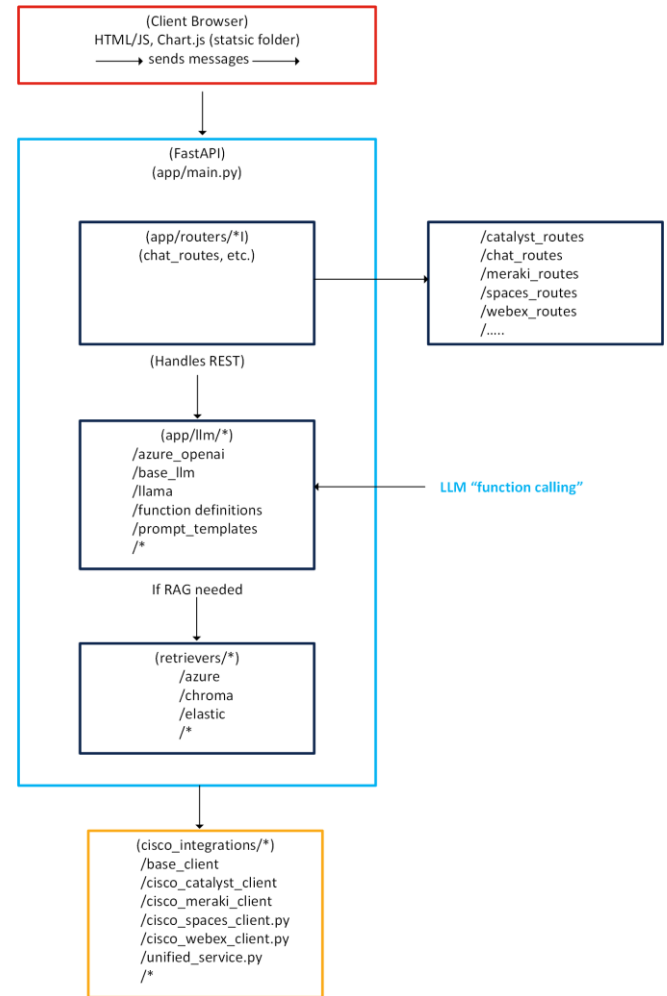
- Implements a “**function-calling**” AI agent (via FastAPI + LLM) that dynamically routes user requests to various Cisco platforms (*Catalyst Center*, *Meraki*, *Spaces*, *Webex*, etc.) through **dedicated integration clients**.
- Includes an **optional retrieval layer** (RAG) for **domain documents**, plus a structured approach to add or expand integrations.

Why This AI Agent Architecture?

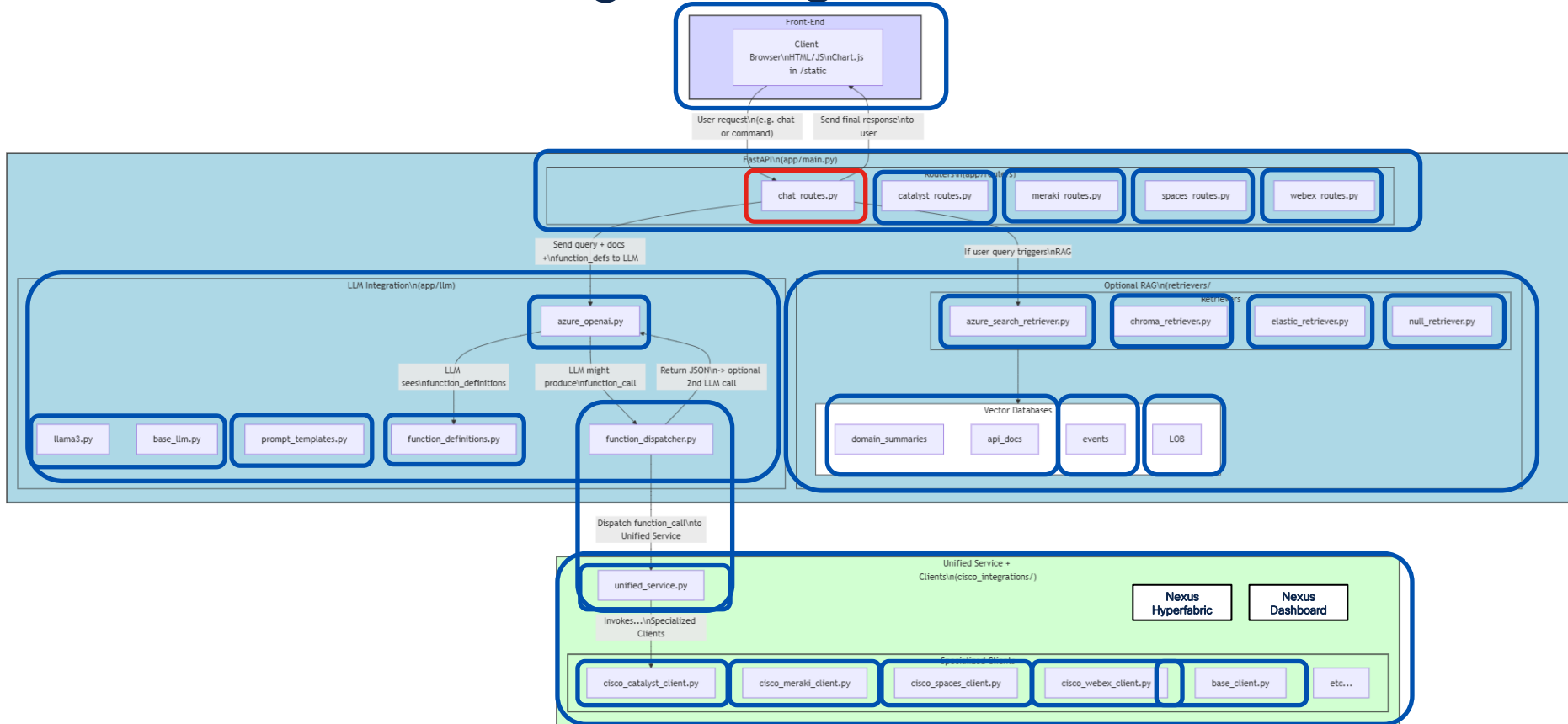
Compared to a **typical** “agent with tools” (often one file containing ad-hoc API calls), the **Cisco Data Bridge AI Agent emphasizes**:

- **LLM & Retrieval Separation:** Language orchestration and domain lookups are separate from other concerns.
- **Unified Cisco Service:** Each Cisco product is a modular client, maintaining enterprise standards for security and scalability.
- **Front/Back-End Split:** The user interface can be replaced or upgraded without altering the LLM or integration layers.

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2. Cisco Data Bridge AI Agent



3. Cisco Data Domain Index

- **Builds Vector Databases** (e.g., Azure AI Search, Chroma, Elasticsearch) containing
 - Cisco API docs
 - Domain summaries
- **Two-Stage Approach**
 - High-level **domain summaries** index
Determines the relevant Cisco product.
 - Detailed **API specs/docs** index
Enables deeper RAG queries.
- **Optimized for Efficiency**
 - Reduces LLM overhead by retrieving only the most relevant context.
- **Additional Features**
 - Separate vector database for **events**.
 - **40** industry-specific knowledge domains for demos



Cisco AI Data Bridge Project Suite

40+ Sample Line Of Business – Simple Vector Database Creation for Demo and Testing

Aerospace

Agriculture

Airline

Automotive

Biotechnology

Construction

Consumer Electronics

Cybersecurity

Healthcare

Human Resources

Insurance

Manufacturing

E-Commerce

Education

Energy & Utilities

Entertainment & Media

Financial

Food & Beverage

Gaming

Government & National
Security

Hospitality

Information Technology &
Services

Legal Services

Non-Profit

Pharmaceuticals

Professional Services

Real Estate

Retail

Social Services

State & Local Government

Telecommunications

Transportation & Logistics

Marketing & Advertising

Mining & Natural Resources

Oil & Gas

Operations

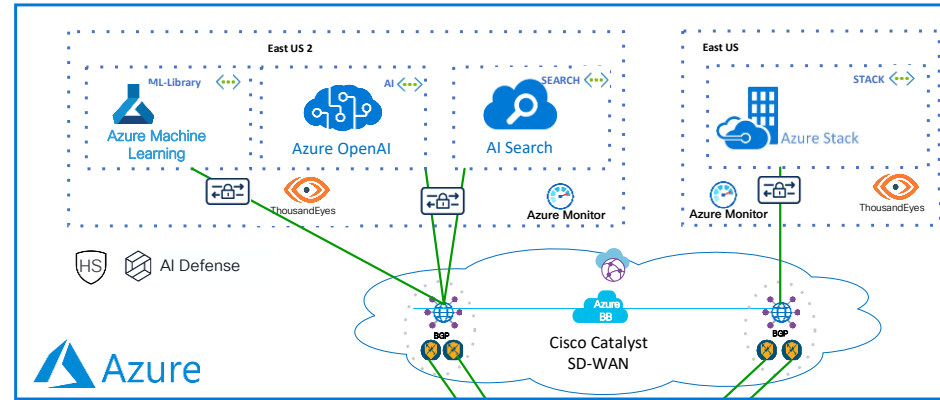
4. Cisco Data Bridge Connect

- Delivers an iOS (or mobile) app granting **real-time access** to the **Cisco Data Bridge ecosystem**.
- Offers a **streamlined client interface** to:
 - Send queries to the **AI Agent**
 - **Utilize domain indexes** (if RAG is enabled)
 - Tap into **hybrid or on-prem infrastructure** for specialized ML tasks
- Focuses on **mobile security** and **enterprise compliance**.

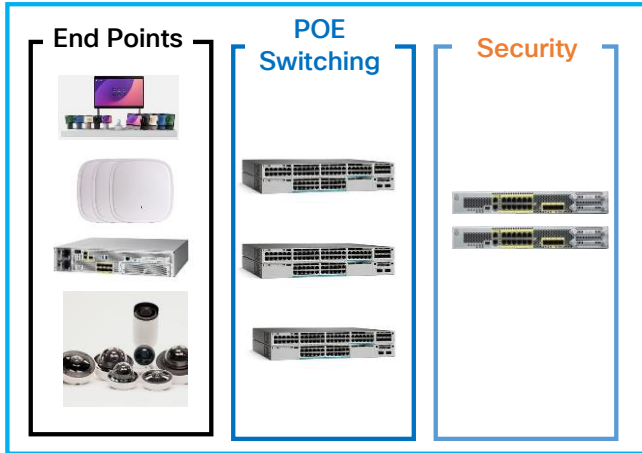


Data Sources

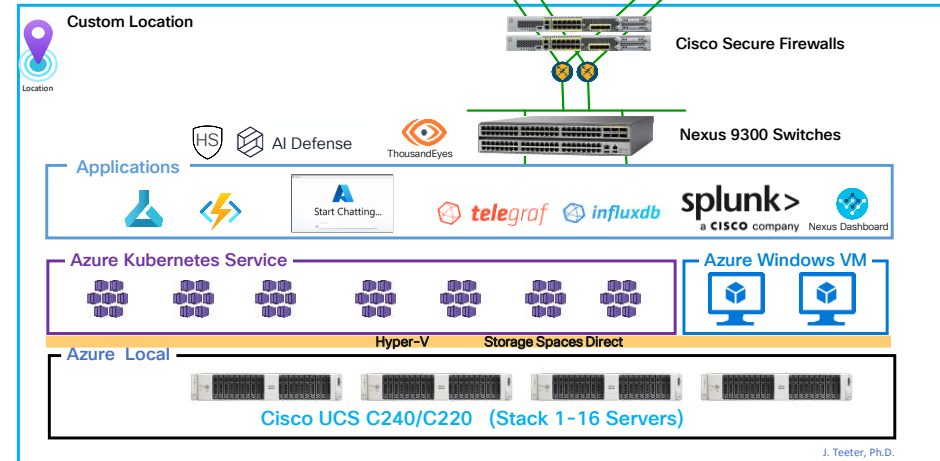
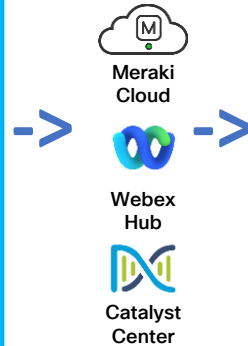
- Cisco Spaces
- Meraki Cloud
- Webex Hub
- Catalyst Center
- Cisco Devices
- 3rd Party Data



Cisco Intersight



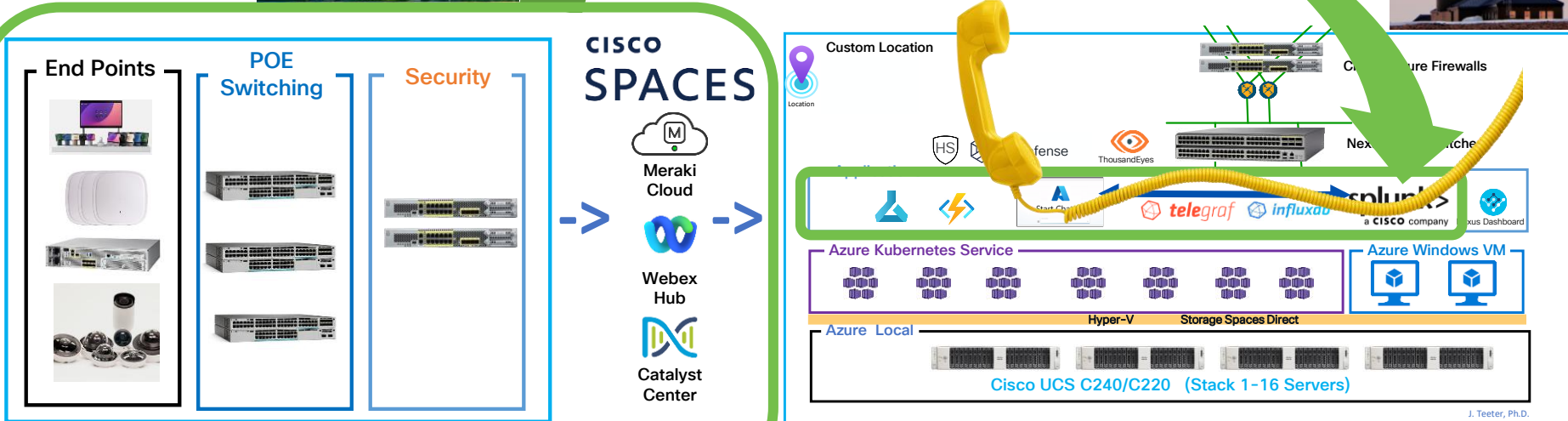
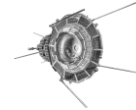
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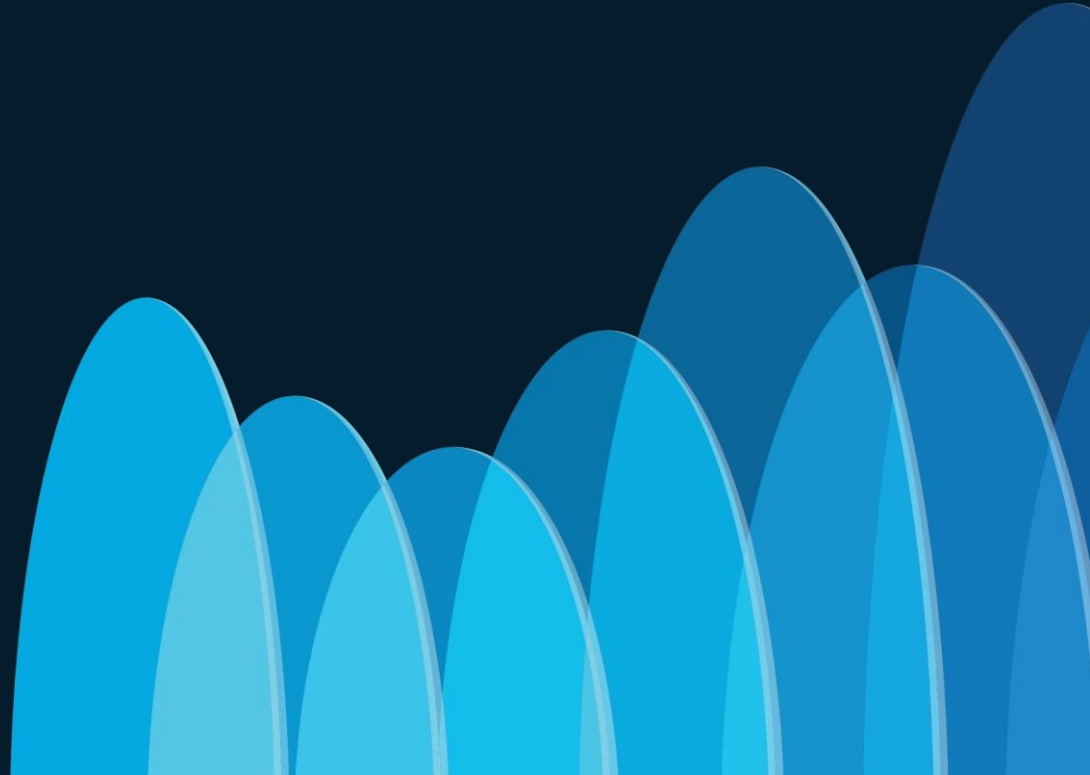
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Unlock Enterprise Data with the power of Cisco Platforms and the simplicity of Cisco and Azure AI



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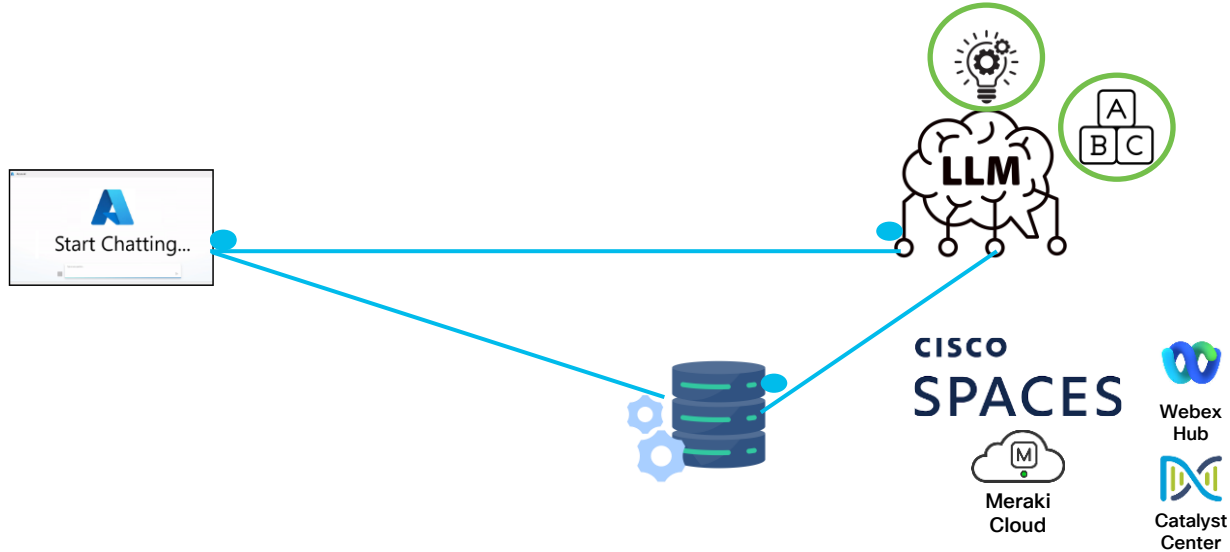
Generative AI



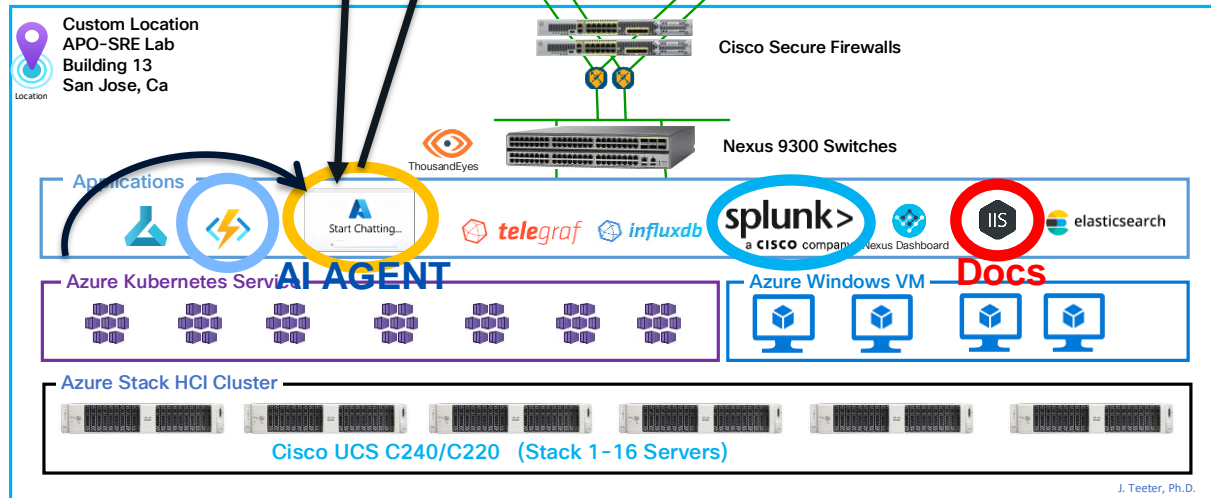
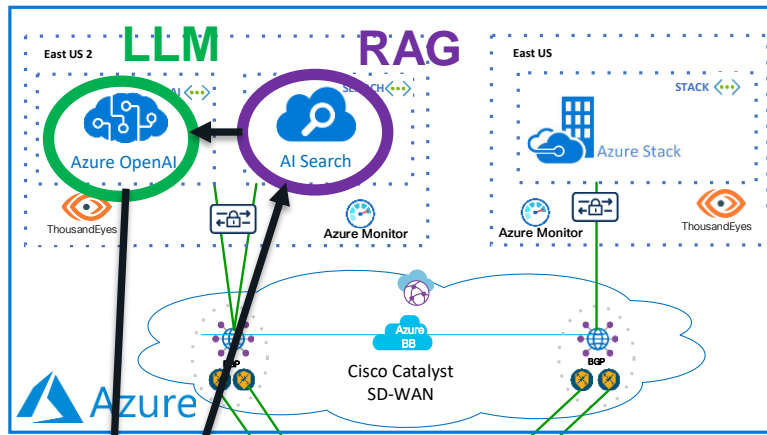
RAG: Retrieval Augmented Generation

+

Cisco Platforms



Generative AI Hybrid Cloud Data Flow



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Gen AI Demo 1

Enterprise Domain AI

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How important is real-time operational intelligence (e.g., using Splunk) in your AI strategy?

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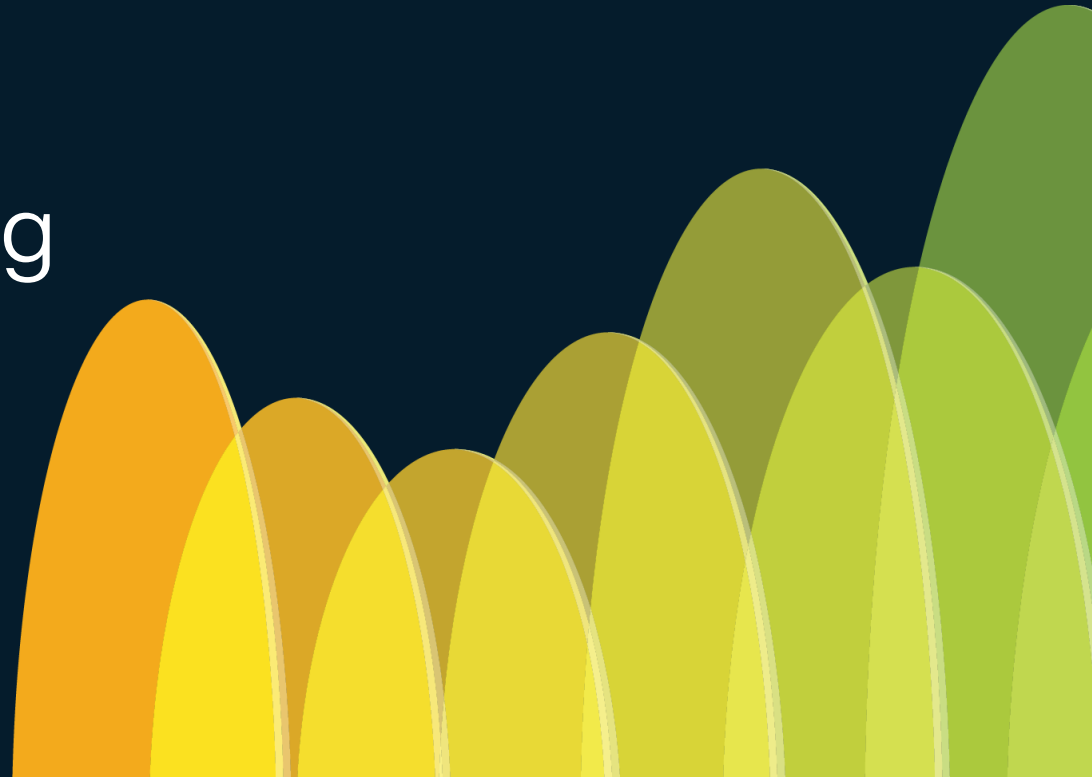
Gen AI Demo 2

Operational AI

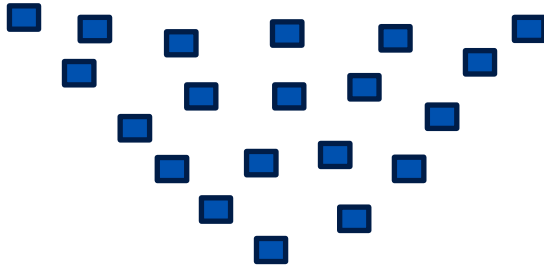
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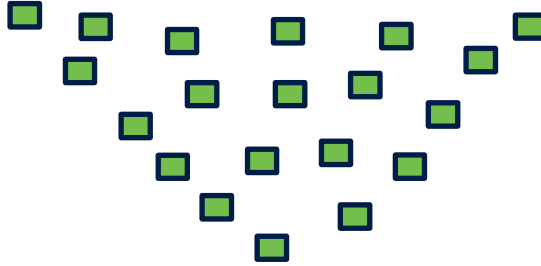
Machine Learning



Machine Learning



Build Model
Training Pipeline
[Step One]



Prediction
Inference Pipeline
[Step Two]



Visualization
Splunk
[Step Three]

ML Demo

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If you could automate one enterprise workflow with AI, what would it be?

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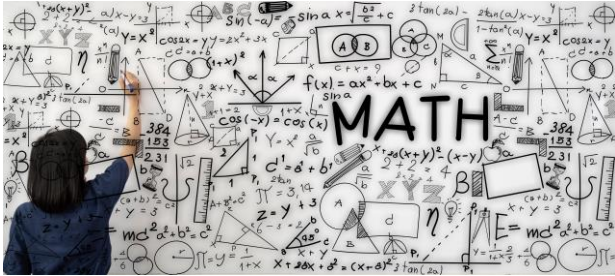
Conclusion





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Recap



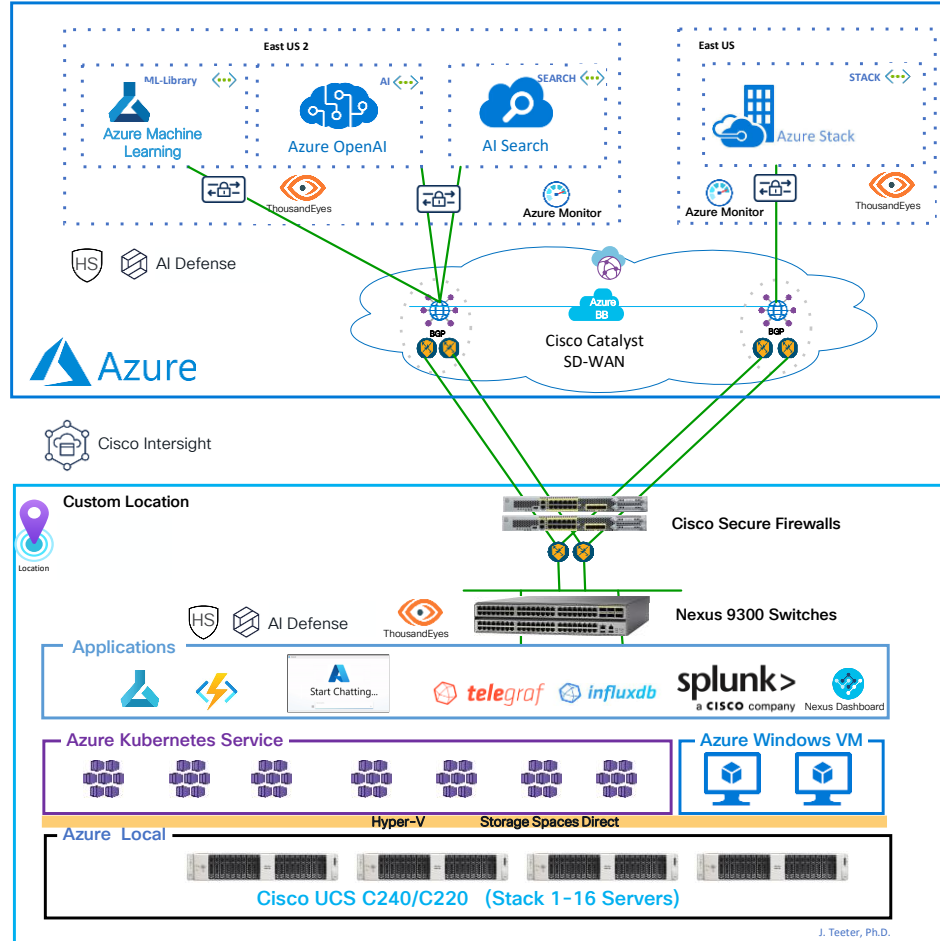
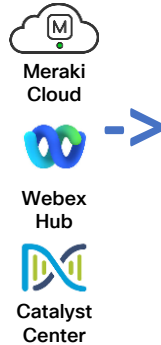
Deep Dive into Cisco's Hybrid Cloud with Azure Local



Demonstrate Cisco's Hybrid Cloud with Azure Local

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Additional Sessions to Check Out

AI Defense

- Security for AI: Cisco AI Defense in Action [CENSEC-1801]
- Red vs. Machine: A Practical Exploration to AI Algorithmic Red Teaming [CTF-1434]
- Protecting Generative AI and LLMs from Adversarial Attacks [AIHUB-2958]
Thursday, Feb 13, 11:30 AM - 12:00 PM CET

Hypershield

- Cisco Hypershield: Mastering Next-Generation Security [BRKSEC-2265]
- Security Management with Cisco Security Cloud Control and Hypershield APIs [DEWVKS-2348]

SPLUNK

- Maximizing AI Potential: Best Practices for Leveraging Cisco and Splunk Data [CISCOU-2029]

Catalyst SD-WAN

- 7 Steps: Master the Art of Unifying Multicloud Secure Connectivity and Design - Cisco SD-WAN + Multicloud Defense [BRKENT-2283]
Thursday, Feb 13, 8:30 AM - 10:00 AM CET
- Cisco Catalyst SD-WAN Fundamentals [CISCOU-2030]
Thursday, Feb 13, 9:30 AM - 10:00 AM CET

Thank You !

Next Steps

1. Stay Connected

- **GitHub Repository:** Explore all the documentation, resources, and demos
- **Webex App:** I will monitor until February 28, 2025

2. Take Action

- Experiment with Cisco AI/ML solutions on Azure Local.
- Engage your Cisco account team for lab access or to start your own (start small with one C220 and Nexus 9300 switches).
- Identify opportunities for generative AI and hybrid solutions in your projects.

3. Dive Deeper

- Explore Hybrid Cloud Solutions with Azure Control
 - AI/ML and Traditional Workloads
 - Smart Buildings & Advanced Analytics

4. Engage

- Share feedback: What resonated with you, and what would you like next?
- Look out for future workshops and webinars!

Webex App

Questions?

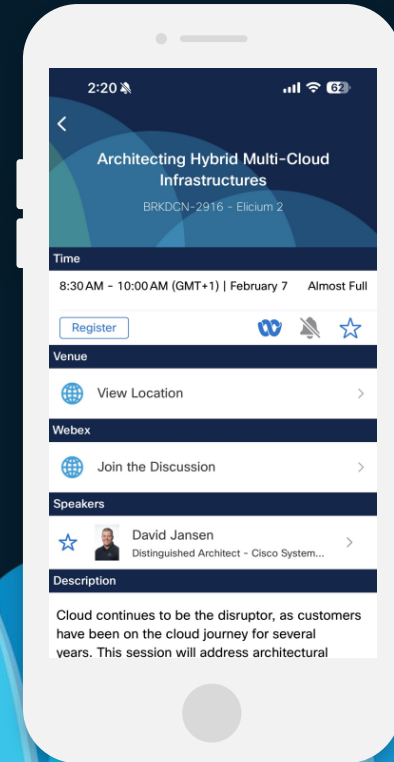
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(from 11:30 on Thursday, while supplies last)



All surveys can be taken in the Cisco Events mobile app or by logging in to the Session Catalog and clicking the 'Participant Dashboard'



Content Catalog

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- Visit the Cisco Showcase for related demos
- Book your one-on-one Meet the Engineer meeting
- Attend the interactive education with DevNet, Capture the Flag, and Walk-in Labs
- Visit the On-Demand Library for more sessions at ciscolive.com/on-demand. Sessions from this event will be available from March 3.



Thank you

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GO BEYOND

A series of overlapping, vertically-oriented ovals in various shades of blue, ranging from light to dark, positioned on the right side of the image.