
cisco Live!
Let's go
#CiscoLive

The bridge to possible

Unleashing Innovation!

Introducing Outshift by Cisco

Tim Szigeti, Principal Technical Marketing Engineer
@tim_szigeti

BRKETI-1003

Cisco Webex App

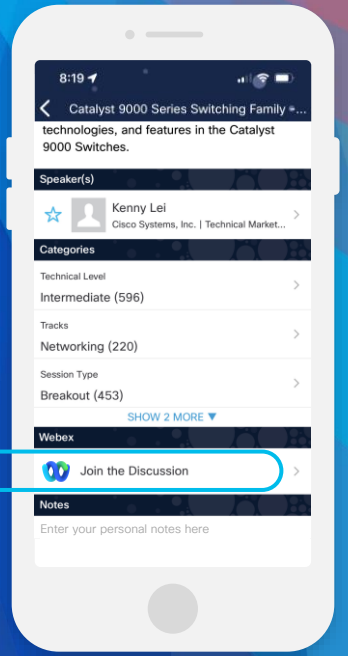
Questions?

Use Cisco Webex App to chat
with the speaker after the session

How

1. Find this session in the Cisco Live Mobile App (BRKETI-1003)
2. Click “Join the Discussion”
3. Install the Webex App or go directly to the Webex space
4. Enter messages/questions in the Webex space

Webex spaces will be moderated by the speaker until June 9, 2023.

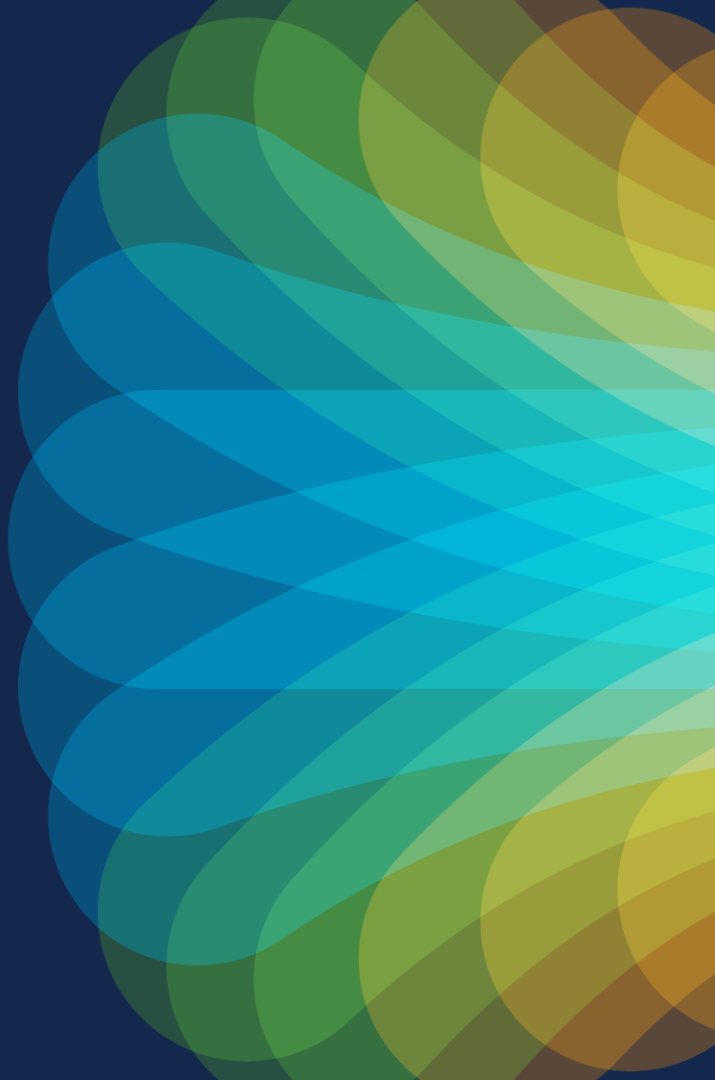


https://ciscolive.ciscoevents.com/ciscolivebot/#BRKETI-1003

Agenda

- Who We Are
- Cloud Native Innovations
- Edge Native Innovations
- Next Gen AI Innovations
- Quantum Research
- Conclusion

Who We Are



Who We Are

We are engineers, architects, strategists, and leaders.

We're innovators, inventors, futurists, and explorers.

We're drivers of real change.

We are Cisco's incubation engine.

And we're not doing this alone but are partnering with our customers to drive innovation together.

Put simply, we are here to deliver really awesome products that solve real problems—full speed ahead.

Tech evolves fast. We will evolve faster.

Our Mission

Pushing into new territories to extend Cisco's mission to empower an inclusive future for all.

What We Believe

- The world of technology doesn't just need more ideas
- At Outshift, we believe it needs *more concrete products*
  - Innovative endeavors that result in action
  - Real software, apps, and platforms that *solve real problems*
  - Whether they are 18 months out or five (or more) years into the future
- We are shifting Cisco incubation into high gear, bringing emerging technologies to market by applying the best of startup spark– velocity, flexibility, and user-driven product growth–to the proven scale and solidity of a global business leader

New Emerging Technologies

- We build the vision and an achievable path forward for our customers to achieve success thanks to a breadth of emerging (and inevitably, indispensable) technologies.
- From modern, cloud native and edge applications, to AI and quantum networking, and beyond, Outshift is fueled by the mission to solve tomorrow's hardest problems and build what's next.

New Emerging Markets

- We not only deliver emerging technologies for Cisco customers, we harness new customers for Cisco technology.
- And we do so by turning user acquisition, engagement, and “corporate” models of customer success on their head.

New Ideas and Resources

- We drive impact for the broader industry and showcase Cisco's capabilities in these evolving technology spaces through academic and industry publications and conferences, as well as impactful community-wide open source projects.

Building On Our Strengths

Cisco

Collaborative	Passionate	Innovative

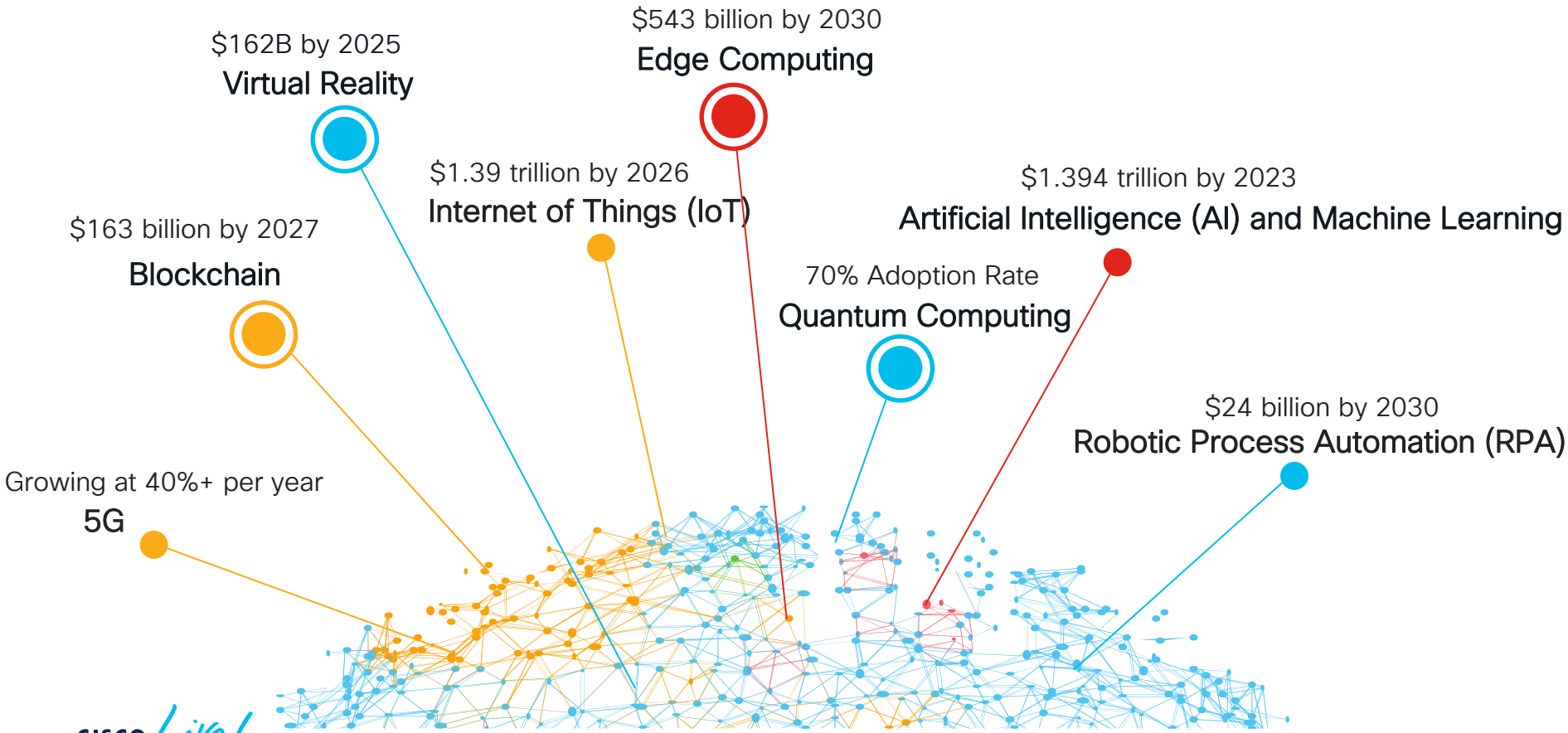
\+ Outshift

Agile	Courageous	Imaginative

Start With Technology?

Or Start With Business Problems?

Trendspotting: Technology Opportunities



Degrees of Innovation

First Degree

Growing the Current Business

- Networking
- Security
- Collaboration
- Applications

Current Cisco Business Entities

Second Degree

Adjacent Markets

- Modern Apps
- Edge Ops/AI
- Data Security

Third Degree

New Markets (for Cisco)

- Disruptive Supply Chain
- Visibility & Observability
- Data Brokering

Nth Degree

New Markets (for the Industry)

- Responsible AI
- Web3
- Quantum Computing and Networking

outshift by cisco

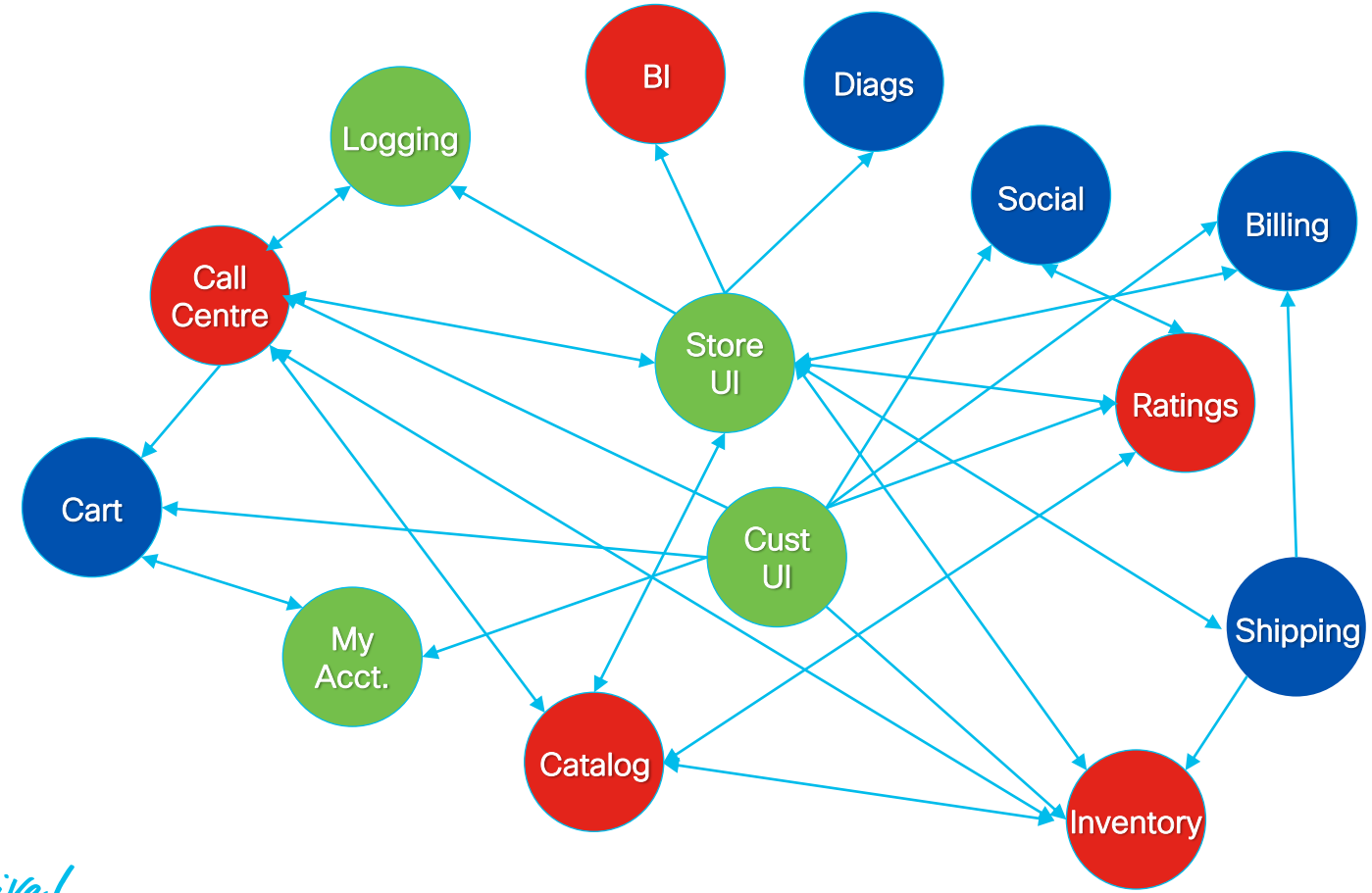
Cloud Native Innovations

750 Million New Cloud Native Applications by 2025

IDC Market Note - Doc # US48441921 - Dec 2021

Application Architecture Evolution–Monolithic

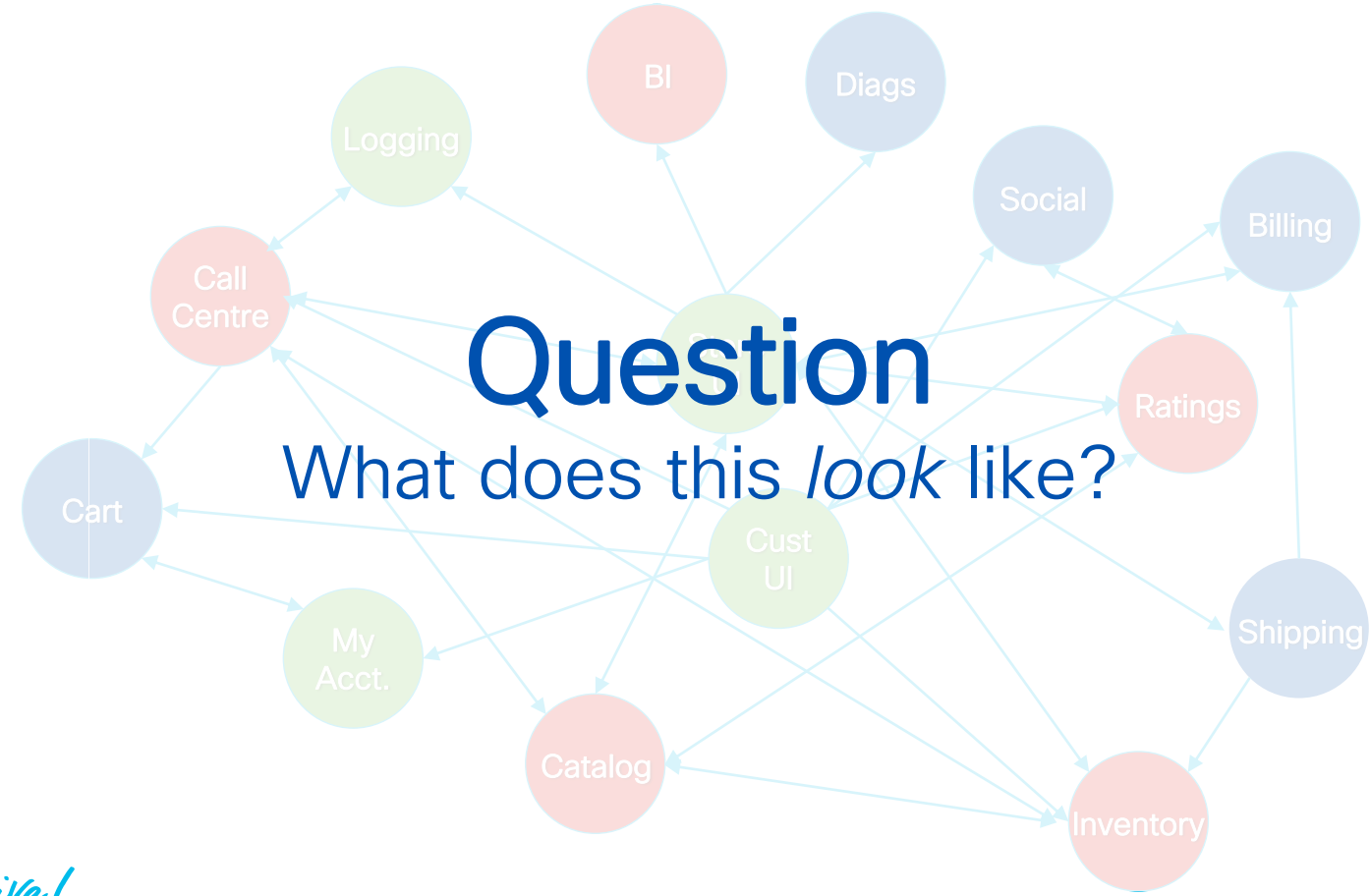
Application Architecture Evolution–Cloud Native



Problems to Solve for Modern Apps

- New infrastructure (K8S, mesh, etc.)
- Massively increased attack surface
- Disparate application platforms
  - VMs
  - Containers
  - Serverless functions
- API exposures
- Securing Streaming Data
- Integrating Observability

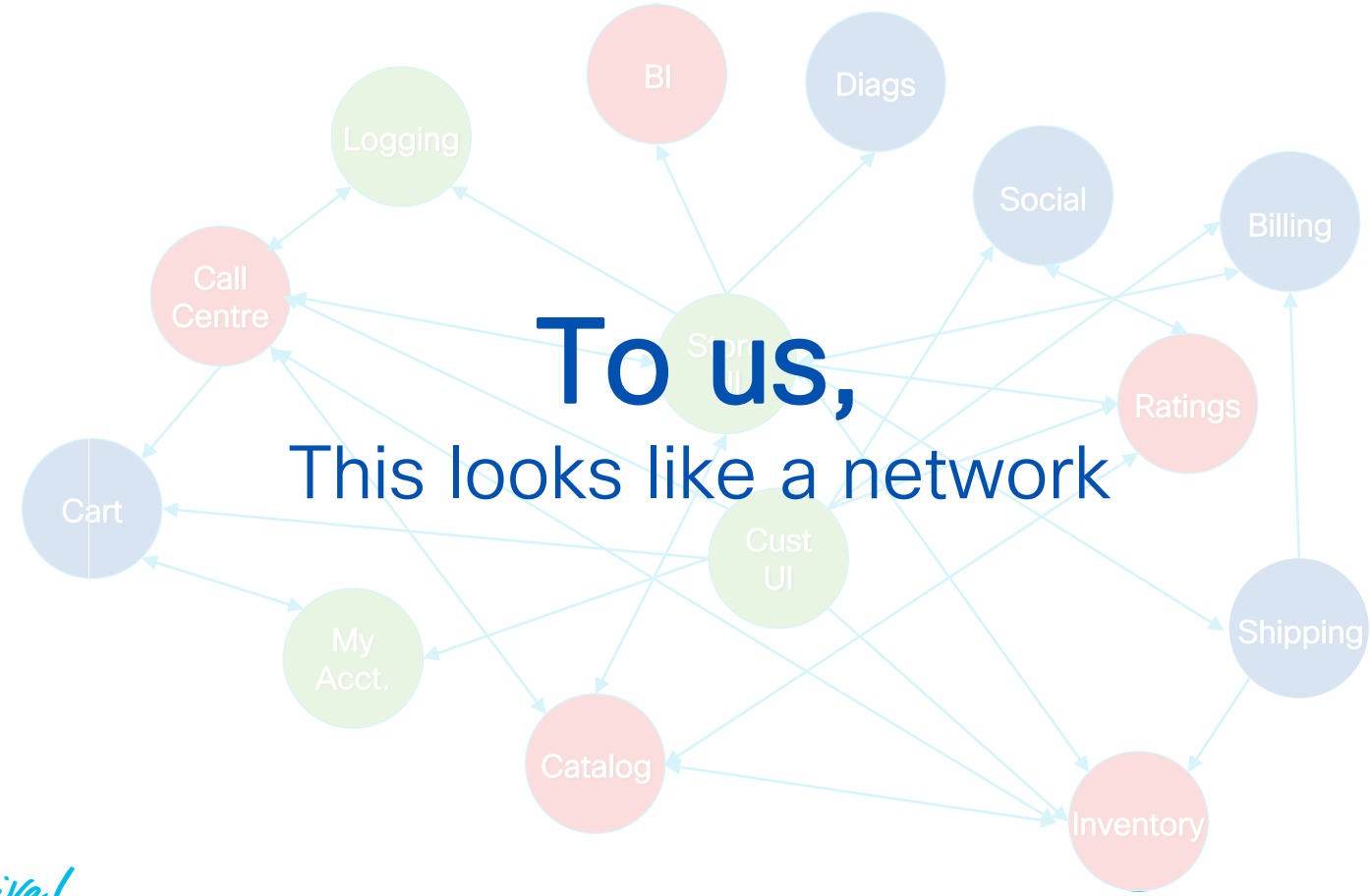
Why Cisco?



Question

What does this *look* like?

Why Cisco?



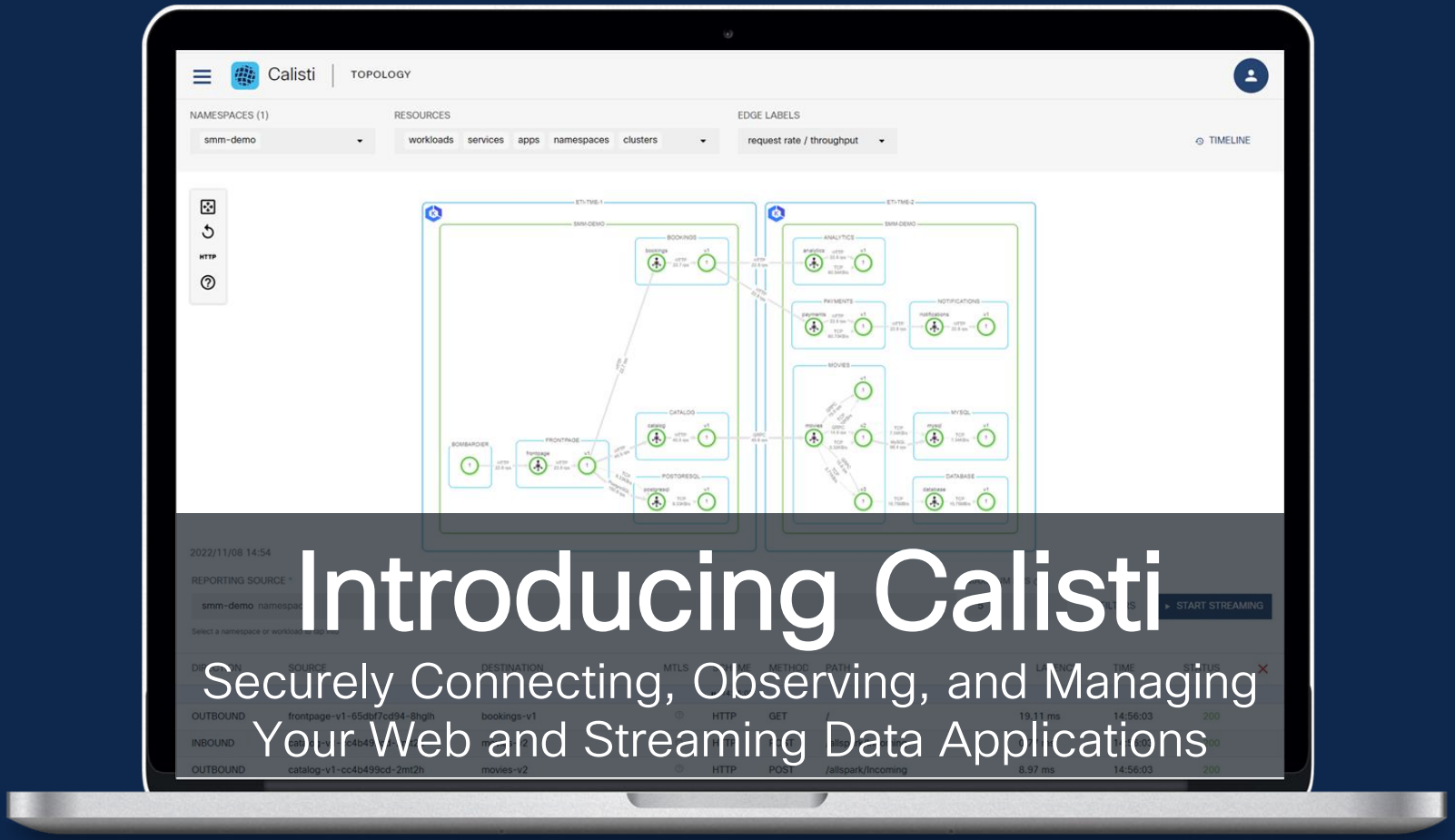
To us,

This looks like a network

Why Cisco?

And like any network it requires:

Connectivity
Security
Observability
Policy
Management



Introducing Calisti

Securely Connecting, Observing, and Managing Your Web and Streaming Data Applications

Introducing Panoptica

Cloud Native application security, simplified.

Emerging Technologies & Incubation

Cloud Native Connectivity

Explore how Cisco is bringing its decades of networking expertise to a new realm of networking: within the application.

START

Monday, June 5 | 9:00 a.m.
DEVWKS-2026
Manage your K8s cluster with the Calisti Service Mesh Manager

Monday, June 5 | 9:30 a.m.
BRKETI-1003
Intro to Outshift

Monday, June 5 | 1:00 p.m.
BRKETI-2003
Understanding Multicluster Kubernetes Connectivity Options

Monday, June 5 | 4:00 p.m.
DEVWKS-2027
Automating Management of Event-Driven Microservices with GitOps

Tuesday, June 6 | 10:30 a.m.
BRKETI-2005
Simplifying Cloud Native Secure Connectivity and Observability with Calisti

Tuesday, June 6 | 12:30 p.m.
PSOETI-2110
Mesh With Your Cloud Native Event Driven Application

Tuesday, June 6 | 3:00 p.m.
DEVWKS-2029
Manage production-ready Apache Kafka clusters on K8s using Calisti Streaming Data Manager

FINISH

Thursday, June 8 | 9:30 a.m.
BRKETI-2006
Real-Time Media in a Cloud Native World

Emerging Technologies & Incubation

Cloud Native Security

Explore why a new approach to security is needed for cloud native applications and learn how Cisco is meeting these rapidly evolving security requirements.

START

Monday, June 5 | 9:30 a.m.
BRKETI-1003
Intro to Outshift

Monday, June 5 | 11:00 a.m.
DEVWKS-2285
Introduction to APIClarity - A Wireshark for APIs

Monday, June 5 | 1:00 p.m.
DEVWKS-2974
Securing Cloud Native Applications with Panoptica

Tuesday, June 6 | 10:30 a.m.
BRKAPP-1116
CNAPP and FSO together - Synergies of Cisco Observability and Cloud-Native Application Security

Tuesday, June 6 | 3:00 p.m.
BRKETI-2511
Securing Cloud Native Applications with Panoptica

Wednesday, June 7 | 10:30 a.m.
BRKETI-2903
Why You Need a CNAPP ASAP!

Wednesday, June 7 | 12:00 p.m.
DEVWKS-3002
API Security with Panoptica

Thursday, June 8 | 8:00 a.m.
IBOETI-2001
Bring the Pain! What Are Your Most Painful Cloud Native Security Problems?

Thursday, June 8 | 9:00 a.m.
DEVWKS-3003
5G Core security with Panoptica

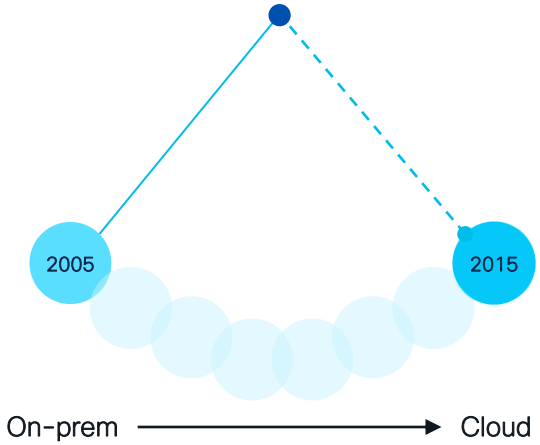
FINISH

Thursday, June 8 | 9:30 a.m.
BRKAPP-1115
Cloud Native Application Security: An Integrated CNAPP Approach from Cisco

Edge Native Innovations

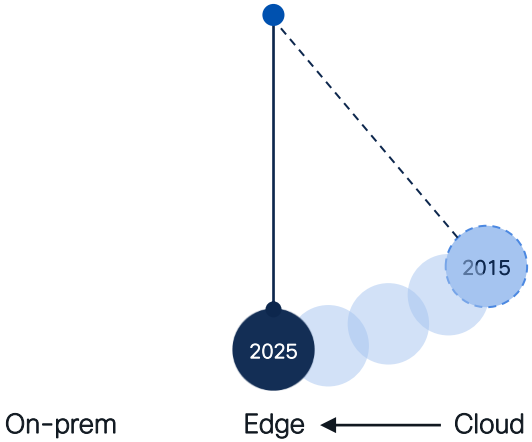
Prem to Cloud to Edge Pendulum Swing

Cloud disrupted the on-prem paradigm...



Industry starts transitioning
towards **centralized cloud model**

... Edge is emerging as the next paradigm



Industry beginning to realize limitations of
the centralized cloud model for certain use cases

Edge computing brings data processing closer to the source

- Reduced latency between sensing and action
- Bandwidth management to reduce costs
- Increased privacy for sensitive data
- Uninterrupted operations with unreliable networks

Smart Device Edge Use-Cases

Mass Transit

- Detect customers w/ luggage on escalators
- Left-luggage detection on train station platform

Retail

- Detect basket shrink at self-checkout terminals
- Customer behavior analytics, peak travel times
- Customized digital signage based on behavioral analytics

Restaurants

- Food preparation times and quality monitoring
- Drive-thru optimization
- Simplified curbside check-in
- Footfall analytics

Road Monitoring

- Broken guardrail detection
- Pothole detection

Safety/Security

- Monitor bus interior and exterior
- Detect security incidents/behavioral concerns

Common Themes

1. Highly distributed locations (hundreds to tens-of-thousands)
2. No IT experts on site
3. AI/ML Use Cases

Problems to Solve in Edge Ops/AI

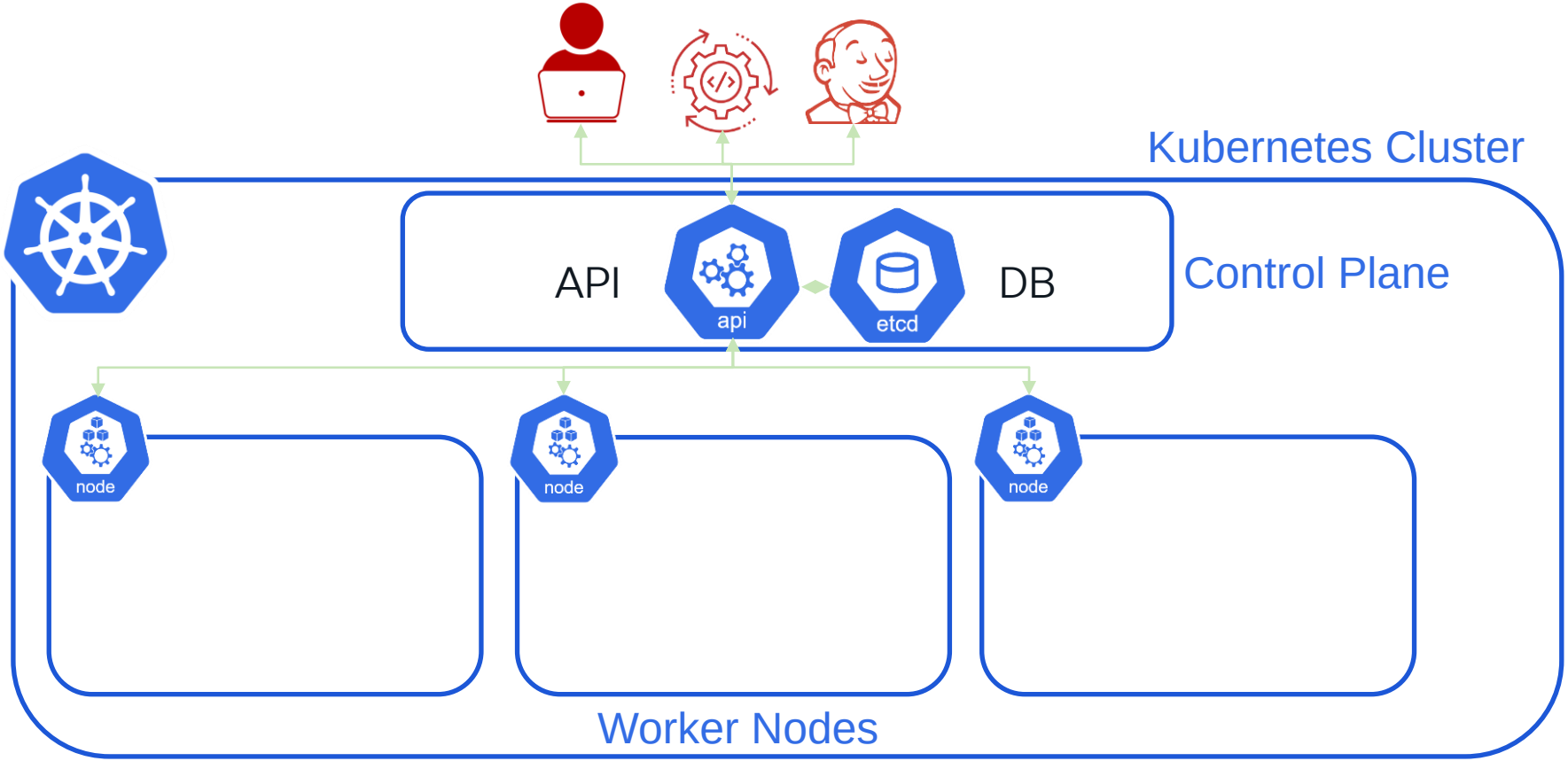
- How to rearchitect applications that were built for cloud-only environments to be distributed across the cloud *and* the edge?
- How to make the edge feel like the cloud from a development and operations perspective?
  - How to run vertical point solutions on a horizonal platform?
  - How to combine single-purpose compute units into multi-purpose clusters?
  - How to manage the edge without tunnels?
  - How to automate deployment?
  - How to scale a deployment to thousands of edge locations?

Edge Native Key Design Tenets

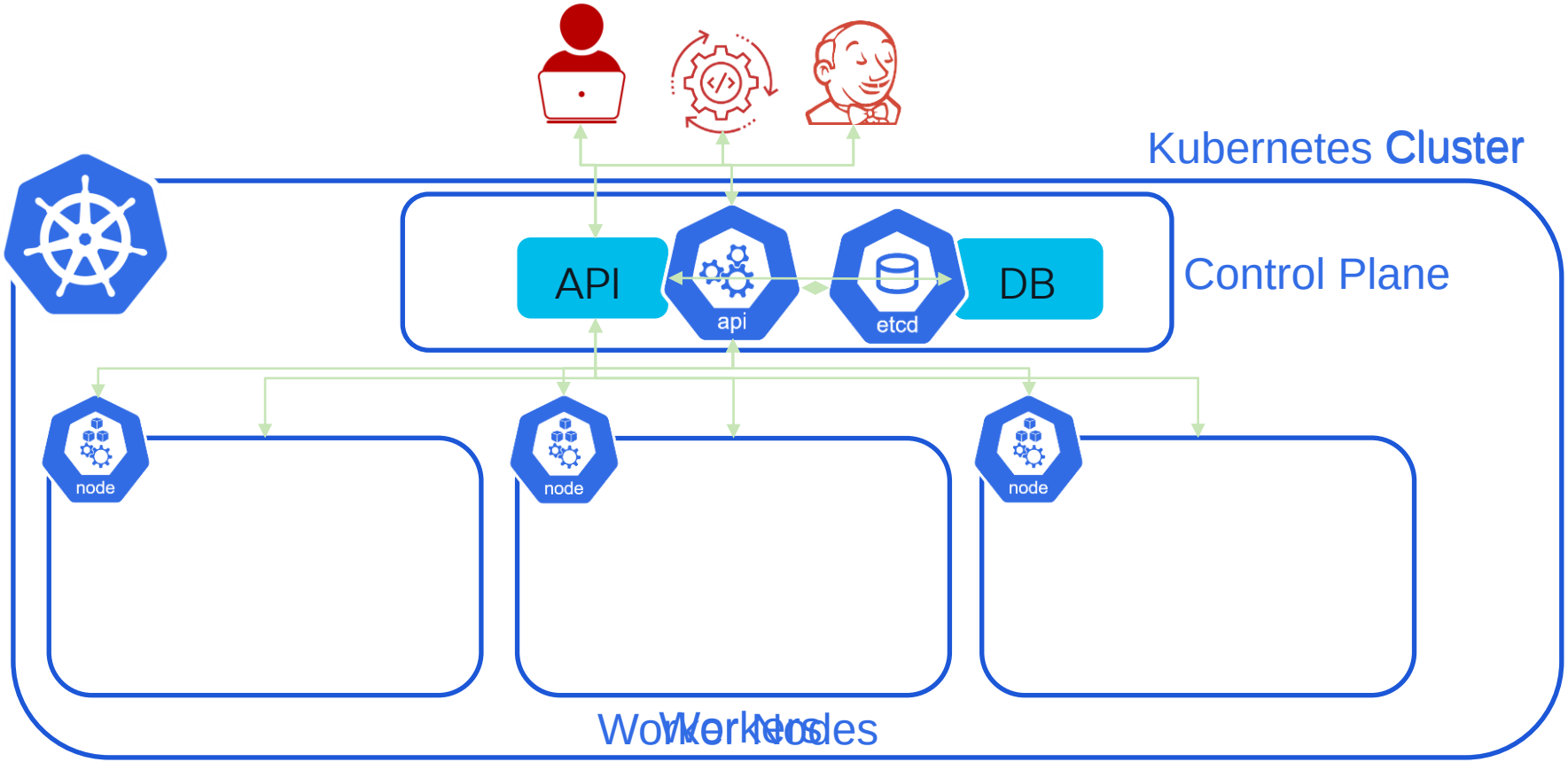
Non-Expert Operator	Intuitive management of “Apps” and “Sites”. Kubernetes complexities entirely hidden
Sites are Cattle	Sites/clusters as scaling entity (as opposed to Pods). Sites are disposable, can fail/restart, get off-grid and re-synch later without losing state/data
Local control, central intent	100% declarative model: Intent in the cloud. Site local, autonomous control plane. No tunnels
Community software rulez	Build on open-source with strong communities and existing SRE-platform provided solutions: K3s, PostgreSQL, Harbor, …
Cloud dev experience	SDK/Tools to hide edge-complexities: SLO-driven workload placement, AI model splitting, Federated Learning Orchestration
Multi-architecture	Support for different Architectures.

See also: Edge Native blog
https://eti.cisco.com/blog/edge-native

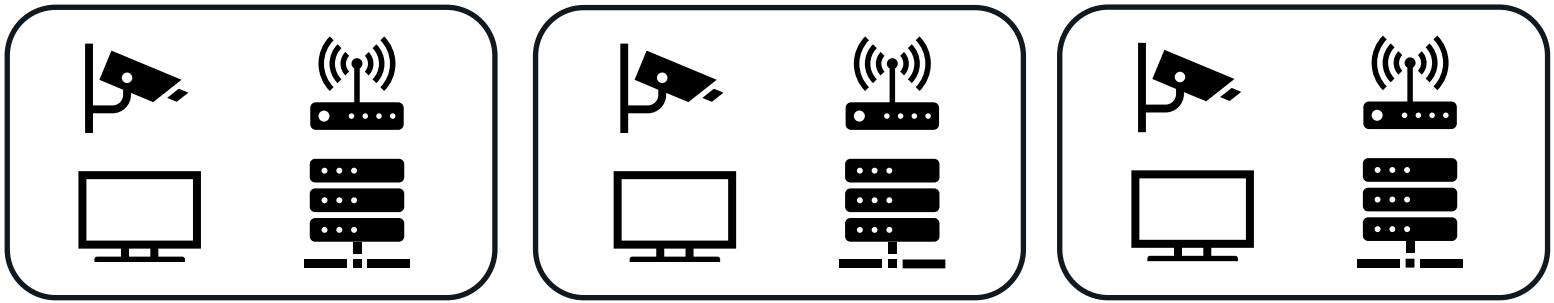
Kubernetes Oversimplified



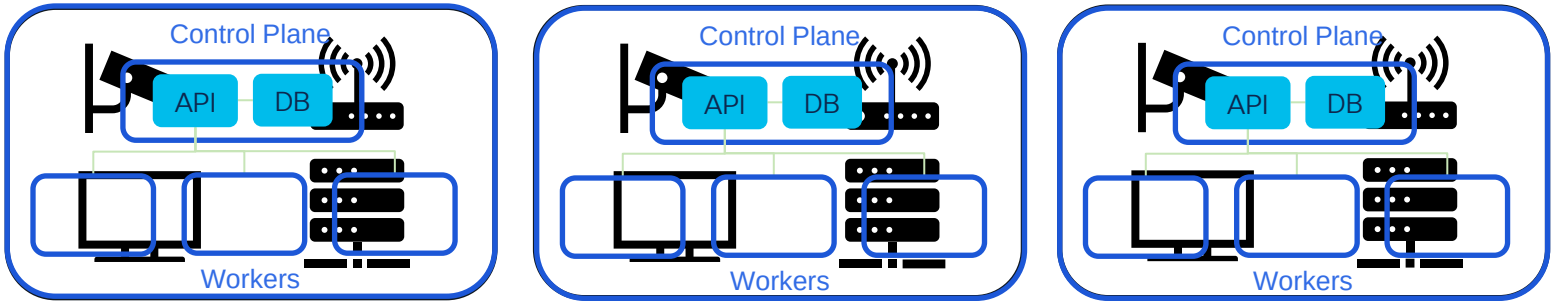
Kubernetes Abstracted



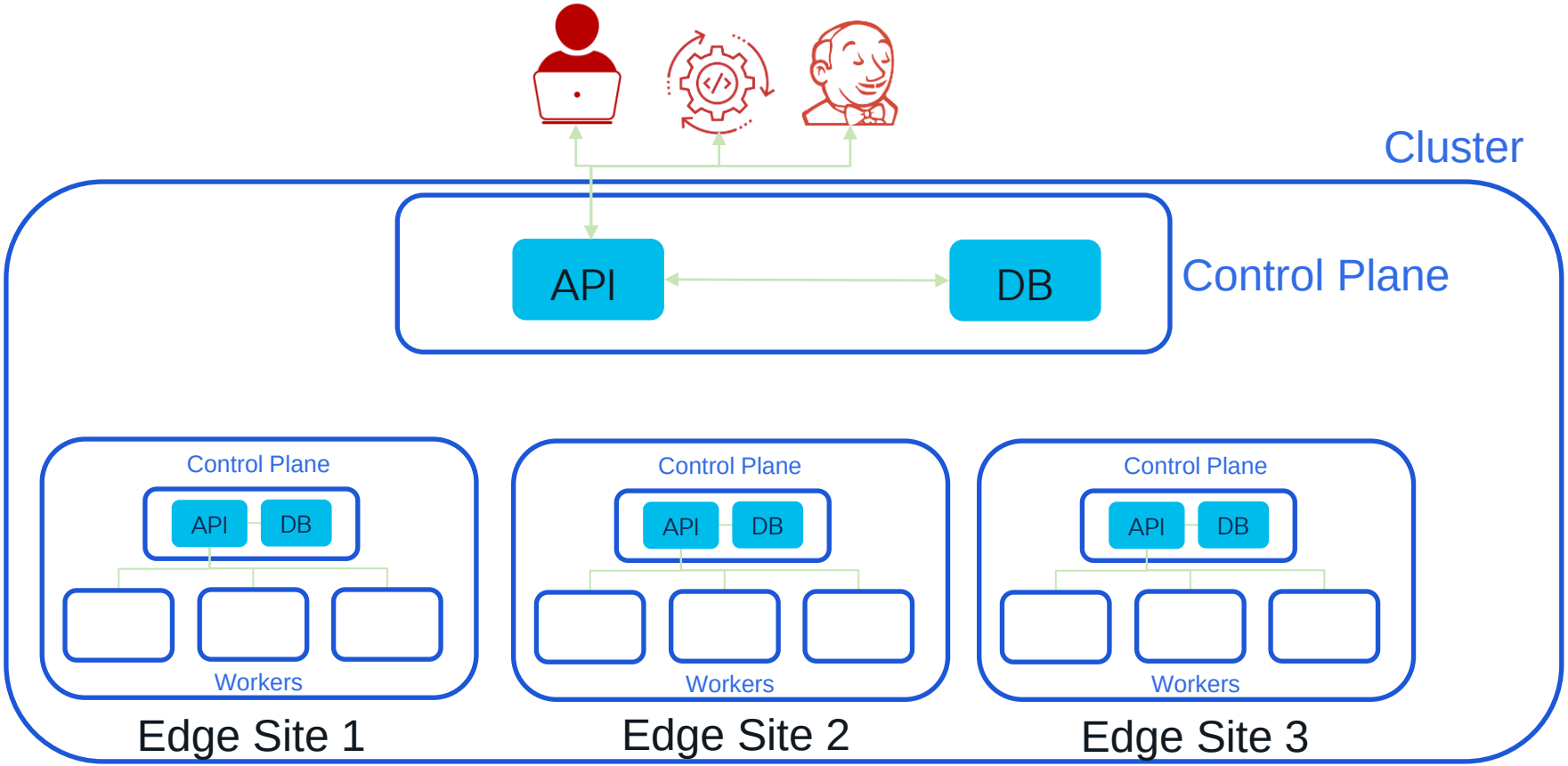
Edge Sites and Compute Resources



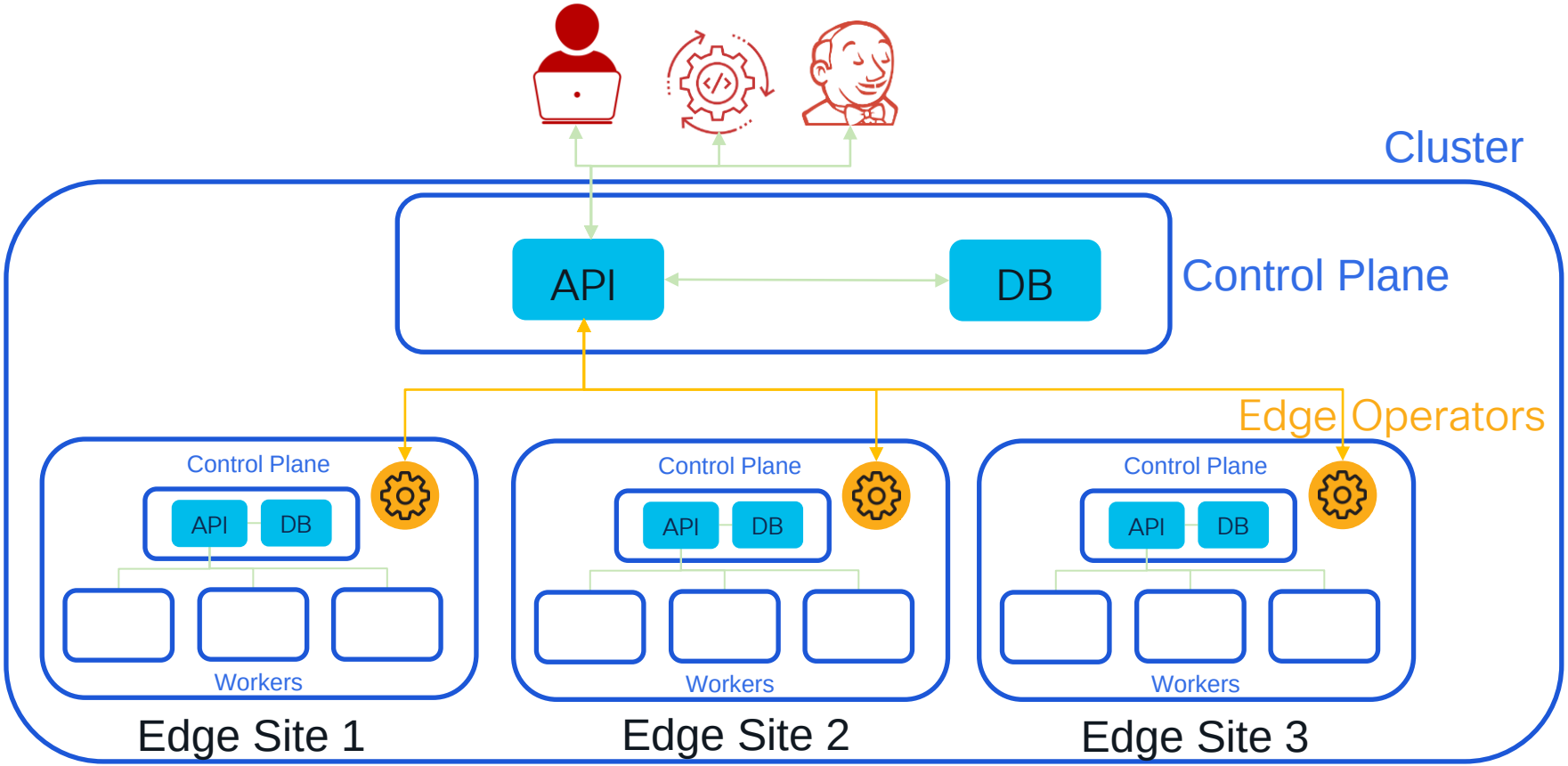
Clustering Local Compute Resources



Simplified Edge Native Example Architecture



Simplified Edge Native Example Architecture



Common Needs Across Edge Use-Cases

Data Management

Pipelined processing, on-demand invocation of workloads; Data caching and storage

Edge Rendering

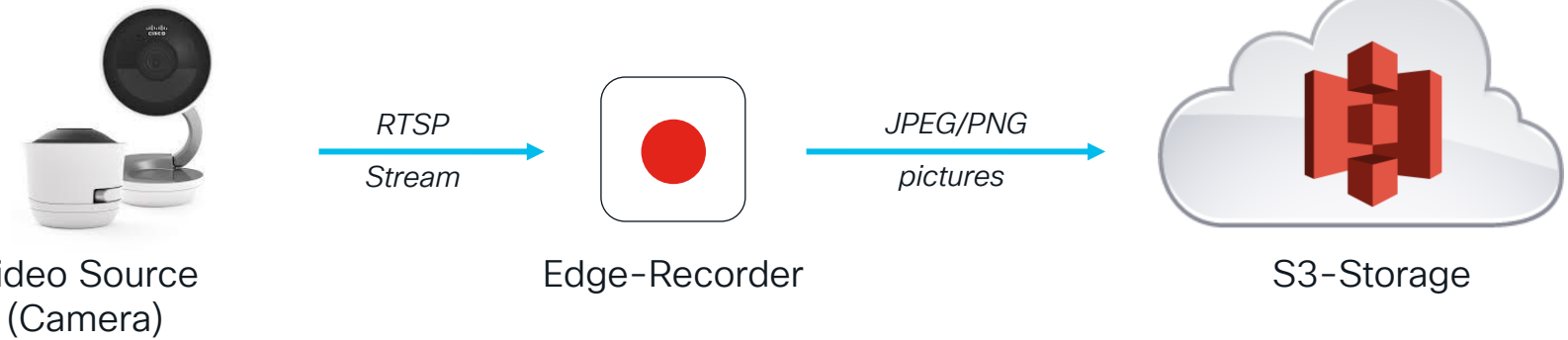
Render and display streaming and static data locally

Edge-AI

Fit AI models to the resources available at the edge for inference; Federate learning

Data Management Use Case

Edge Data Recorder



Great Bear | AWS Management Console | gbear-edge-recordings - S3 buck | Amazon S3 Explorer (v2 alpha)

dashboard.edge.greatbear.io/gbear/sites

Great Bear

Search sites...

Frank Brockners
demo

Overview
Sites
Nodes
Application Store

Sites

+ Add New Site

Site name	Description	Location	Status	Assigned Nodes	Deployed Apps
Cologne	Cisco Cologne Office	Gutenbergstraße, 50823...	Runn...	Cologne Node 1	RTSP Simple Server, RTSP Test Stream
London	Cisco Office London	Bedfont Lakes, Feltham, ...	Runn...	London Node	Event Driven Displays
Paris	Cisco Office Paris	11 Rue Camille Desmouli...	Runn...	Paris Node	Event Driven Displays
Rolle	Cisco Office Rolle	Avenue Des Uttins 5, 11...	Runn...	Rolle Node	Event Driven Displays

Rows per page: 10 1-4 of 4

rtsp://34.245.131.119:30554/mystream - VLC media player

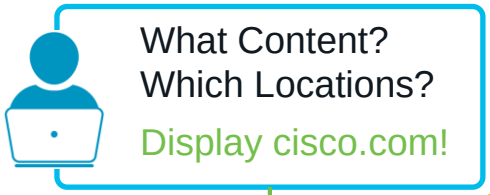
Media Playback Audio Video Subtitle Tools View Help

08:45 00:00

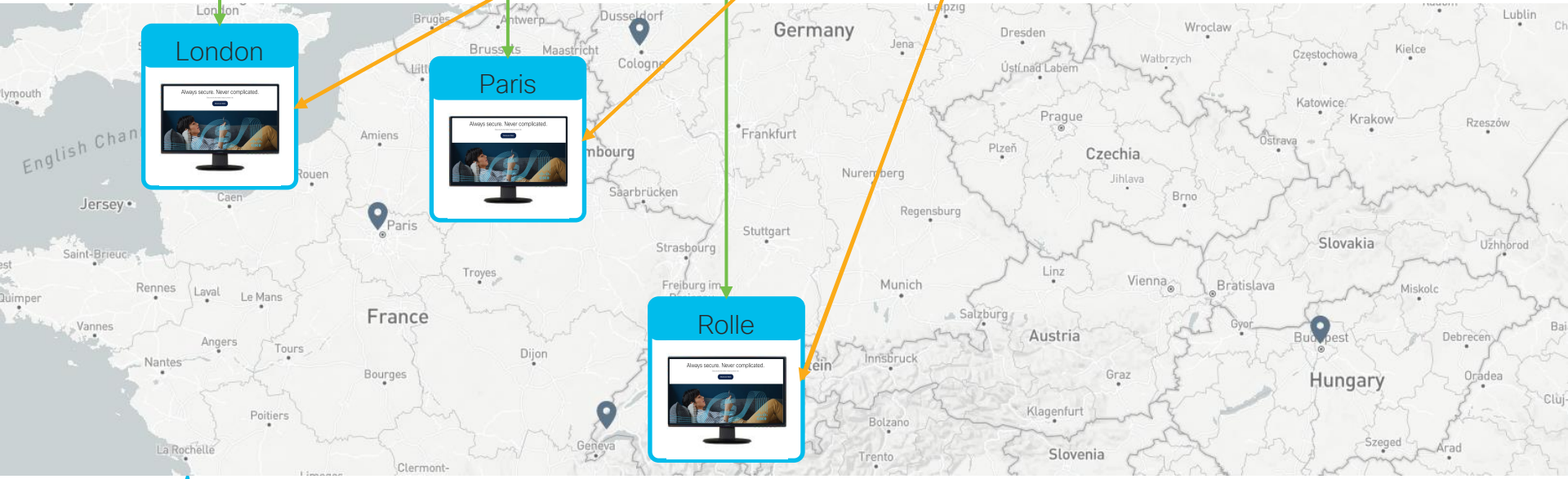
100%

Edge Rendering Use Case

Event Driven Display



www.cisco.com



Edge AI Use Case

Edge AI Challenges

2 FPS **5** people detected

5 FPS **6** people detected

Edge AI Use Case

Edge AI Challenges

ONNX

~ **1.1** FPS

ONNX ONNX

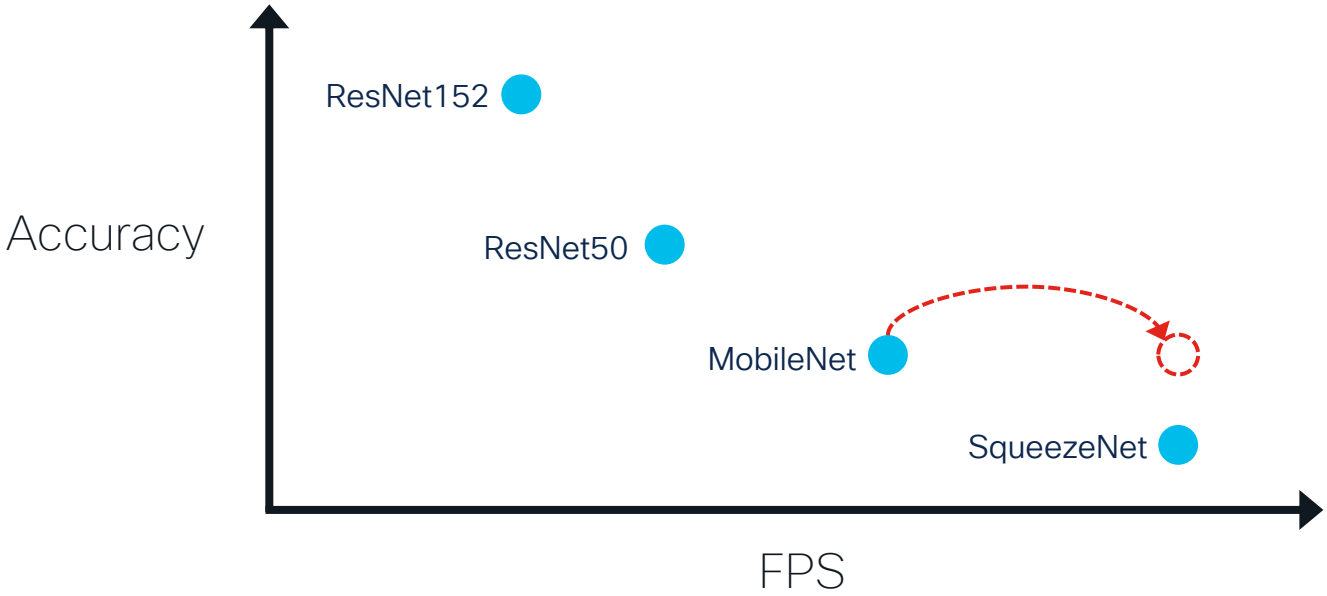
~ **1.7** FPS

ONNX TFLite

~ **2.4** FPS

Edge AI Use Case

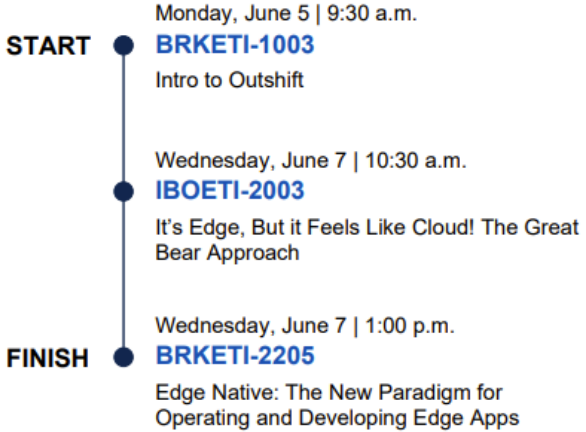
Edge AI Approaches: Spitting & Distributing



Emerging Technologies & Incubation

Edge Native

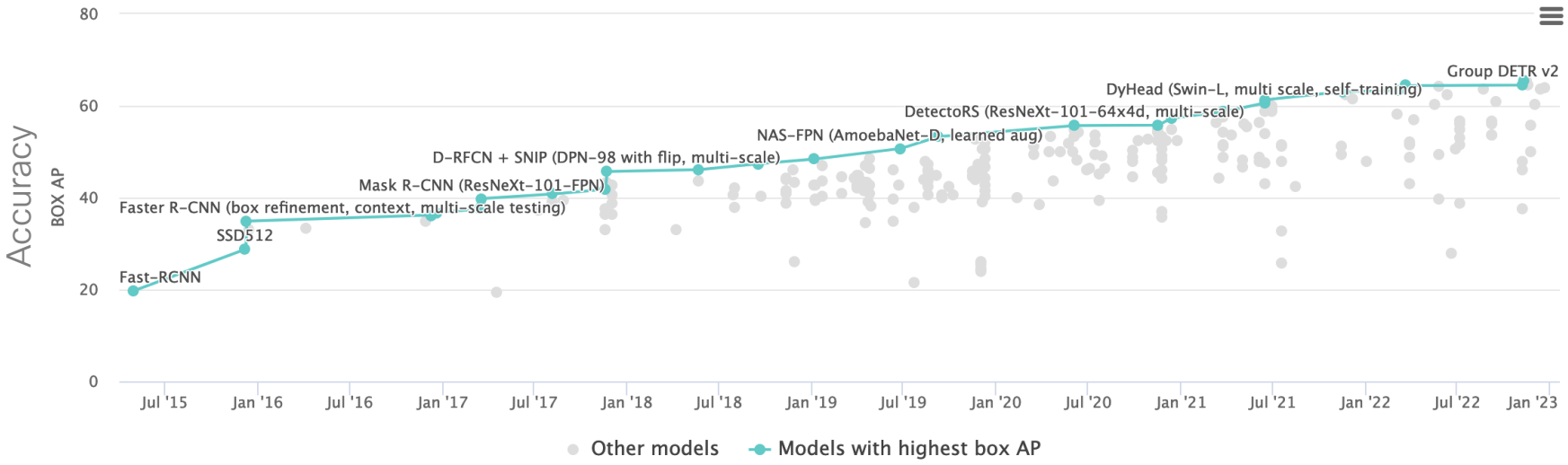
Explore how Cisco is bringing the power and simplicity of the cloud to the edge.



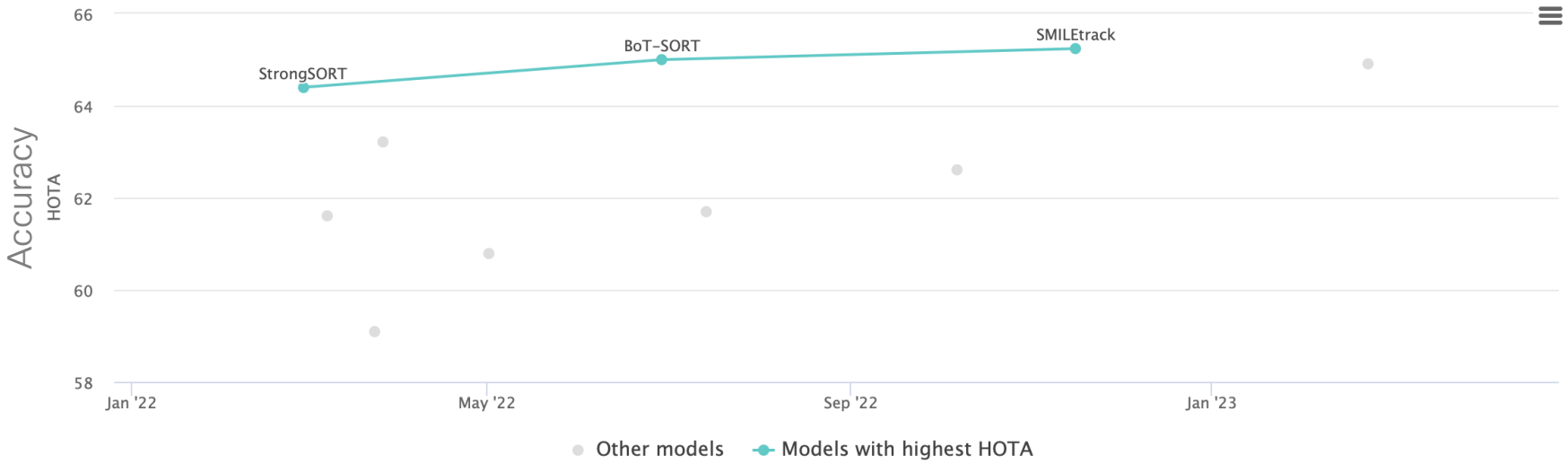
Next Generation AI Innovations

cisco Live!

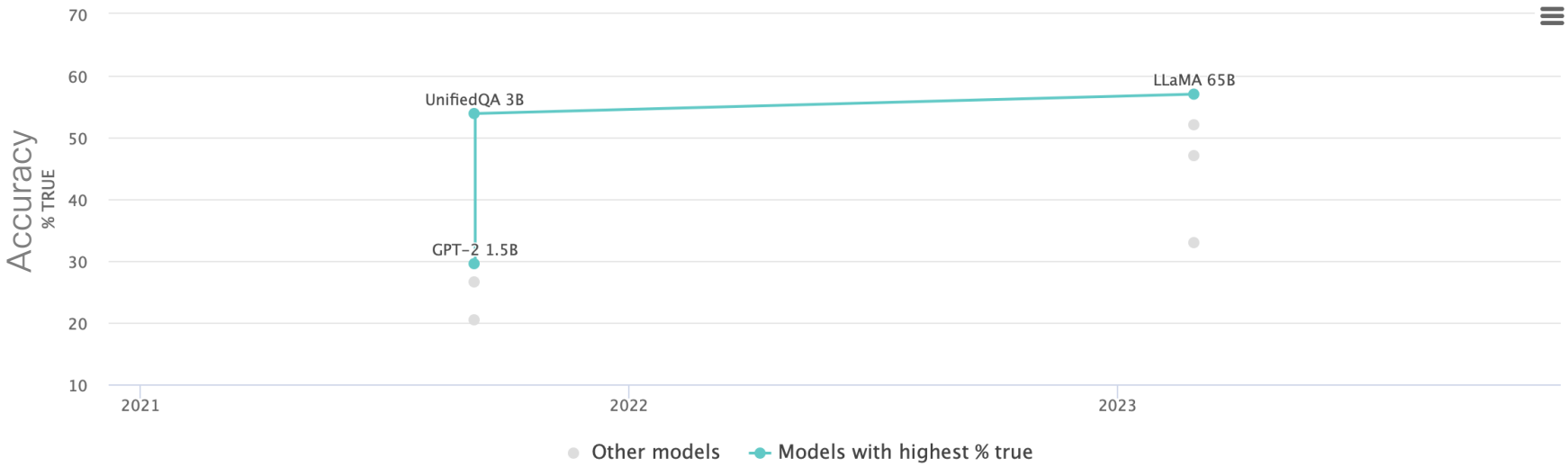
Current State of the Art for Object Detection



Current State of the Art for Multi-Object Tracking

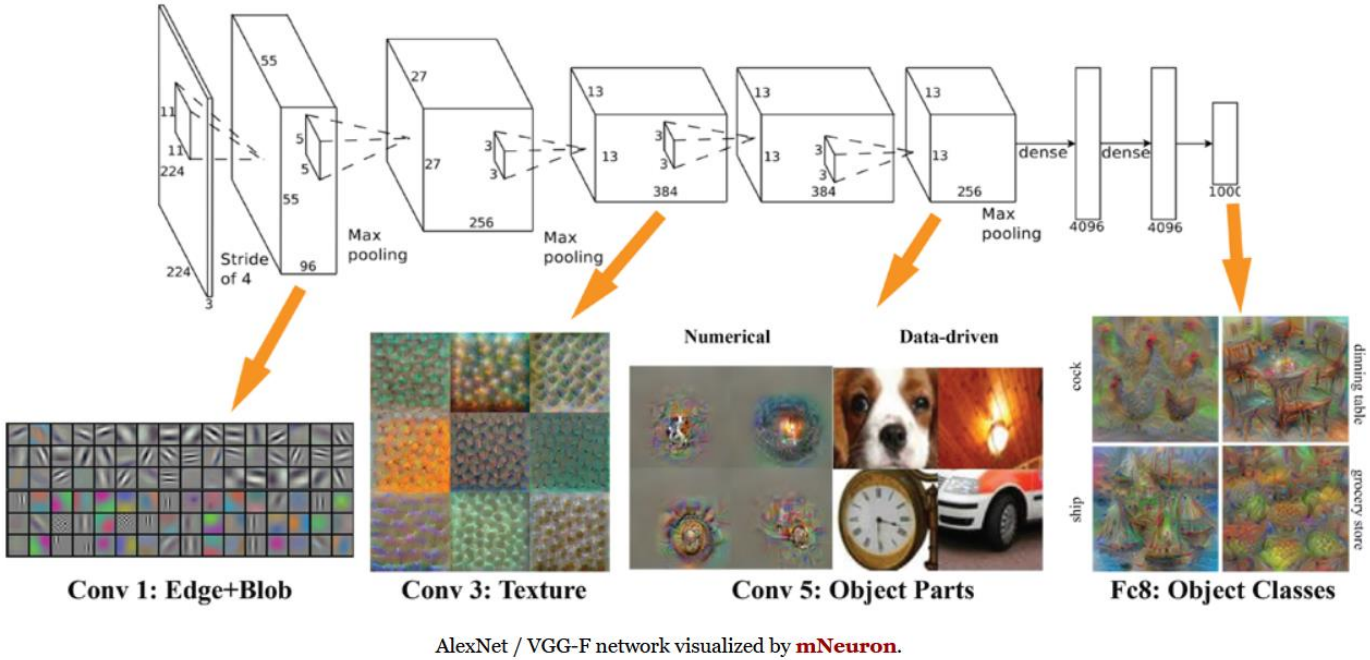


Current State of the Art for Question Answering on Truthful QA



Deep Learning Approach

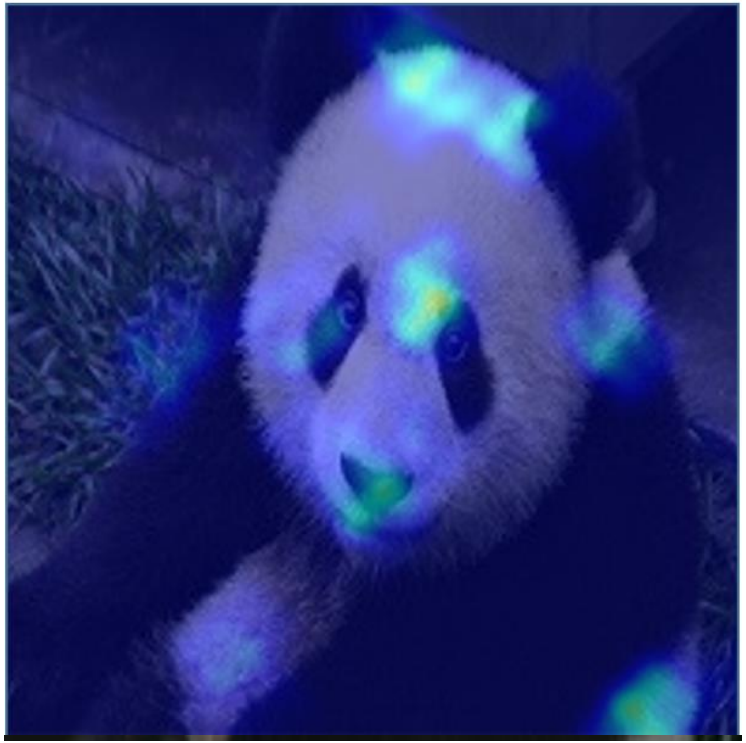
Deep Learning Approach



AlexNet / VGG-F network visualized by **mNeuron**.

Training usually takes around 100K labeled images per class

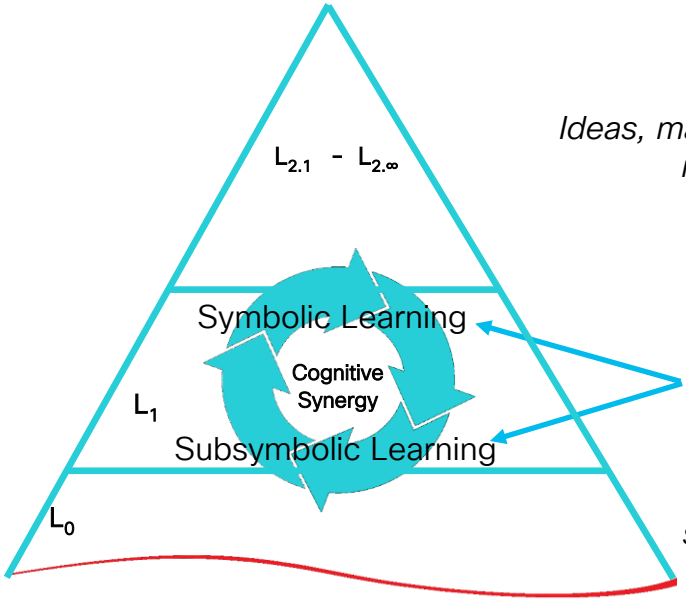
Deep Learning Limitations



As this saliency map shows, deep learning algorithms will make the final panda/no-panda decision based on just the few highlighted pixels

Hybrid AI Overview

Leveraging Efficient Learning by Reasoning with a Neurosymbolic Approach



Conceptual world

Ideas, maps, concepts, metaconcepts, meta-metaconcepts...

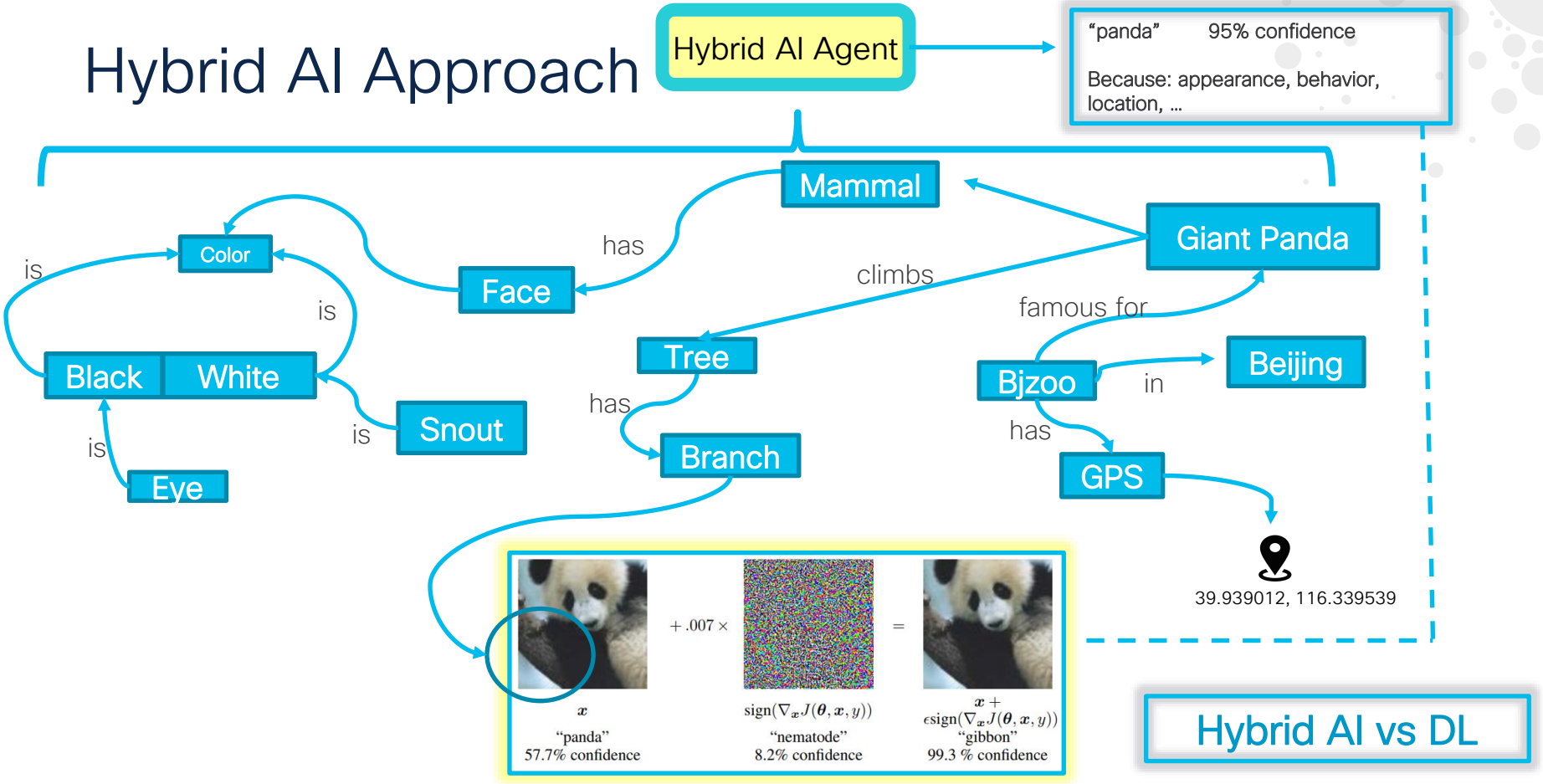
Unsupervised Learning

Physical world

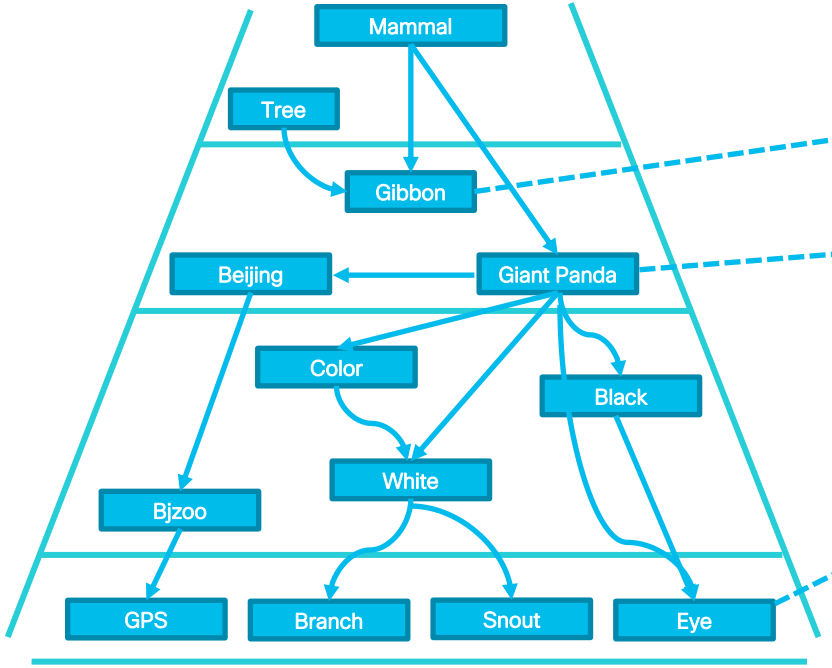
sensor data, text, video...

Building a **model of knowledge** supporting **abstraction**, **distinctions**, **similarities**, and **structure**

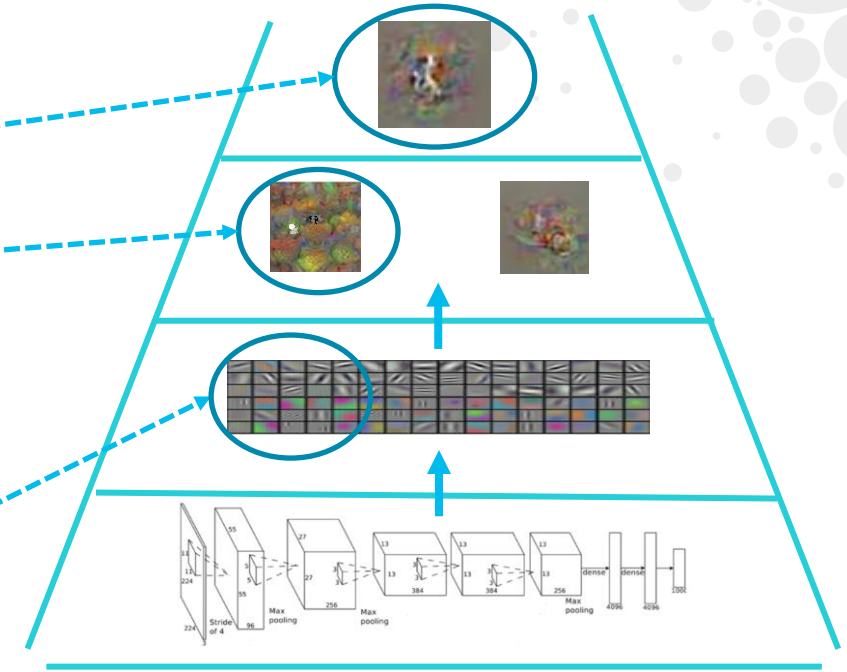
Hybrid AI Approach

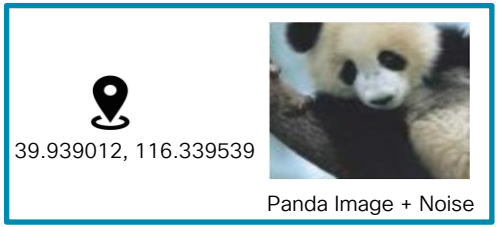


Self-wonder? → **Panda**!



Self-wonder? → **Gibbon**!



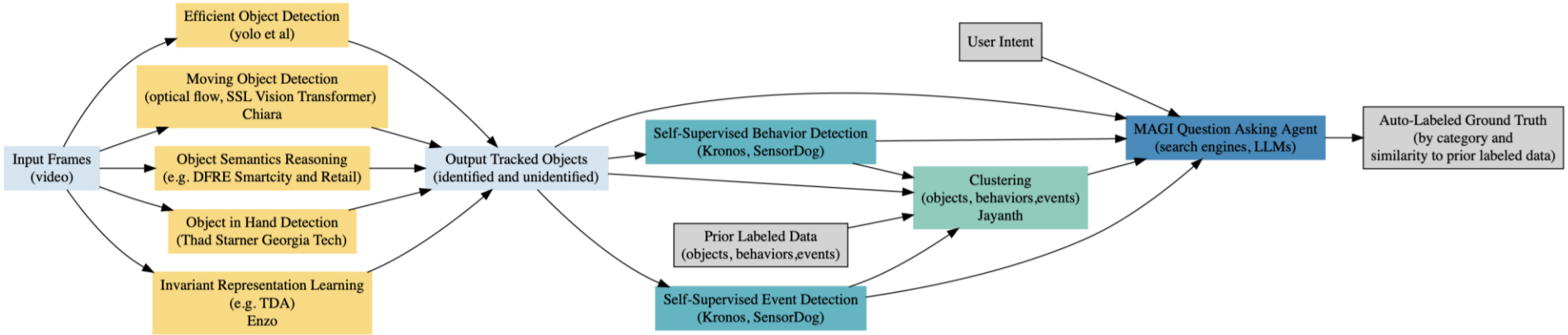


Less Data & More Knowledge
Increased Abstraction → Experience, memory & ontologies, contextualization

Cisco Deep Vision

- Scalable and modular serverless open-source framework
- State-of-the-art object detectors, trackers, behavior detectors
- New types of reasoning engines
- 3D semantics projects
- Multi-modal data stream analytics
- Neurosymbolic integration
- Knowledge representation
- Self supervised learning
- Explainable Perception

Cisco Deep Vision Auto-Labelling Process

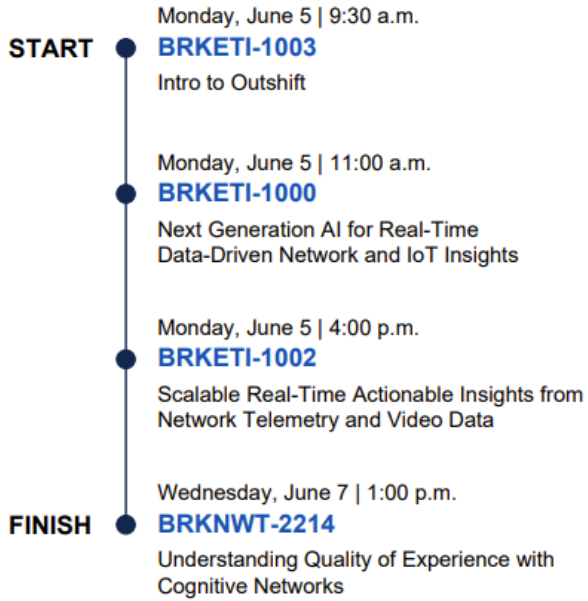


Cisco Deep Vision Demo Video

Emerging Technologies & Incubation

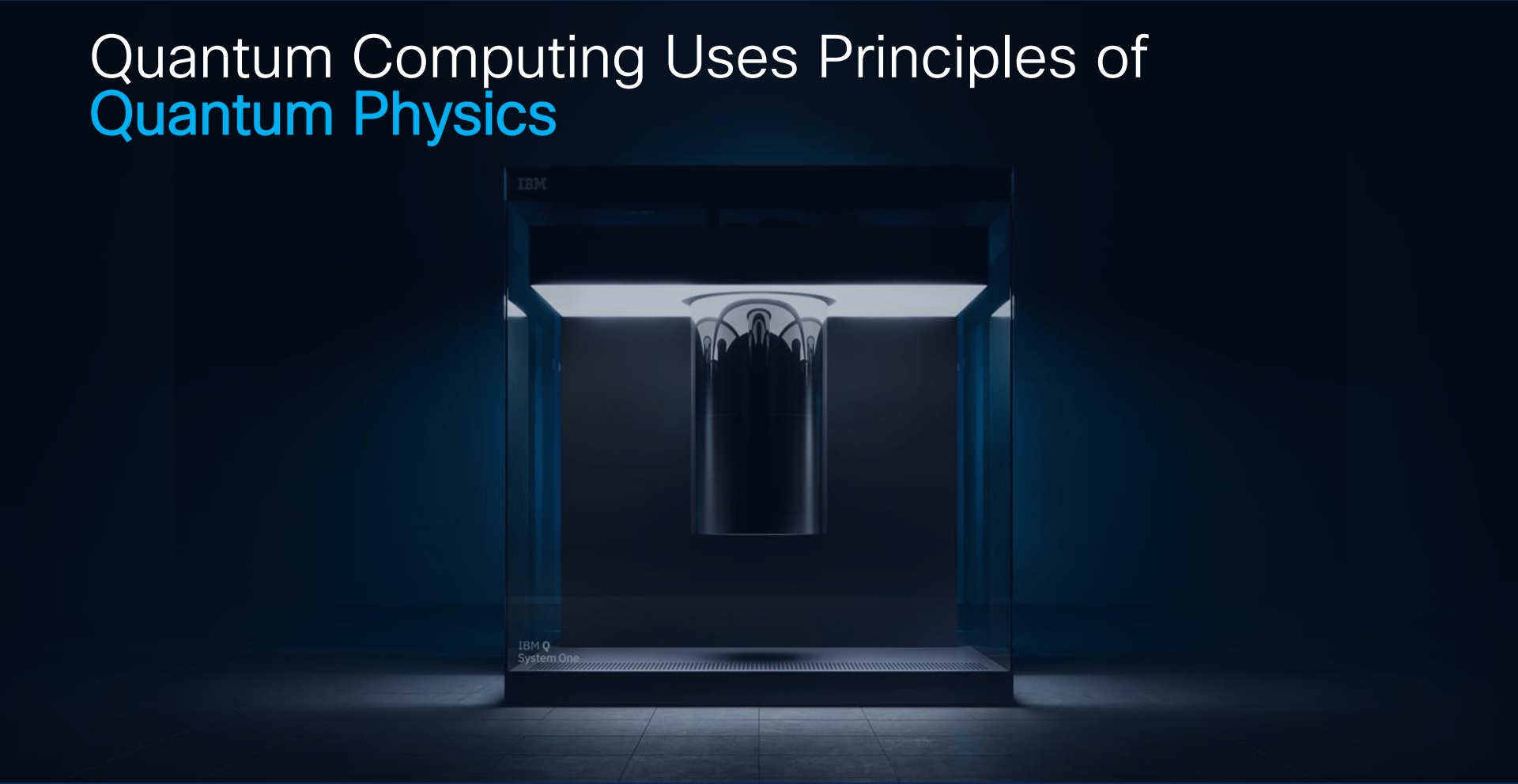
Next Generation Artificial Intelligence

Explore the latest advancements from Cisco research and development in Artificial Intelligence and Machine Learning.



Quantum Research

Quantum Computing Uses Principles of Quantum Physics



Existing Computers use the “Bit”

A Bit can represent a 0 OR 1 state
at any point in time

Quantum Computers use the **“Qubit”**

A Qubit can represent a **0** **AND** **1** state at ***THE SAME*** point in time

This Introduces the Concept of Quantum Superposition

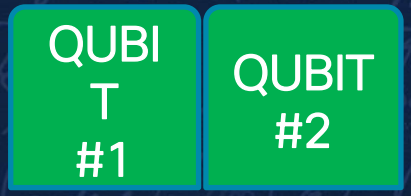
Performing an operation using a single Qubit
Performs action on **TWO** ***values***

Twice *your bang for buck*

Qubit *State*

Quantum **Parallelism**

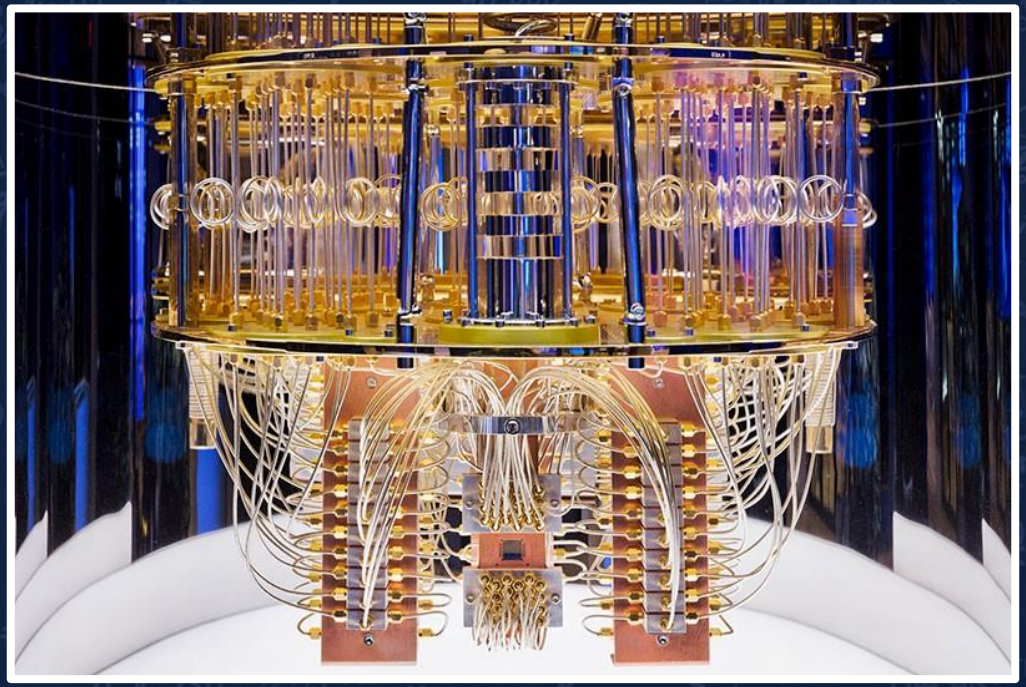
Holds **value** of
0 and 1
simultaneously



Holds **value** of
00, 01, 10, 11
simultaneously

Holds **value** of
000, 001, 010,
011, 100, 101,
110, 111
simultaneously

Adding **Qubits**
scales a quantum computer's
performance *exponentially*



World's largest Quantum Computer (by IBM) has **127 Qubits**

$2^{127} = 1.7 \times 10^{38}$ values

170,000,000,000,000,000,000,000,000,000,000,000

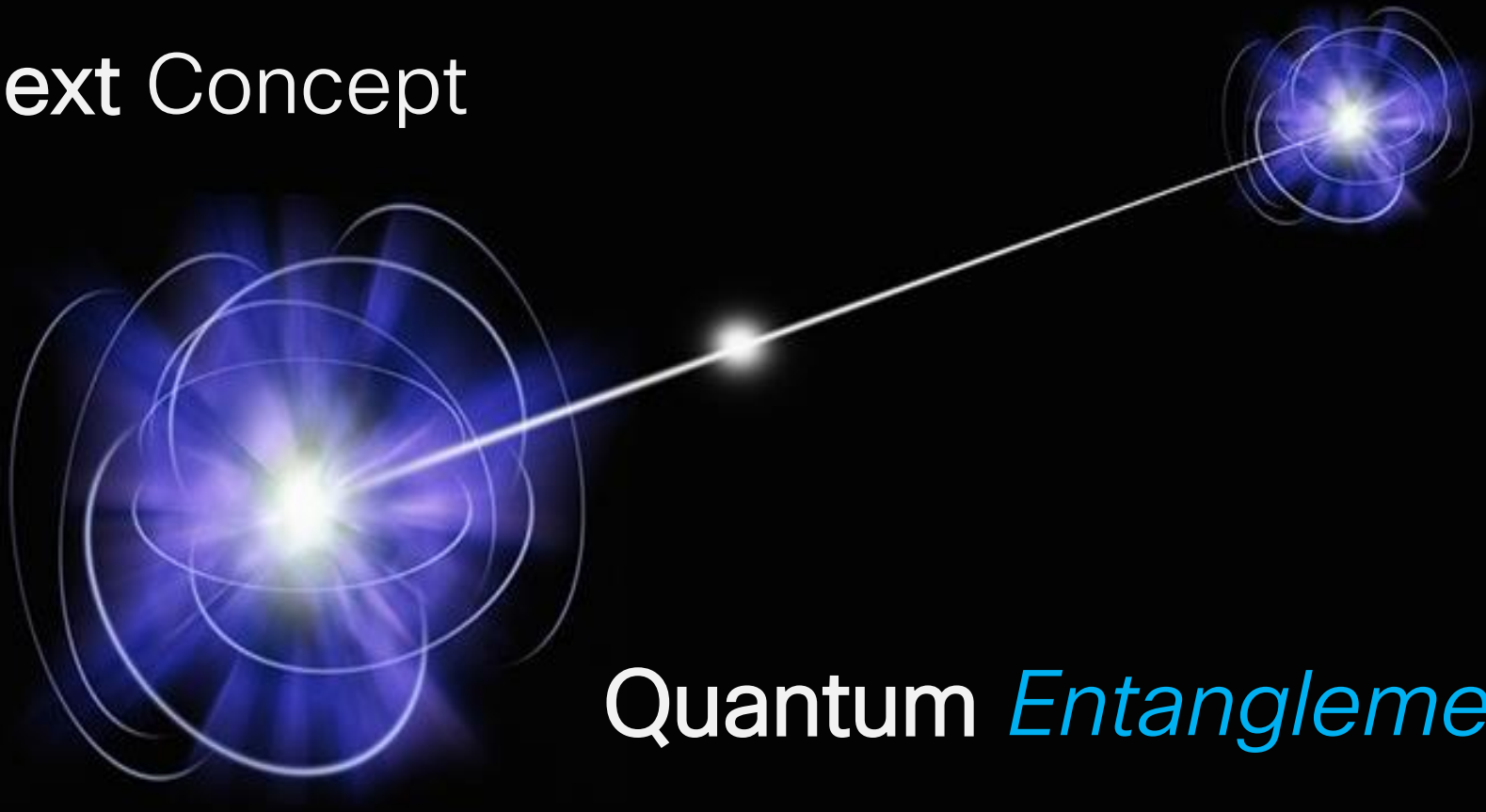
Just how fast is a

Quantum Computer?

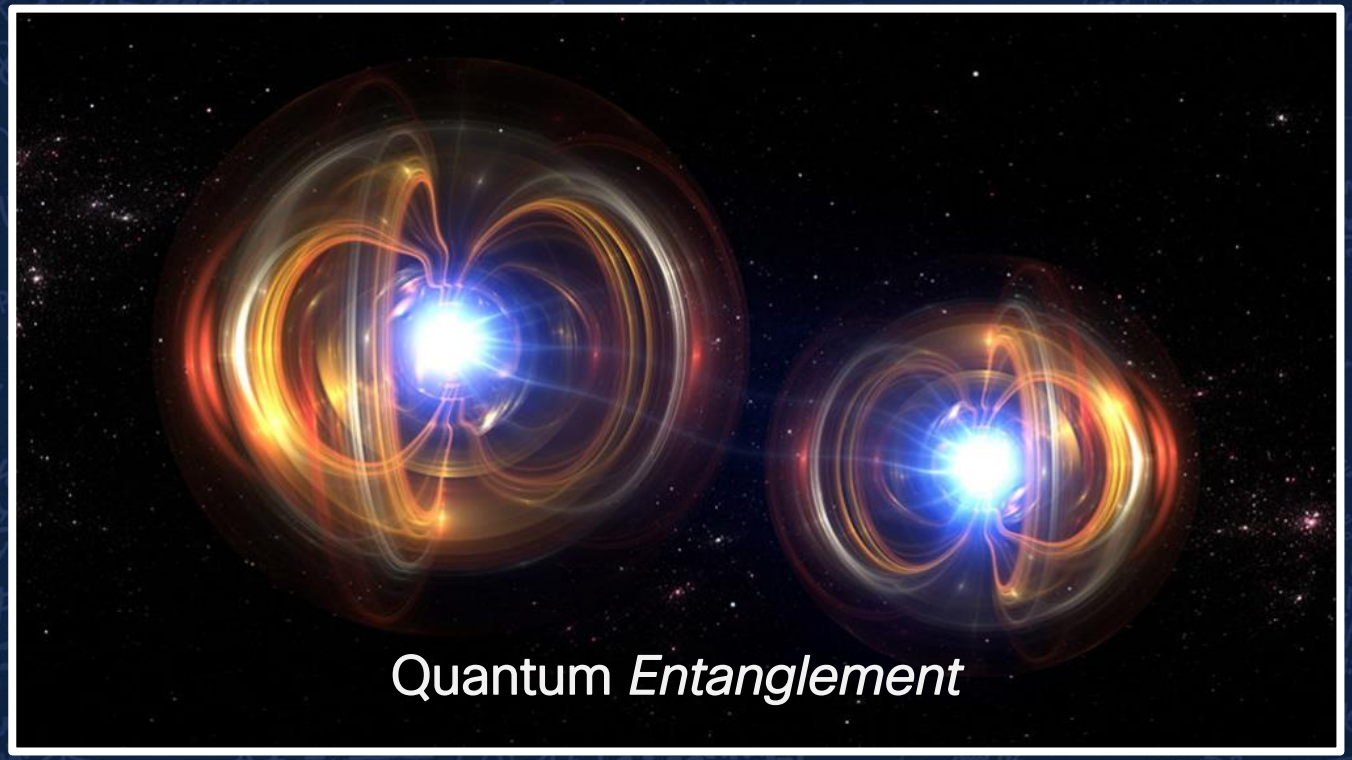
158M Times *Faster*

A task that takes a digital supercomputer 2,500 years to complete can be done on a **Quantum** *Computer* in 1 minute

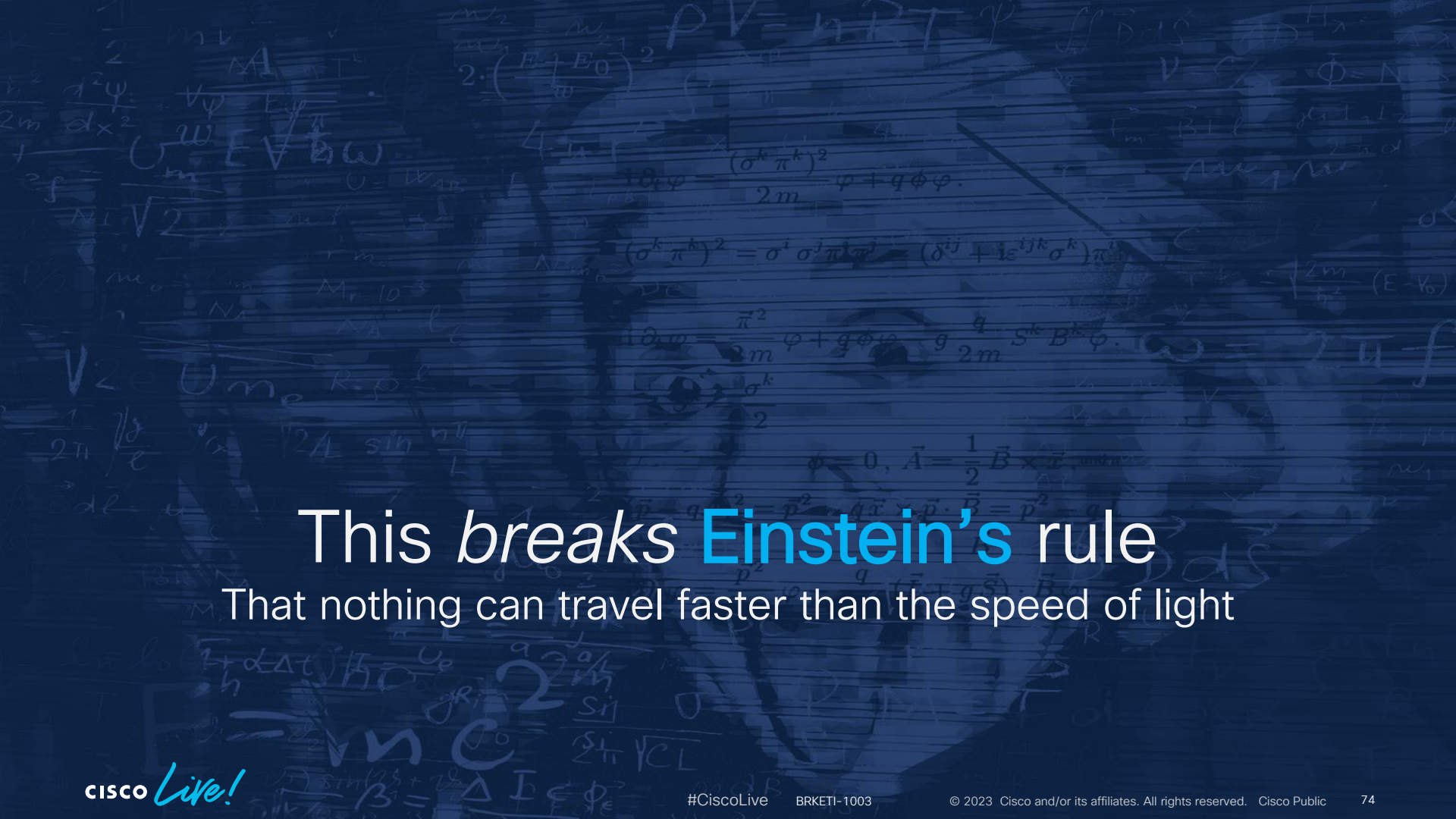
Next Concept



Quantum *Entanglement*



Two quantum particles are connected where the *change in state* in one is **reflected in the other** even though **both** can be miles apart



Why is Entanglement Relevant?

One Great Use Case

Crypto Key *Exchange*

Entangled Qubits sharing crypto keys with no third-party sharing that correlation

Quantum Cryptography *Benefit*

No Cloning Theorem

Impossible to copy data encoded in a quantum state

What are the Challenges?

Decoherence

Qubits **interacting** with the *environment* causing *uncontrollable changes* to quantum state that cause information to be **lost**

Entanglement State

Entanglement state can only be *currently maintained* for **400 nanoseconds**

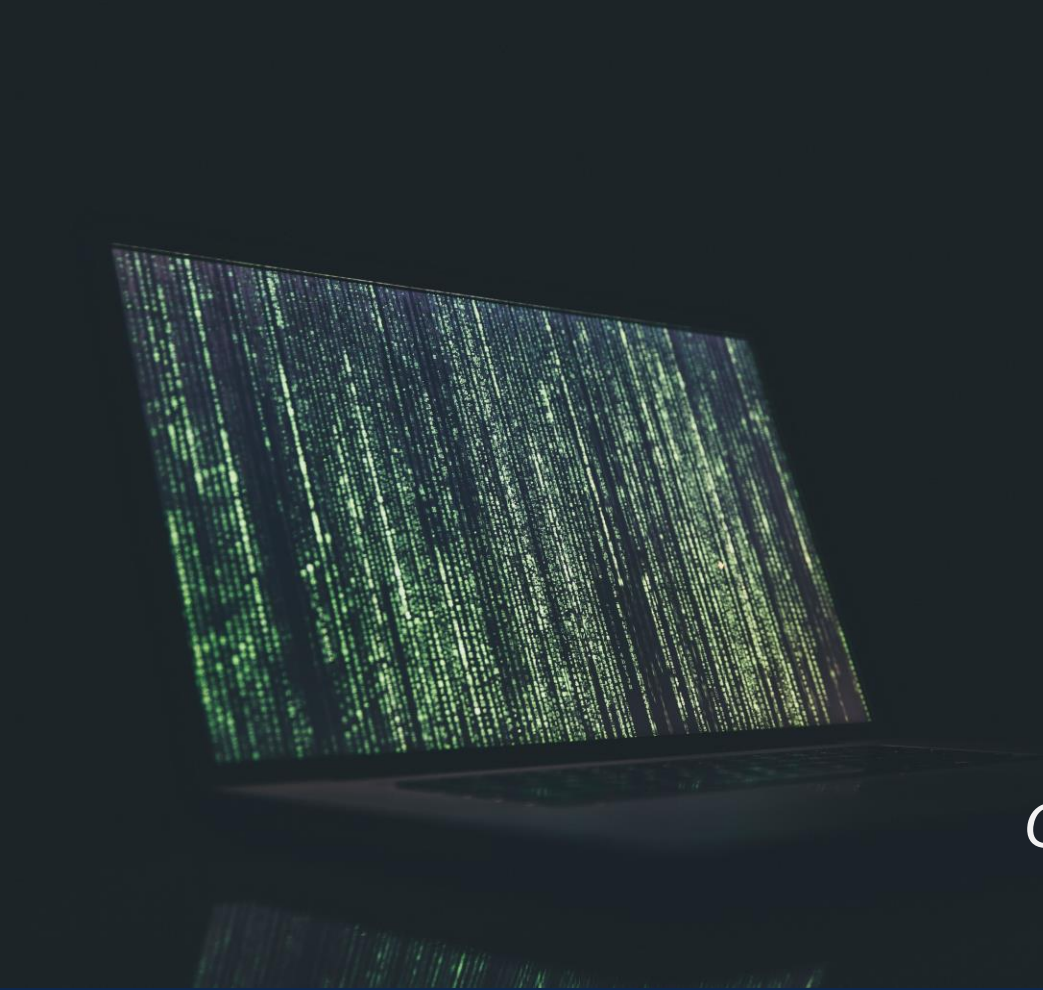
Y2Q

Years to **Quantum**

Time left before quantum computing is **commercially** viable and today's encryption can be broken

Which begs the Question:

How many qubits needed to break **AES-256** Bit Encrypted Data



Answer

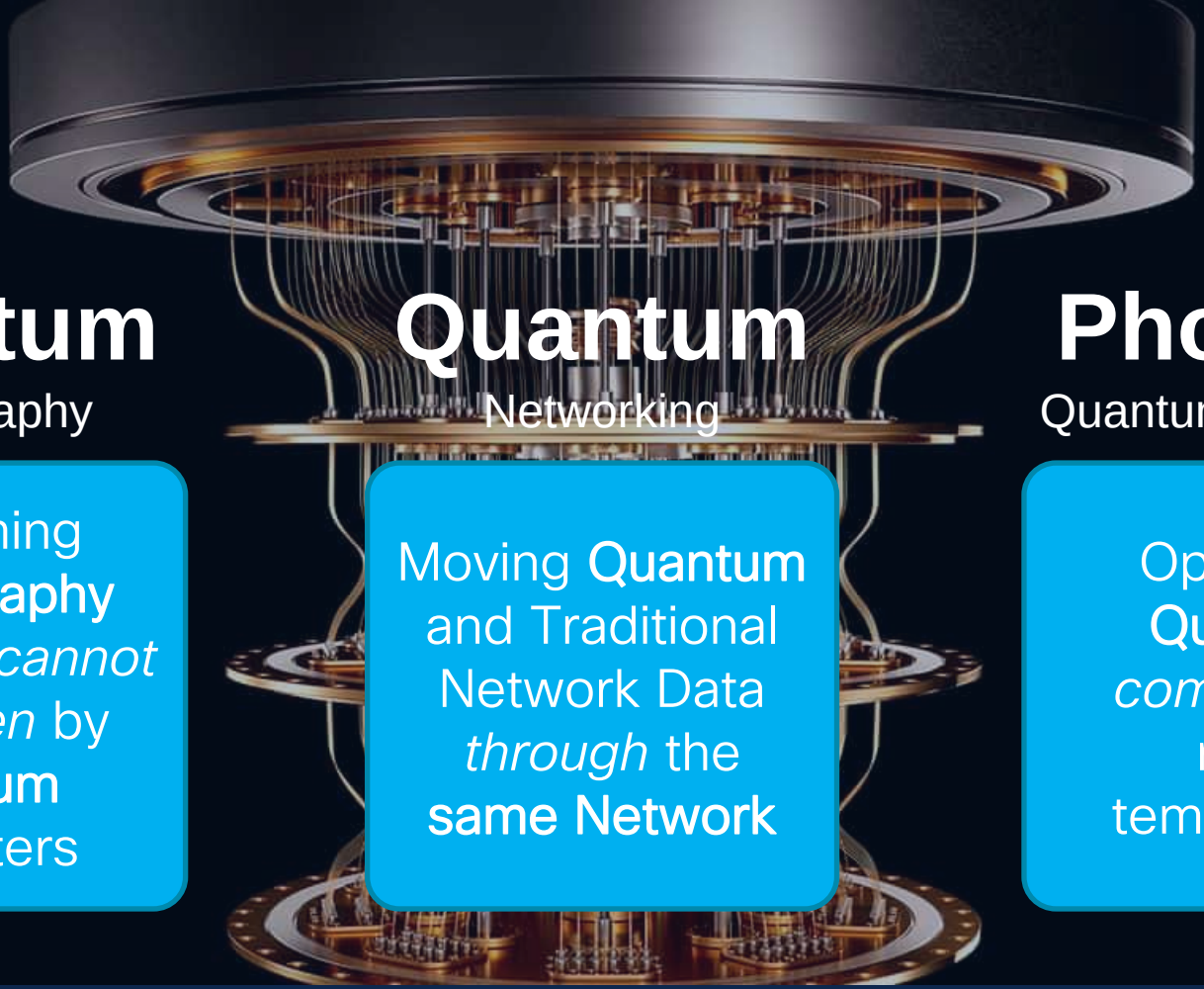
6,600

Logical Error Corrected Qubits

AES-256 Bit Encryption is *Quantum Resistant* until then!

IBM Quantum *Roadmap*

What is Cisco doing?



Quantum
Cryptography

Performing **Cryptography** tasks that *cannot be broken* by **Quantum** computers

Quantum
Networking

Moving **Quantum** and Traditional Network Data *through* the **same Network**

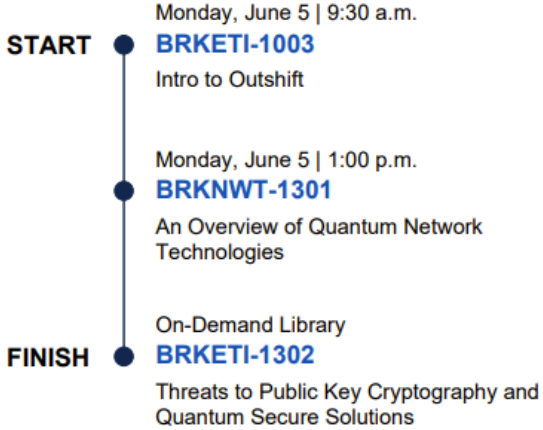
Photonic
Quantum Computing

Operate a **Quantum** *computer* at room temperature

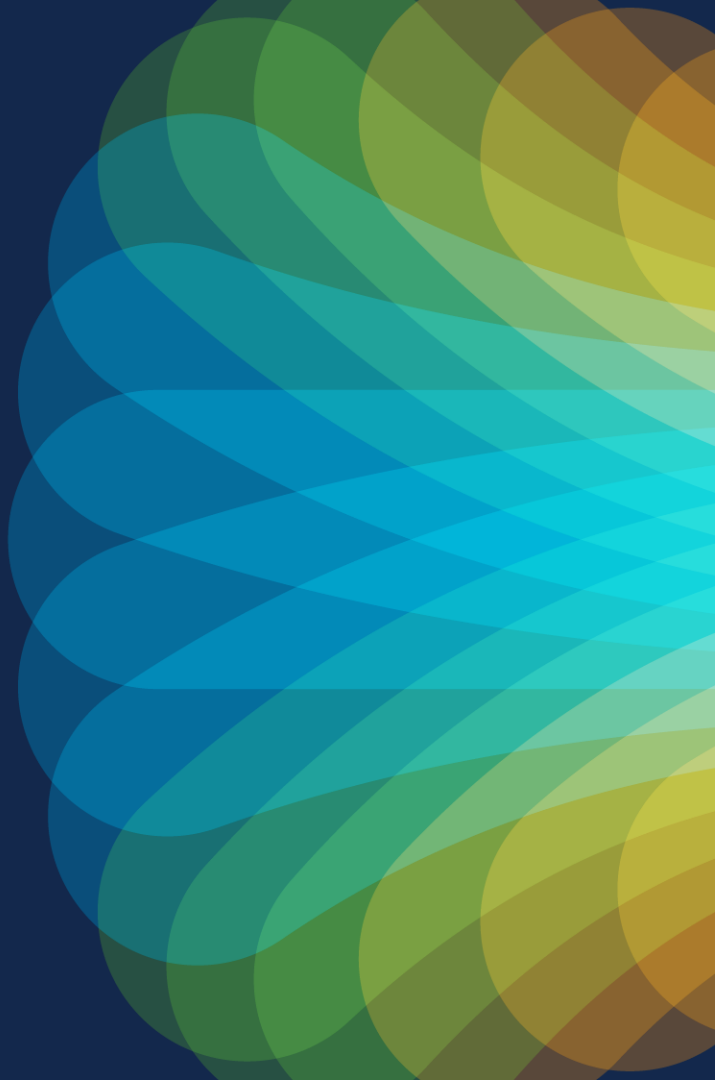
Emerging Technologies & Incubation

Cisco Quantum Research

Explore Cisco research projects in Quantum Networking and Cryptography.



Summary, Key Takeaways and Next Steps



Summary

- Outshift by Cisco is taking an entrepreneurial approach to driving innovation and incubation into new markets
- Recently incubated solutions include:
  - Calisti-Simplifying Cloud Native Secure Connectivity and Observability
  - Panoptica–Simplifying Cloud Native Application Security
  - Great Bear-Simplifying Edge Ops
- Cisco is also researching and developing solutions in many other technology areas, including Next Generation AI and Quantum

Next Steps

- Come see us at the Cisco Showcase and World of Solutions
- Come take a sneak peek on what we're working on next at the Cisco Innovation Forum (Whisper Suites)
- Continue Your Learning by attending more ETI sessions

Visit Outshift in the World of Solutions!

cisco Live!

outshift by CISCO

Take a picture of this slide and bring it to the Outshift booth in the World of Solutions. (#3307)

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Explore outshift.com

Fill out your session surveys!

Attendees who fill out a minimum of four session surveys and the overall event survey will get **Cisco Live-branded socks** (while supplies last)!

Attendees will also earn 100 points in the **Cisco Live Challenge** for every survey completed.

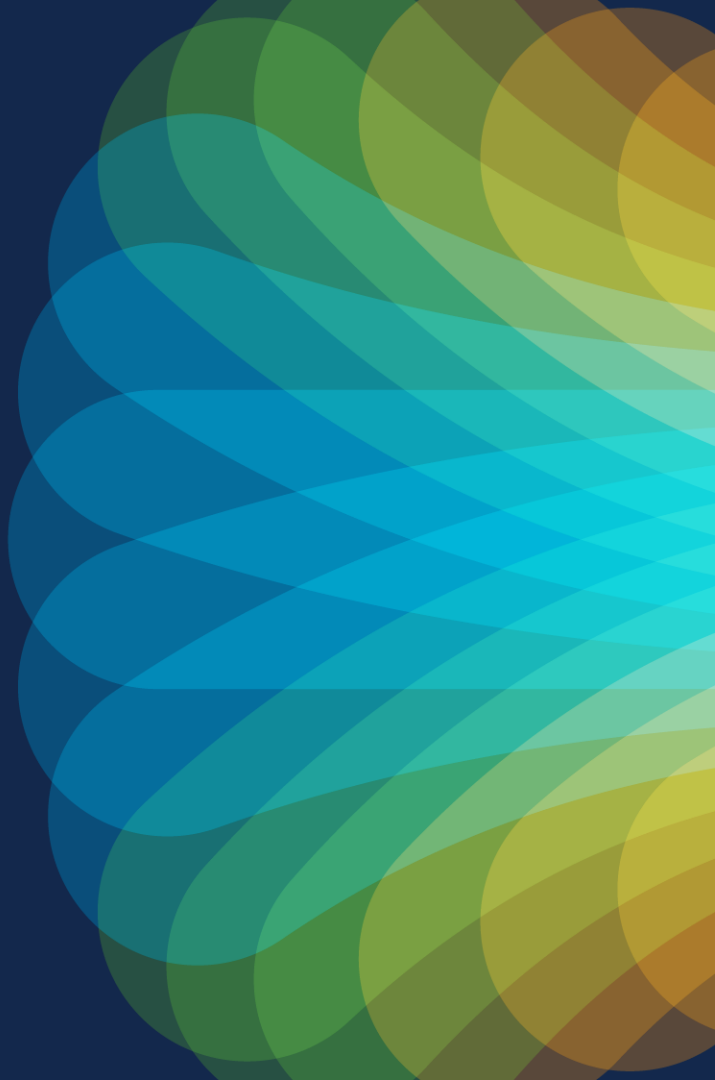
These points help you get on the leaderboard and increase your chances of winning daily and grand prizes

Continue your education

- 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 www.CiscoLive.com/on-demand

The bridge to possible

Thank you



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Challenge

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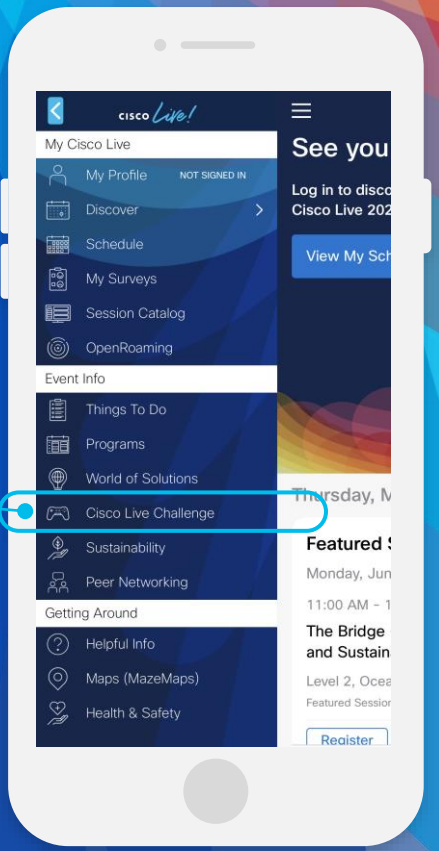
1. Open the Cisco Events App.
2. Click on 'Cisco Live Challenge' in the side menu.
3. Click on View Your Badges at the top.
4. Click the + at the bottom of the screen and scan the QR code:



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Let's go
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