

The background features a vibrant, abstract design. On the left, there are horizontal, wavy bands of color in shades of red, orange, yellow, and green. On the right, a bright white light source emits a series of colorful rays in shades of blue, cyan, and yellow, creating a sunburst effect.

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#CiscoLiveAPJC



The bridge to possible

Unleashing Innovation!

Introducing Outshift by Cisco

Tim Szigeti, Principal Technical Marketing Engineer

@tim_szigeti

BRKETI-1003

CISCO *Live!*

#CiscoLiveAPJC

Cisco Webex App

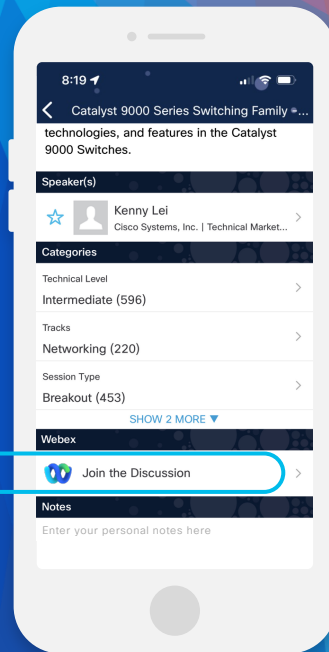
Questions?

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

How

- 1 Find this session in the Cisco Live Mobile App
- 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 December 22, 2023.



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

Agenda

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

Who We Are

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

Building On Our Strengths



Cisco

Collaborative

Passionate

Innovative

+ Outshift

Agile

Courageous

Imaginative

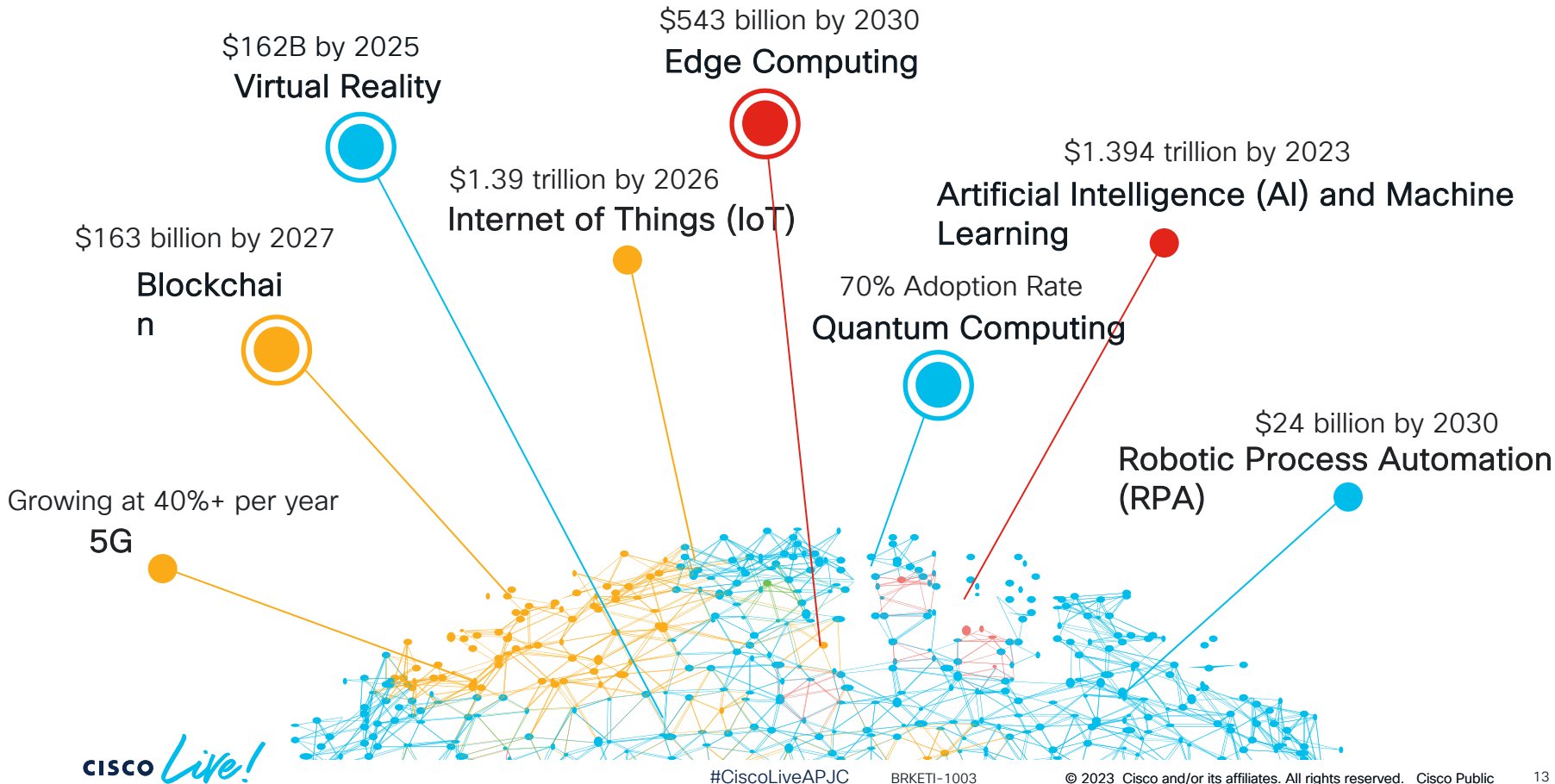
Start With Technology?



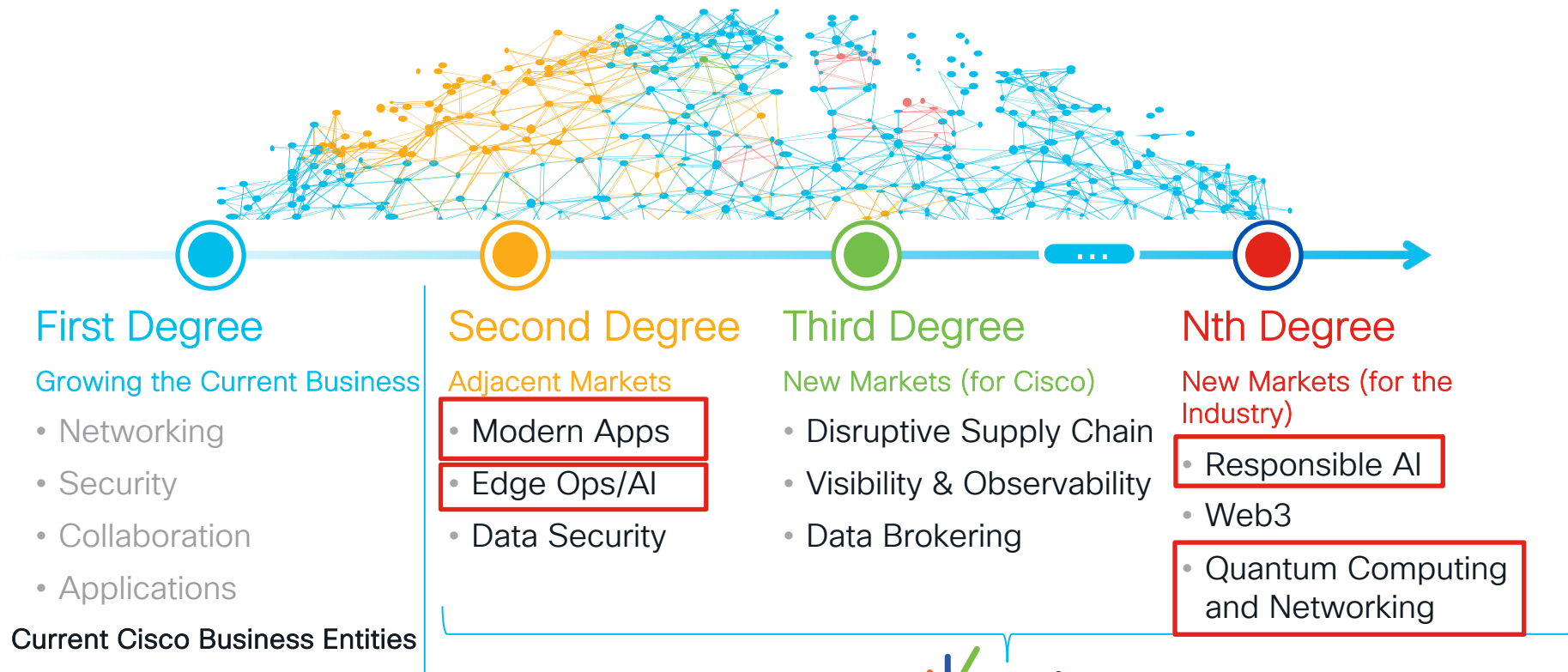
Or Start With Business Problems?



Trendspotting: Technology Opportunities



Degrees of Innovation

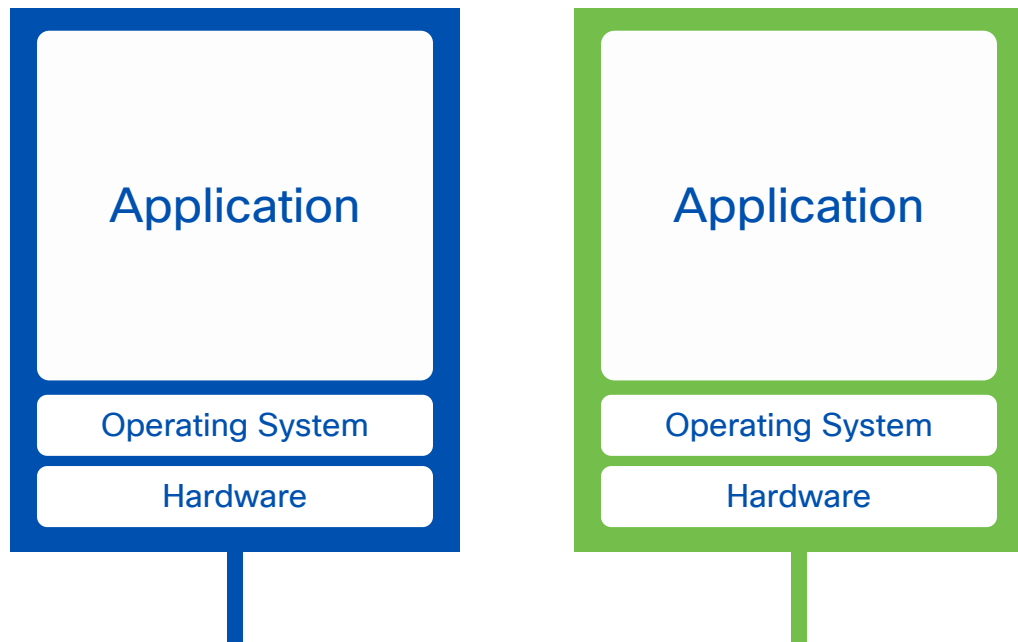


Cloud Native Innovations

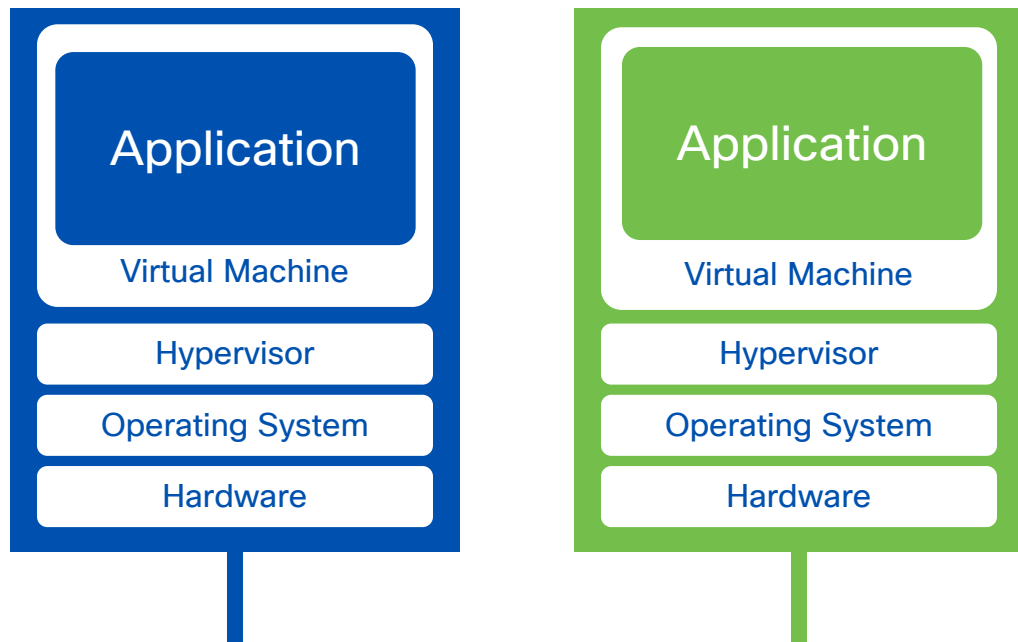
750 Million New Cloud Native Applications by 2025

IDC Market Note - Doc # US48441921 - Dec 2021

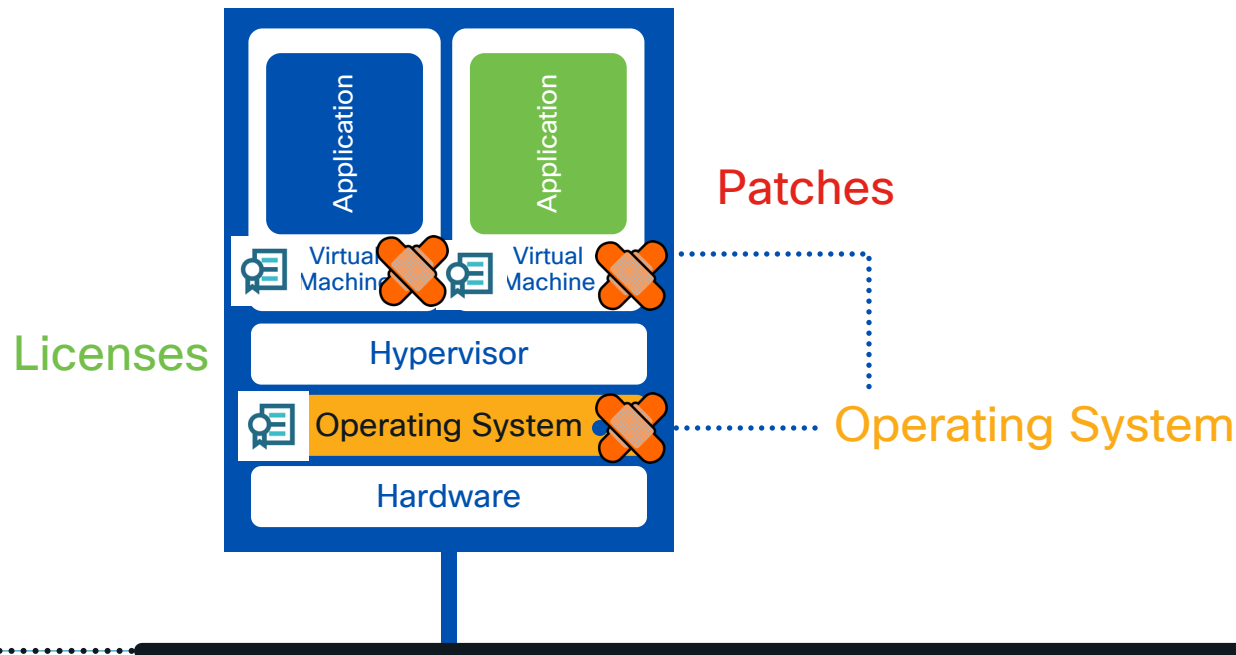
Legacy Application Architecture



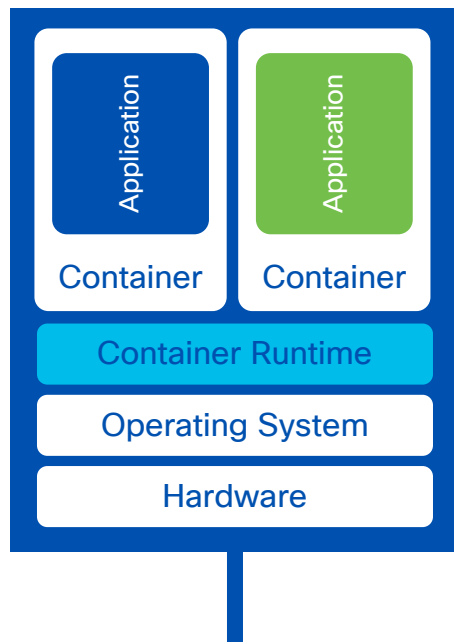
Virtual Machine Application Architecture



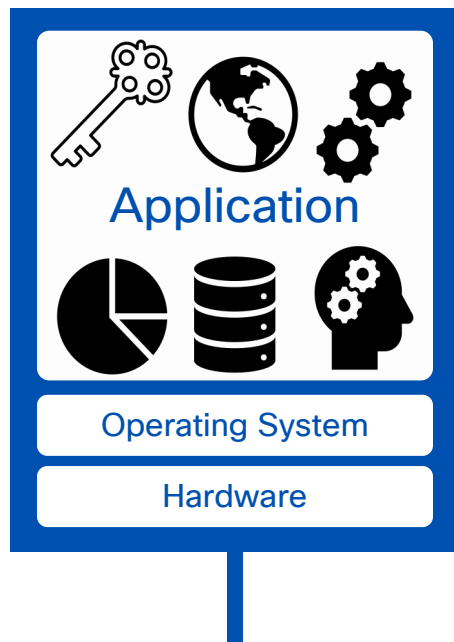
Virtual Machine Application Architecture



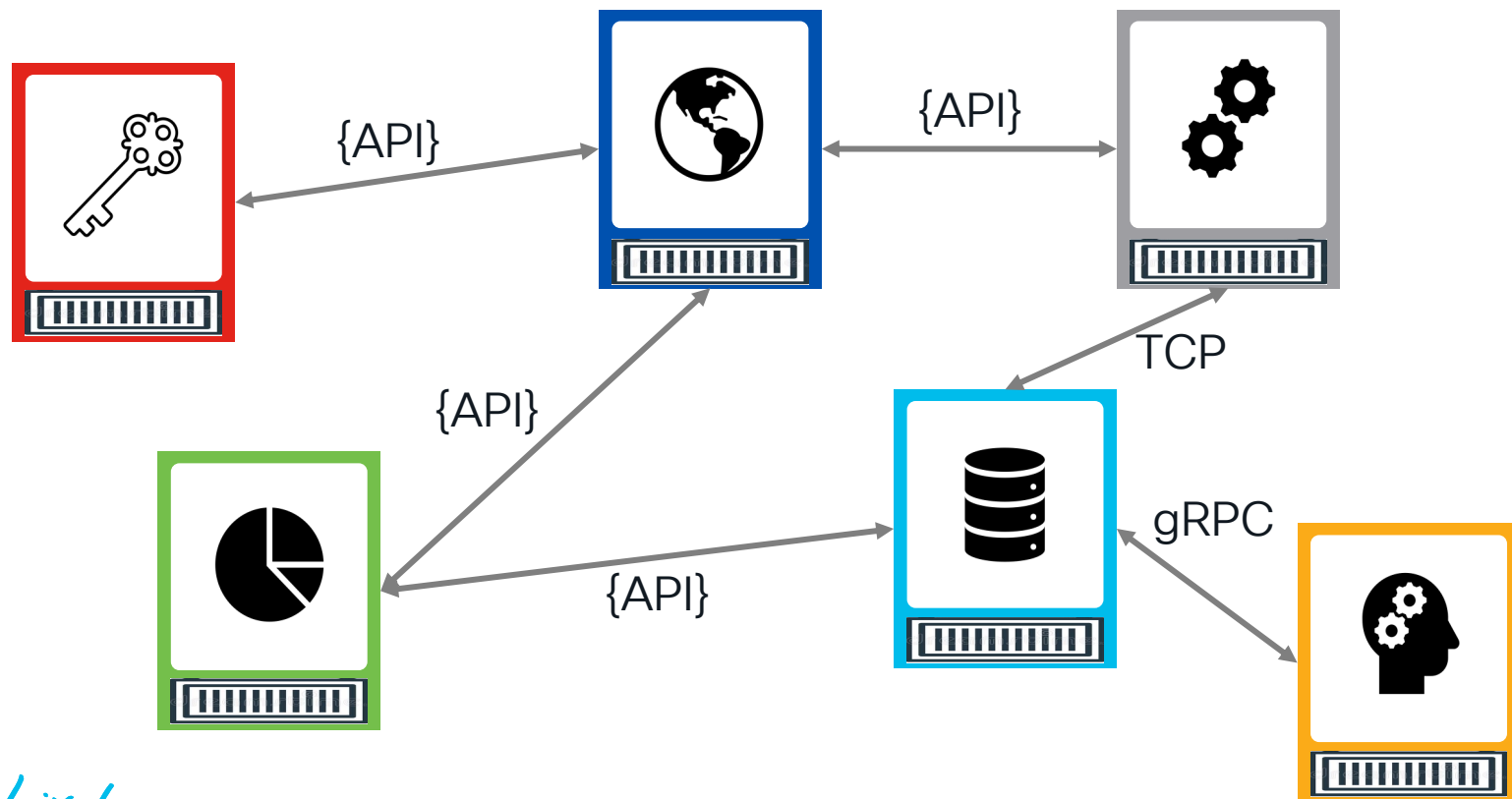
Container Application Architecture



Monolithic Application Architecture

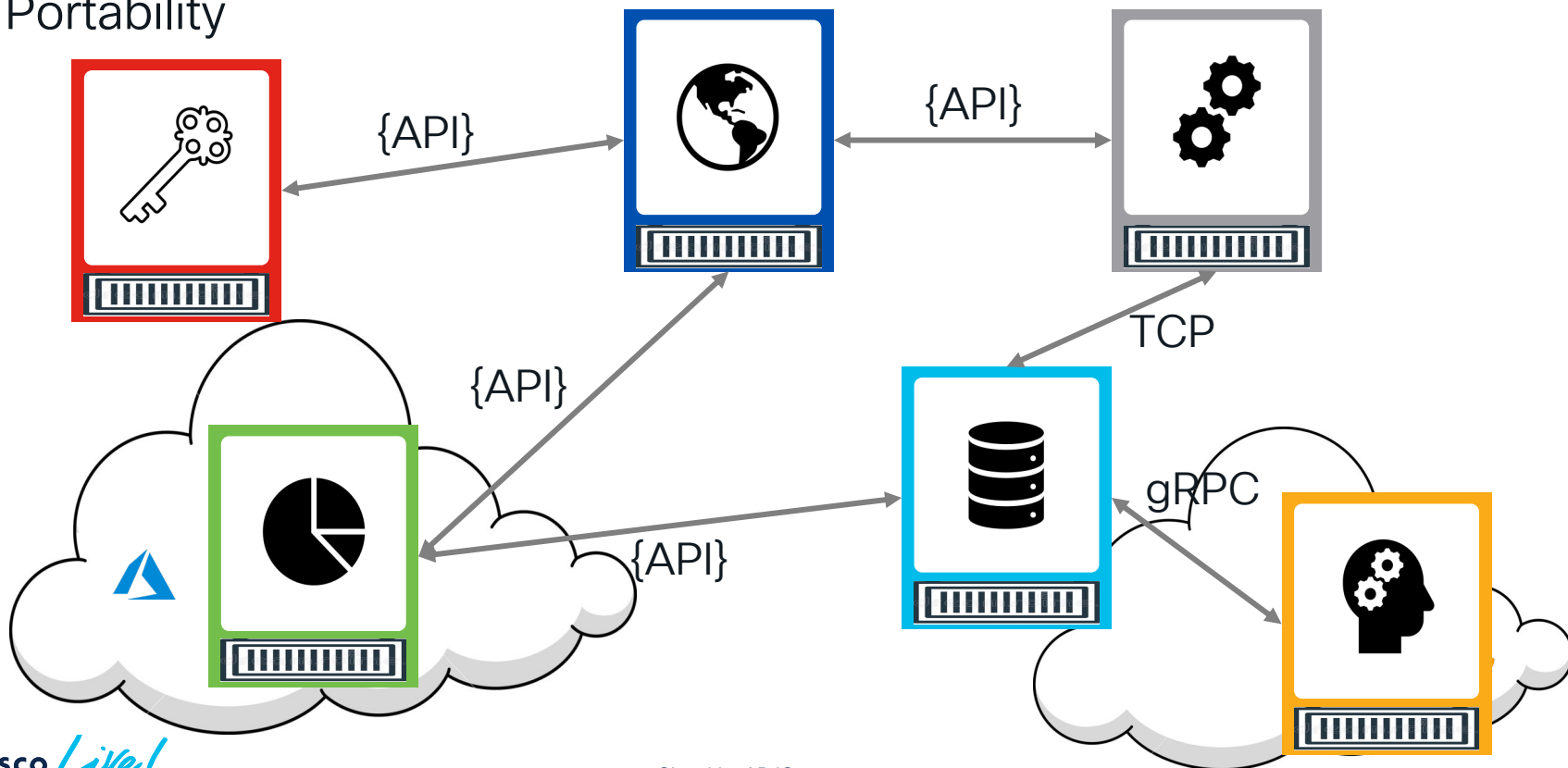


Cloud Native Microservices Architecture



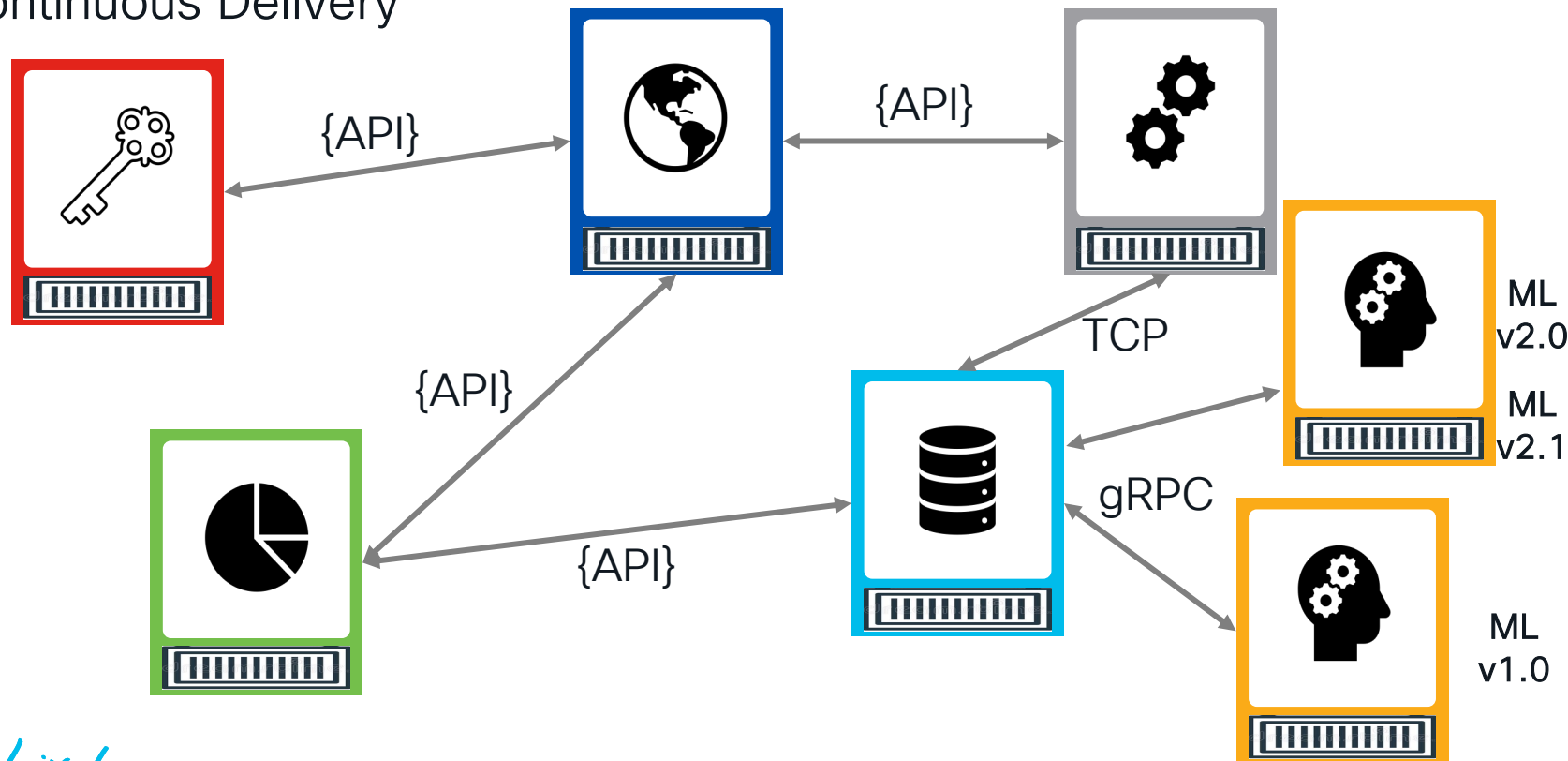
Cloud Native Microservices Architecture

- Portability



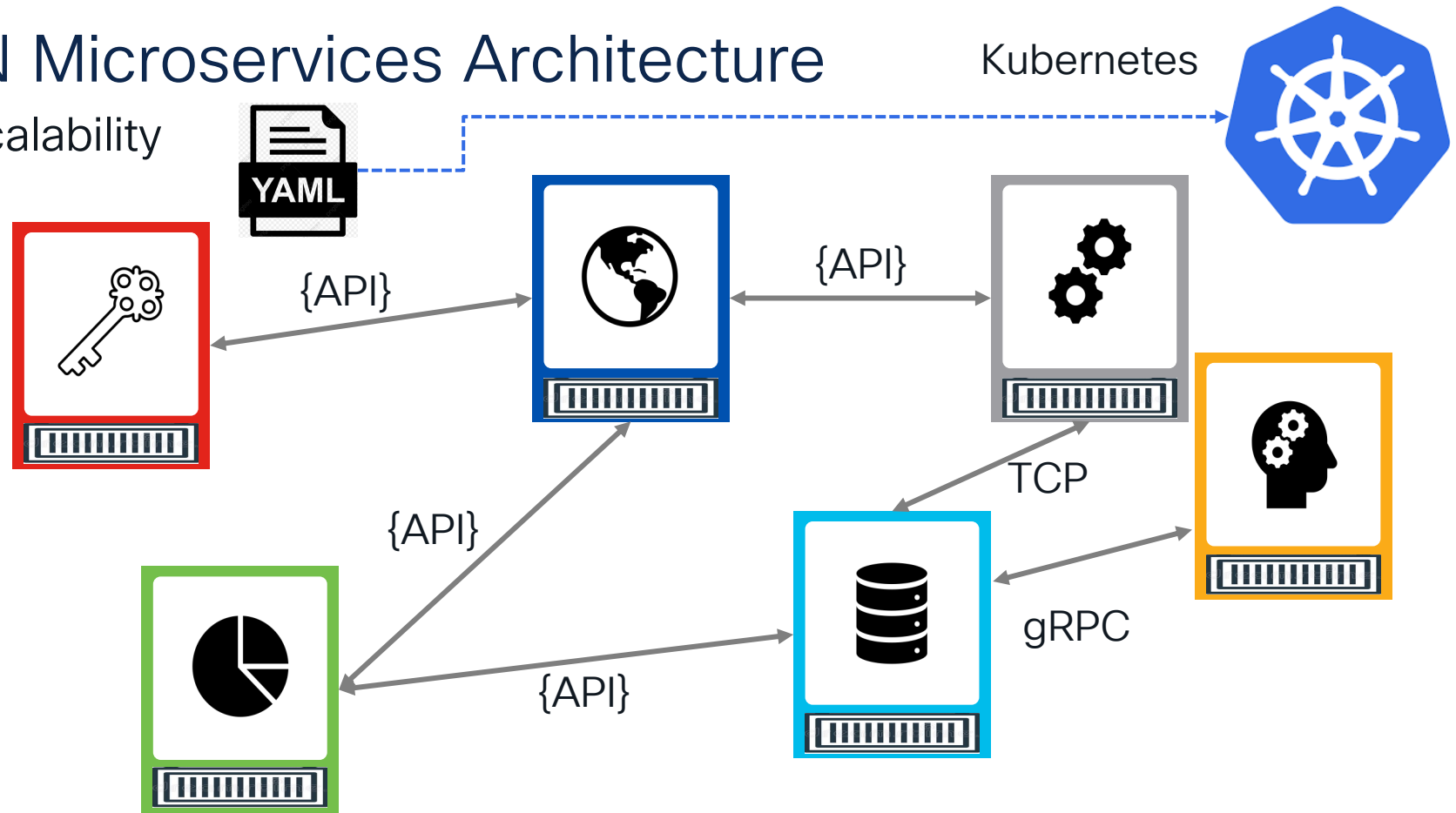
Cloud Native Microservices Architecture

- Continuous Delivery



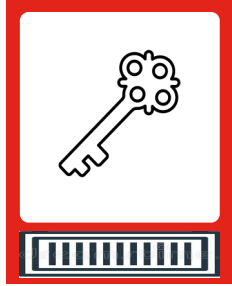
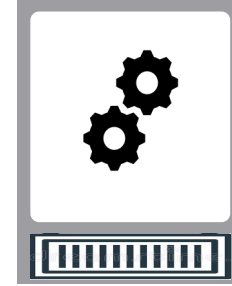
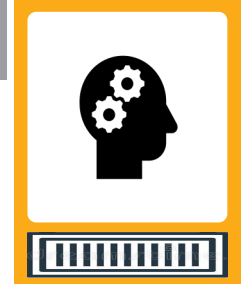
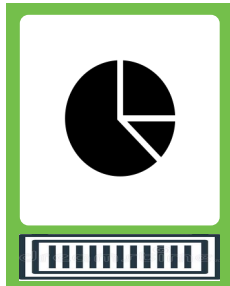
CN Microservices Architecture

- Scalability



CN Microservices Architecture

- Scalability



Kubernetes

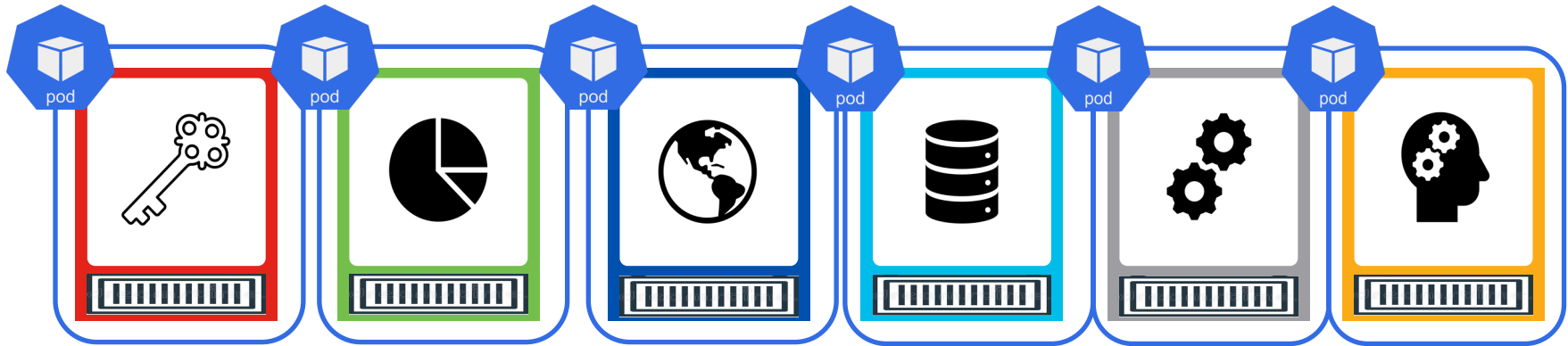


CN Microservices Architecture

- Scalability

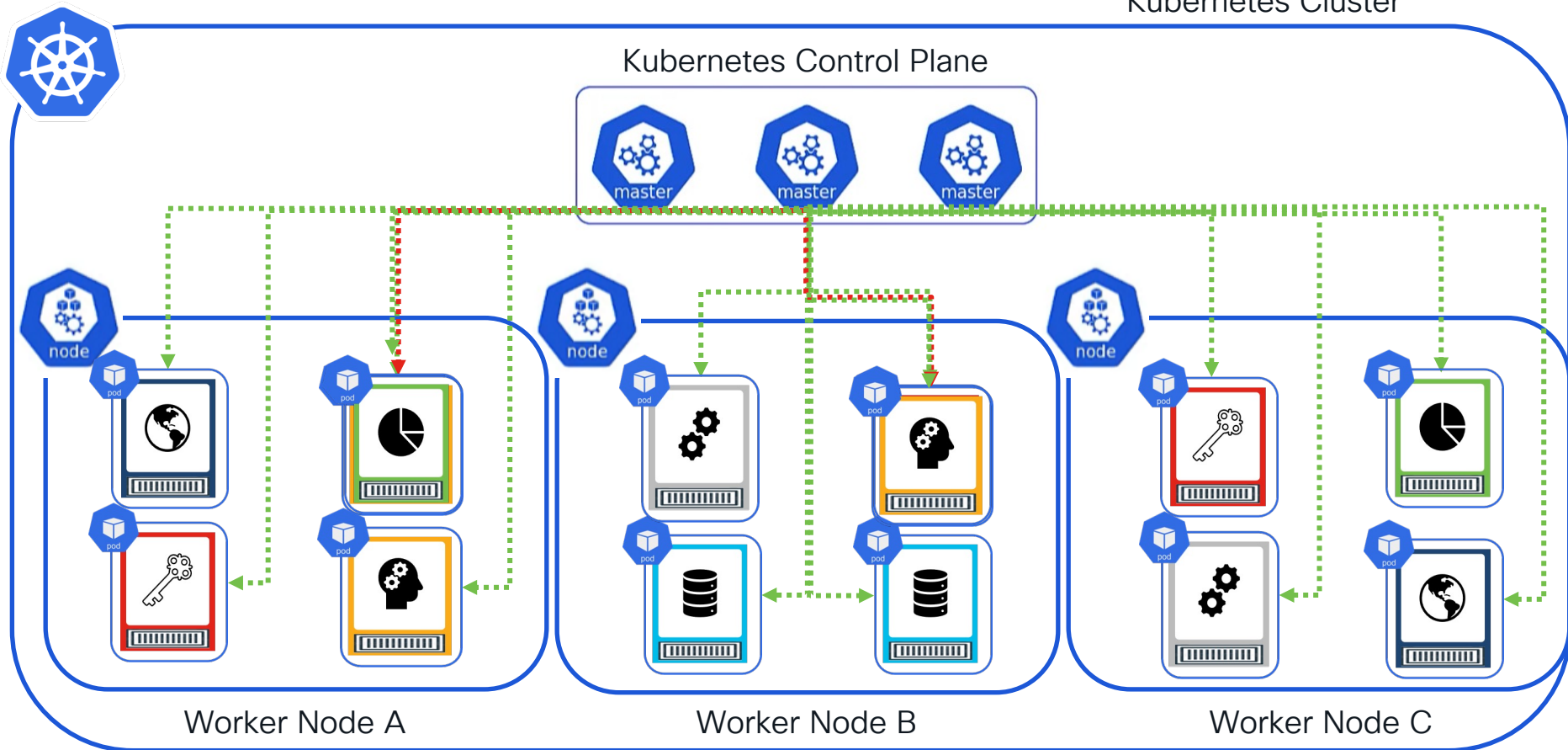


Kubernetes

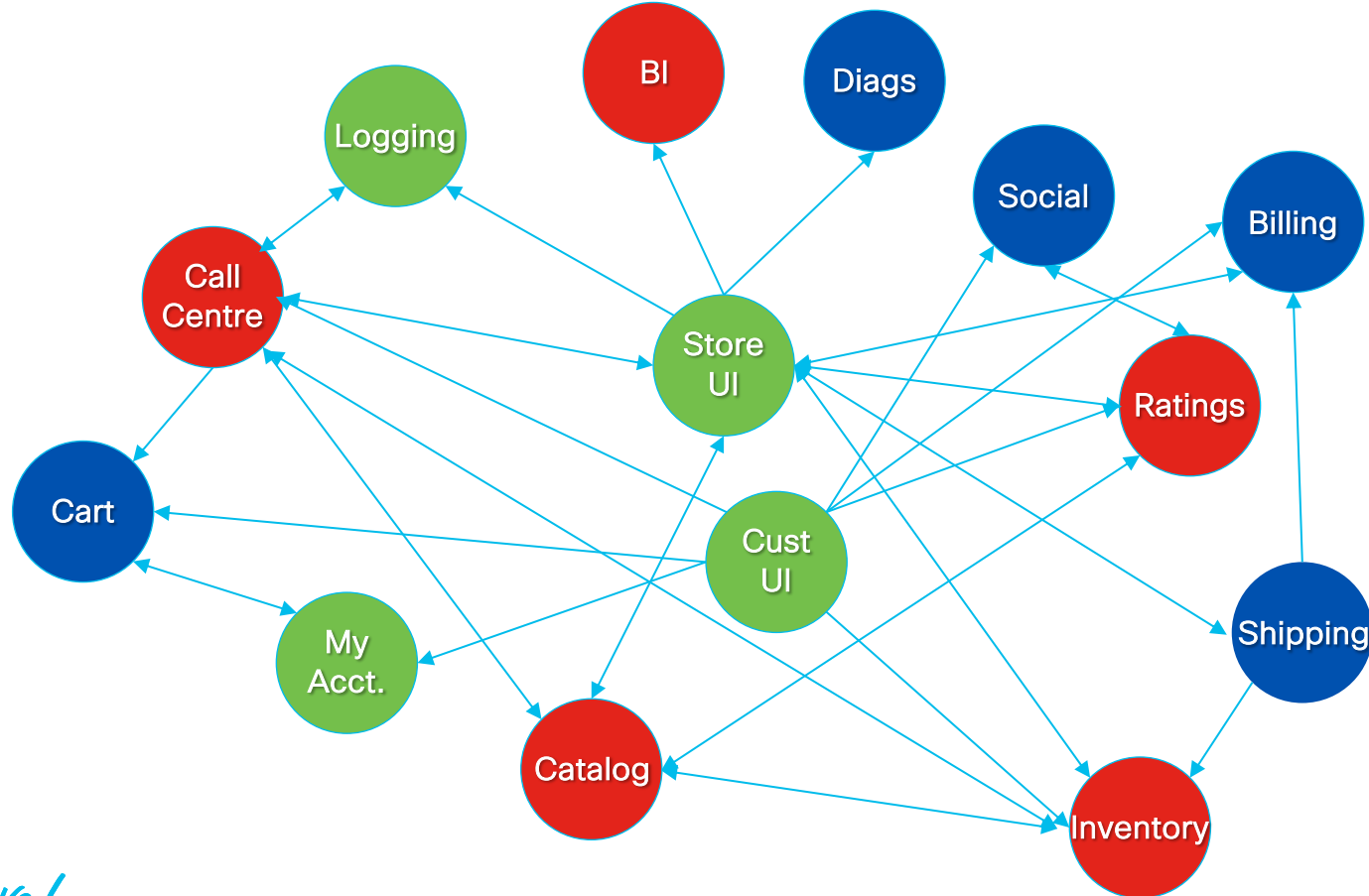


Kubernetes Operation

Kubernetes Cluster



Application Architecture Evolution—Cloud Native

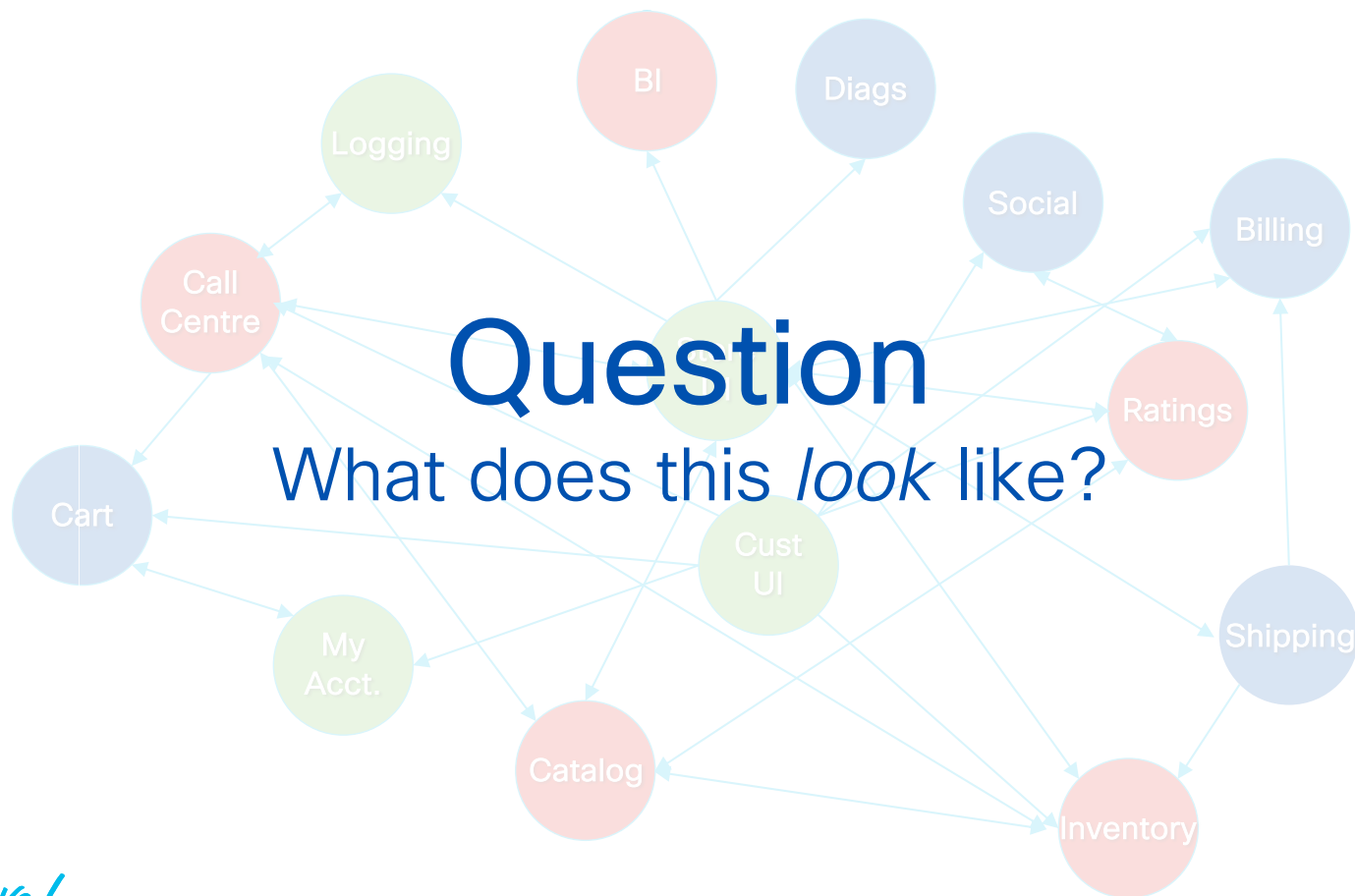


Problems to Solve for Modern Apps

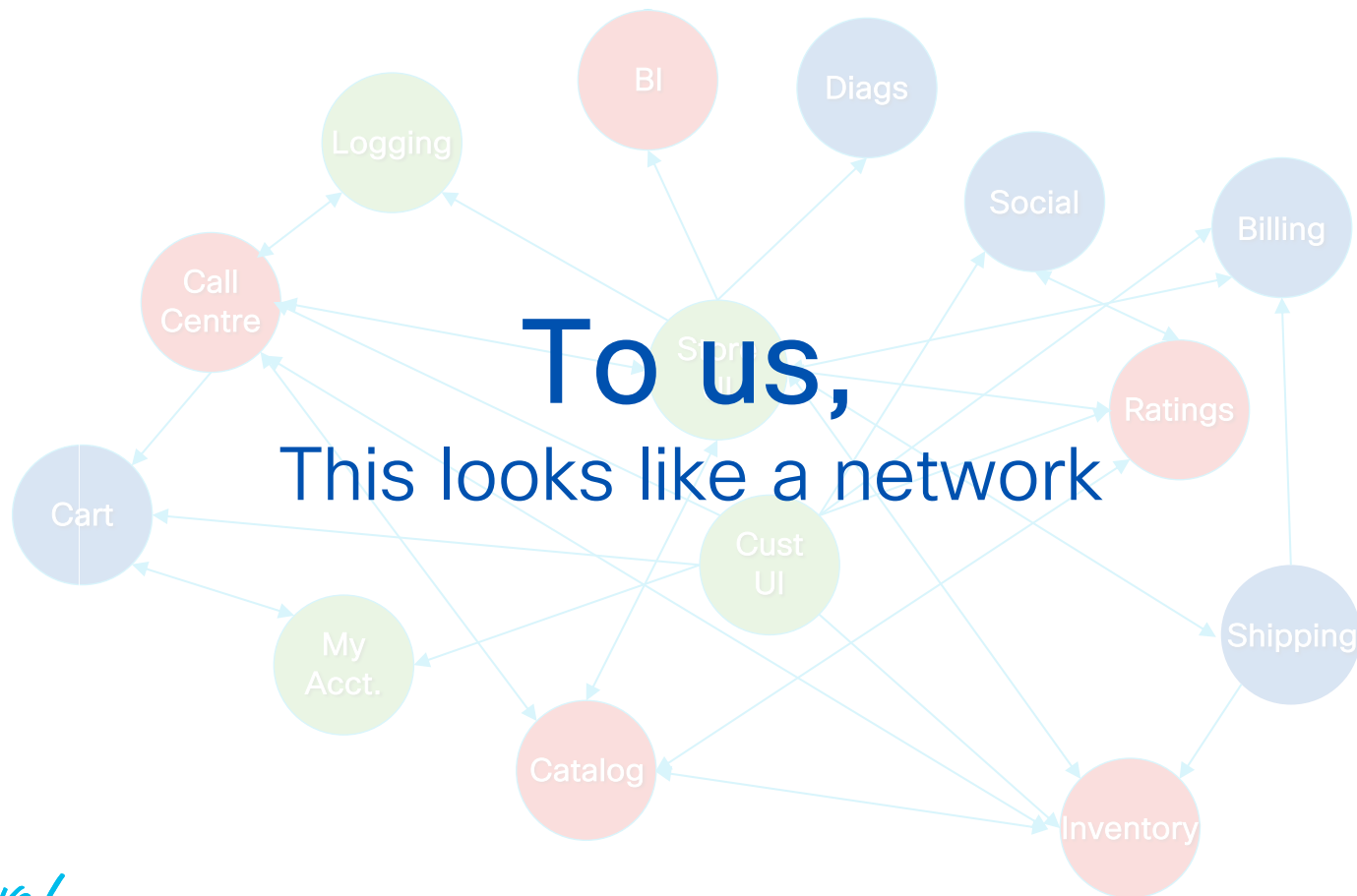
- New infrastructure (K8S, mesh, etc.)
- Massively increased attack surface
- Disparate application platforms
 - VMs
 - Containers
 - Serverless functions
- API exposures
- Securing Streaming Data
- Integrating Observability



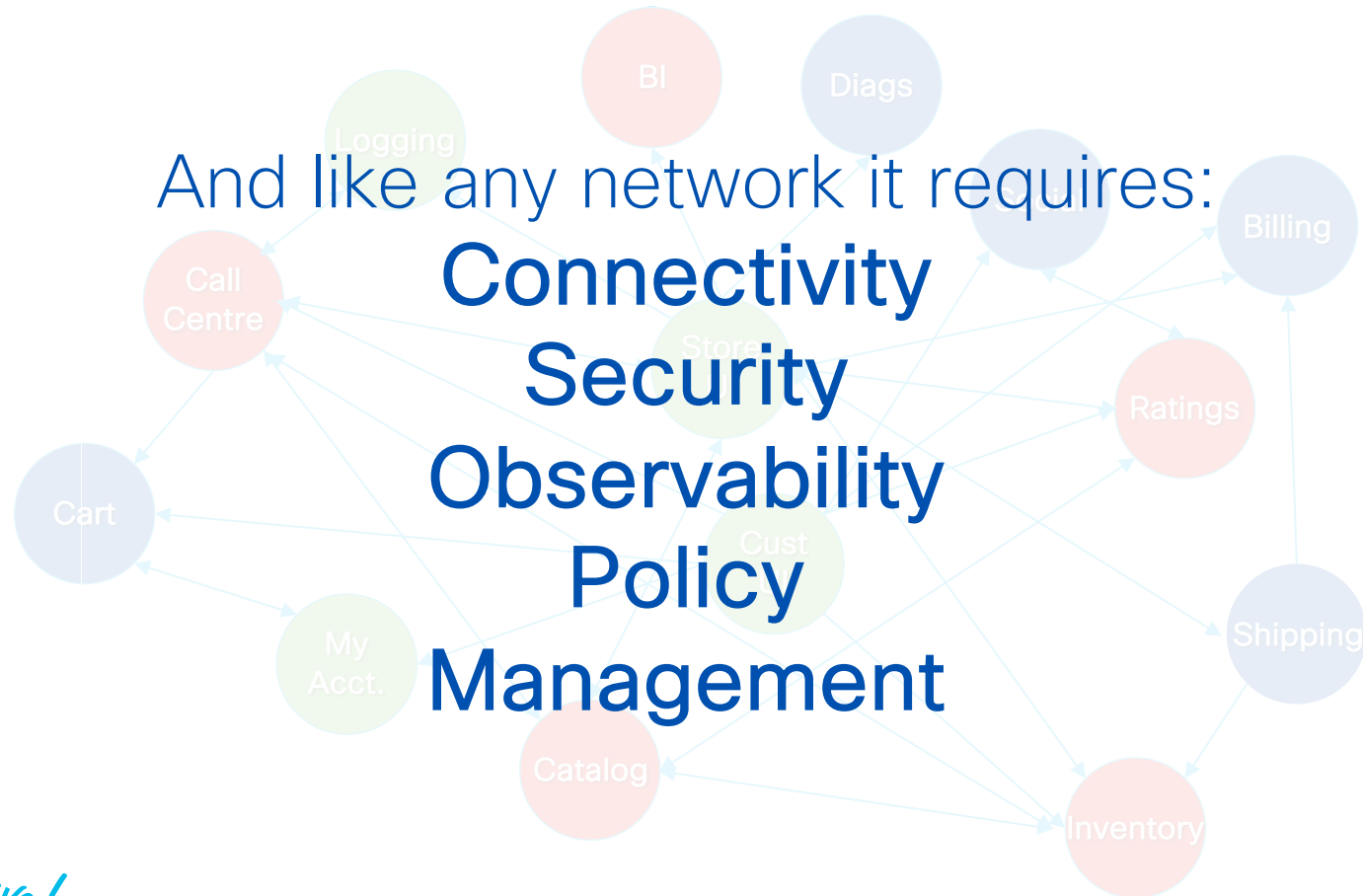
Why Cisco?



Why Cisco?



Why Cisco?





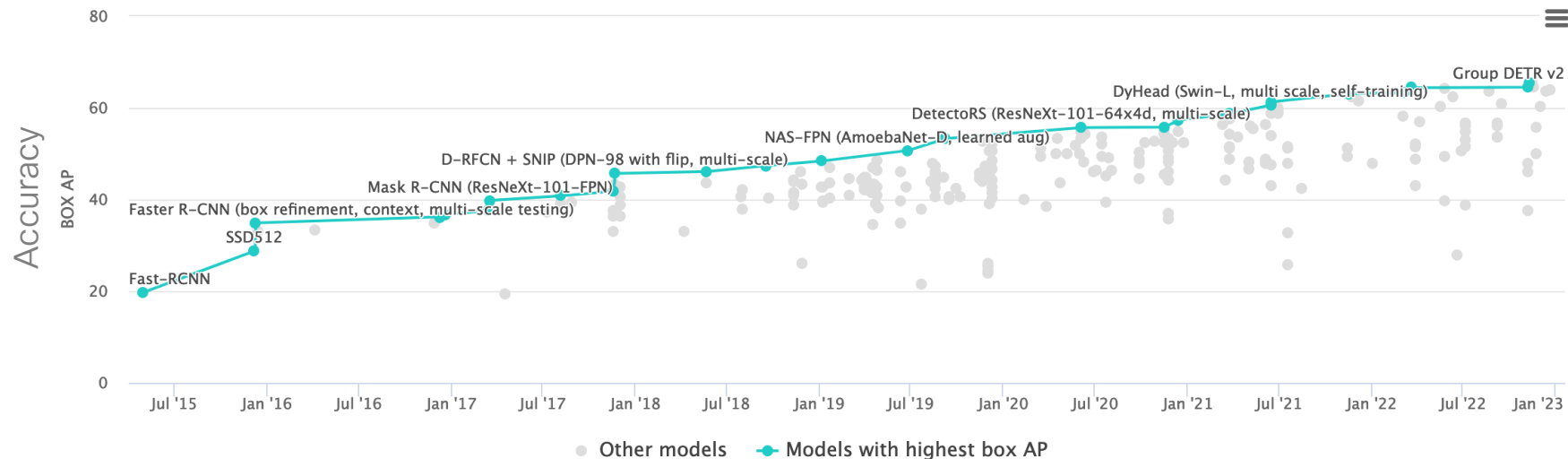
Introducing Panoptica

Cloud Native application security, simplified.

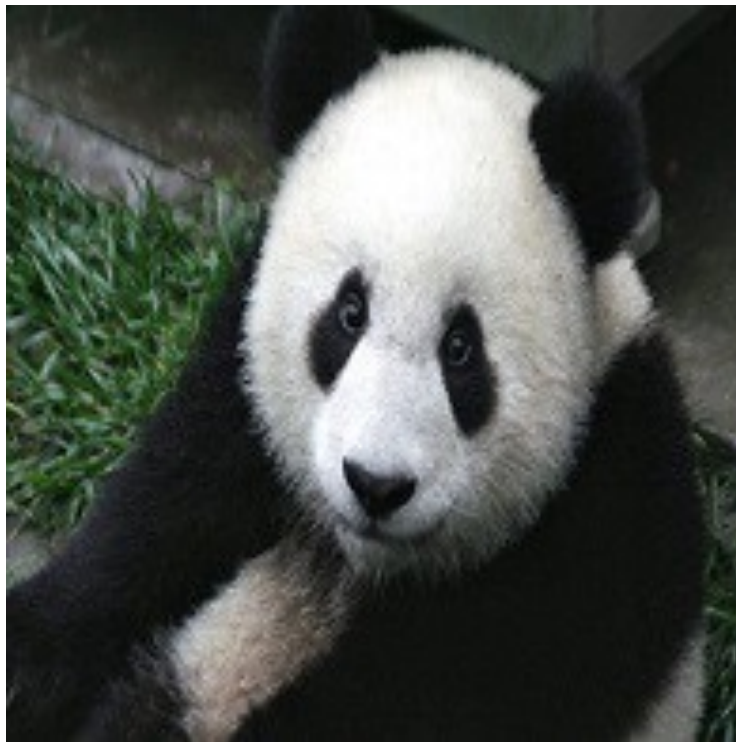
Panoptica Demo

Next Generation AI Innovations

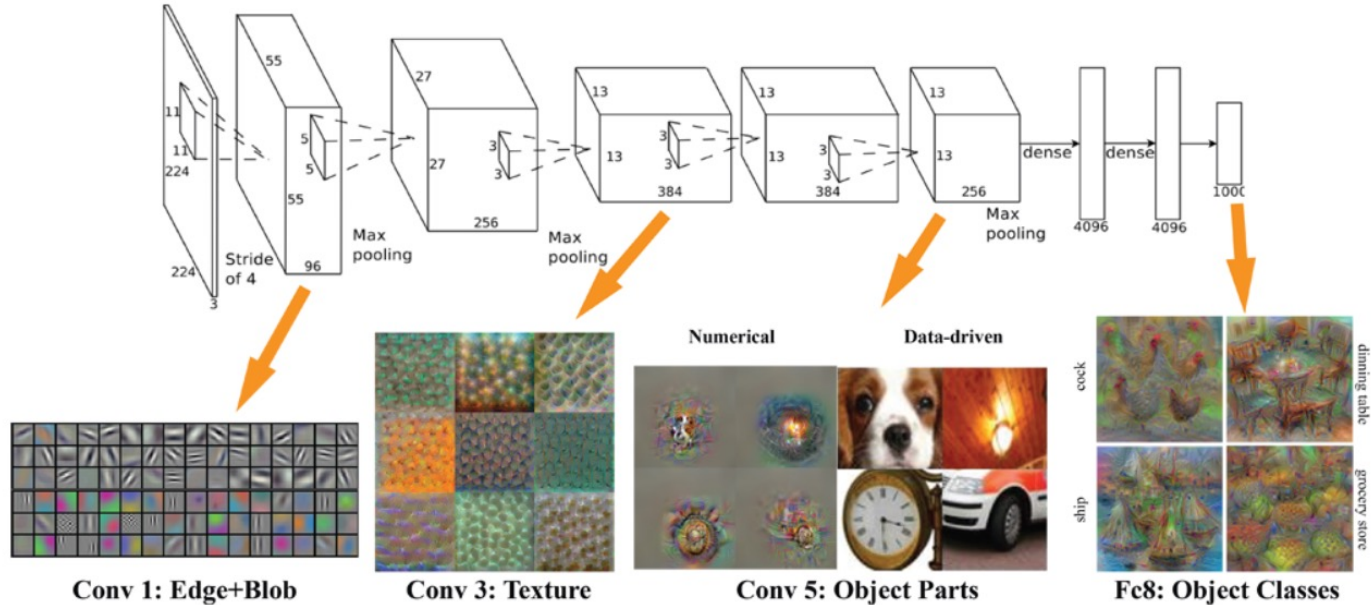
Current State of the Art for Object Detection



Deep Learning Approach



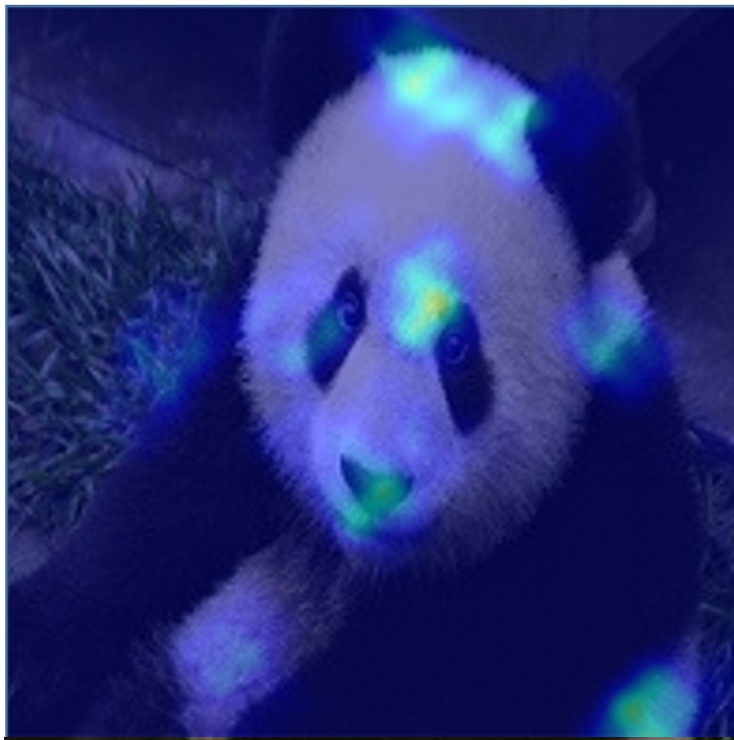
Deep Learning Approach



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

Training usually takes around 100K labeled images per class

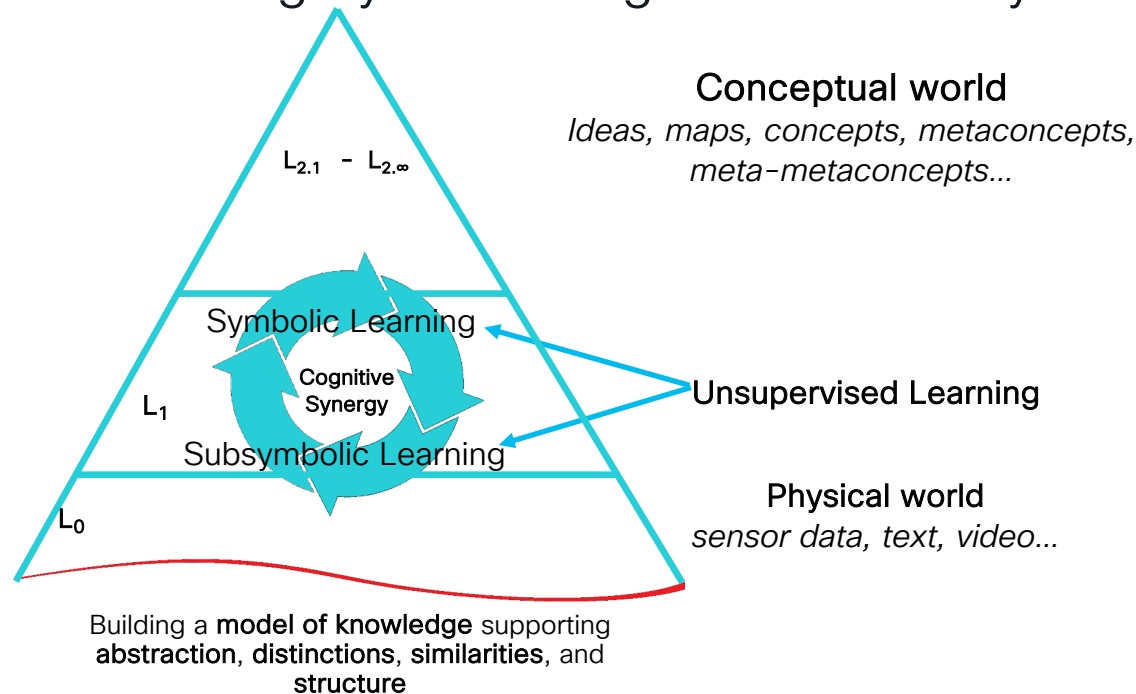
Deep Learning Limitations



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



DL vs. Hybrid AI

Hybrid AI Agent

"panda" → 95% confidence

Because: appearance, behavior, location, ...

Mamma

Giant Panda

Face

has

climbs

famous for

Tree

on

Branch

Beijing
Zoo

is

GPS



39.939012, 116.339539

is

Color

is

Black

White

is

Snout

is

Eye

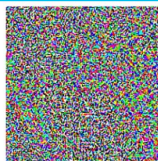


x

"panda"

57.7% confidence

+ .007 ×



$\text{sign}(\nabla_x J(\theta, x, y))$

"nematode"

8.2% confidence

=



$x +$

$\epsilon \text{sign}(\nabla_x J(\theta, x, y))$

"gibbon"

99.3 % confidence

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 Demo Videos

Ethosight



1. child in danger: 0.4346351623535156
2. cooking: 0.26900413632392883
3. burglary: 0.0736141949892044
4. fire_prevention: 0.07326945662498474
5. gas_leak_detection: 0.06314415484666824
6. repairing: 0.017247511073946953
7. vomiting: 0.008393174037337303
8. fire_safety: 0.0065605794079601765
9. decorating: 0.006369316019117832
10. buying: 0.0054978723637759686

<https://techblog.cisco.com/blog/a-new-dawn-in-video-analytics-ethosights-zero-shot-cumulative-approach>

Edge AI Challenges

2 FPS **5** people detected

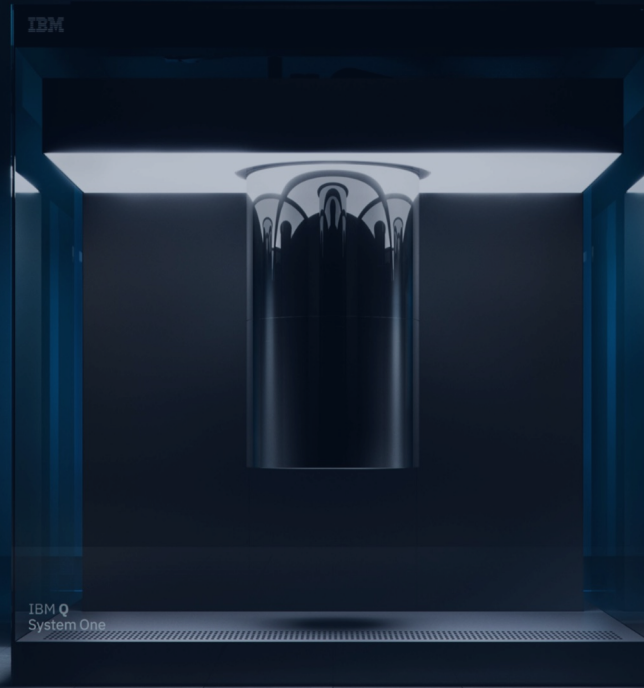


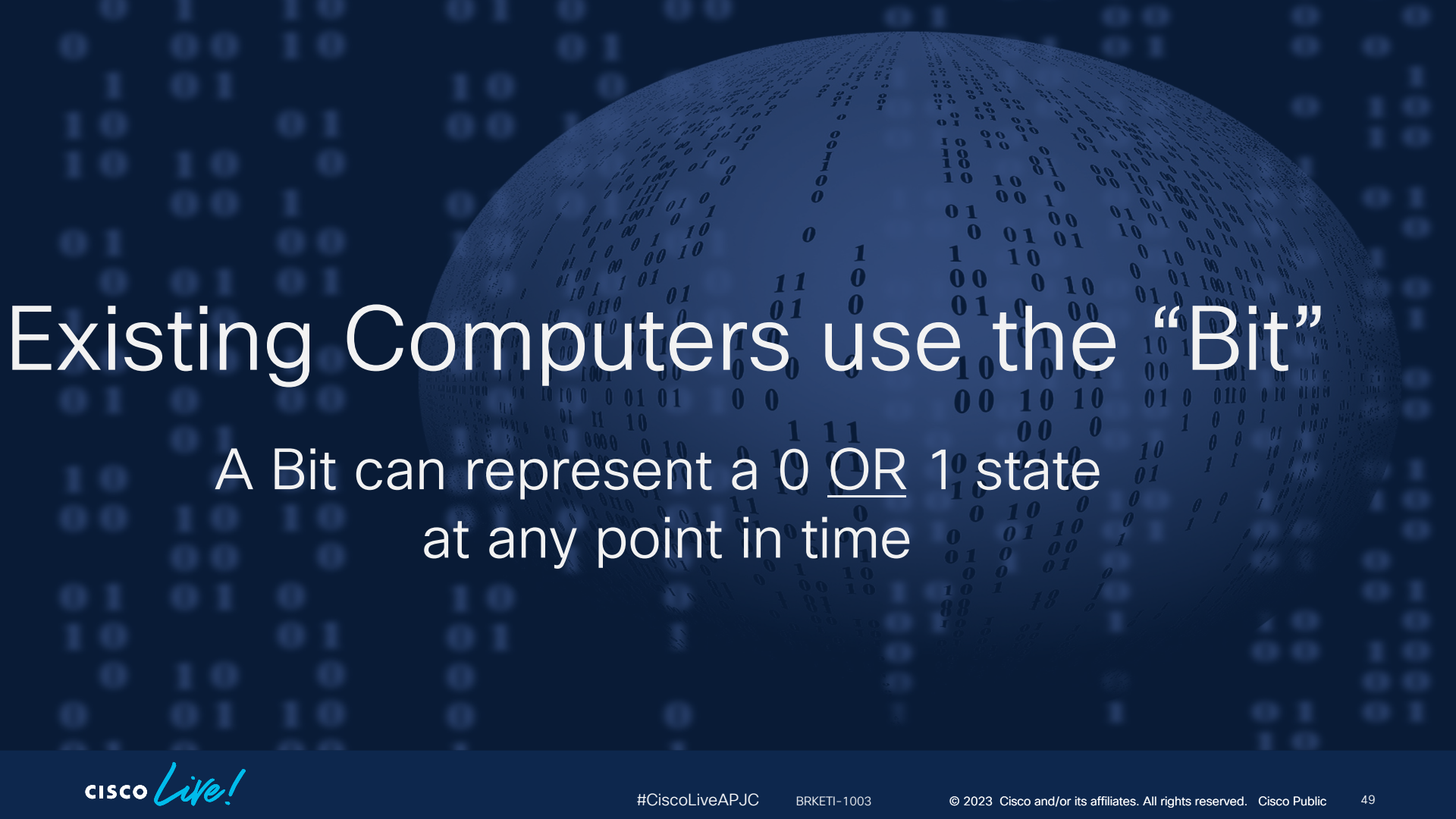
5 FPS **6** people detected



Quantum Research

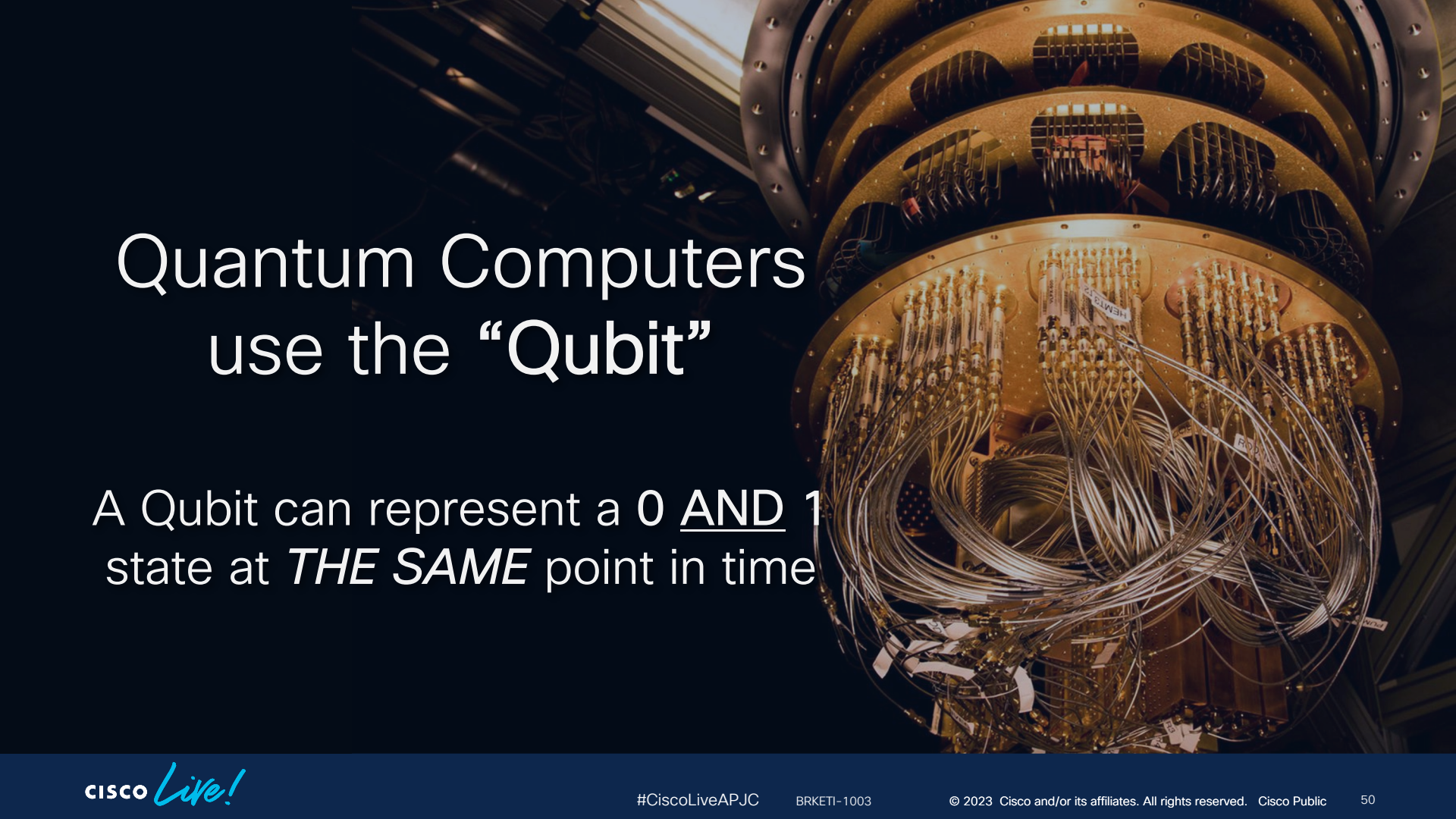
Quantum Computing Uses Principles of Quantum Physics





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

QUBIT
#1

QUBIT
#1

QUBIT
#2

QUBIT
#1

QUBIT
#2

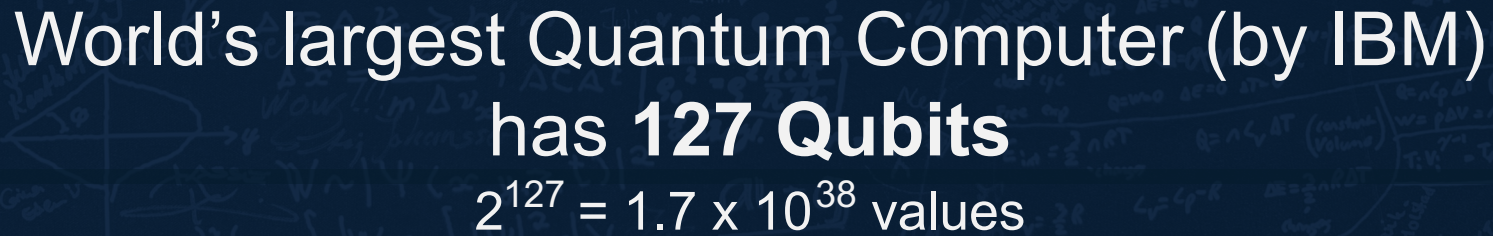
QUBIT
#3

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



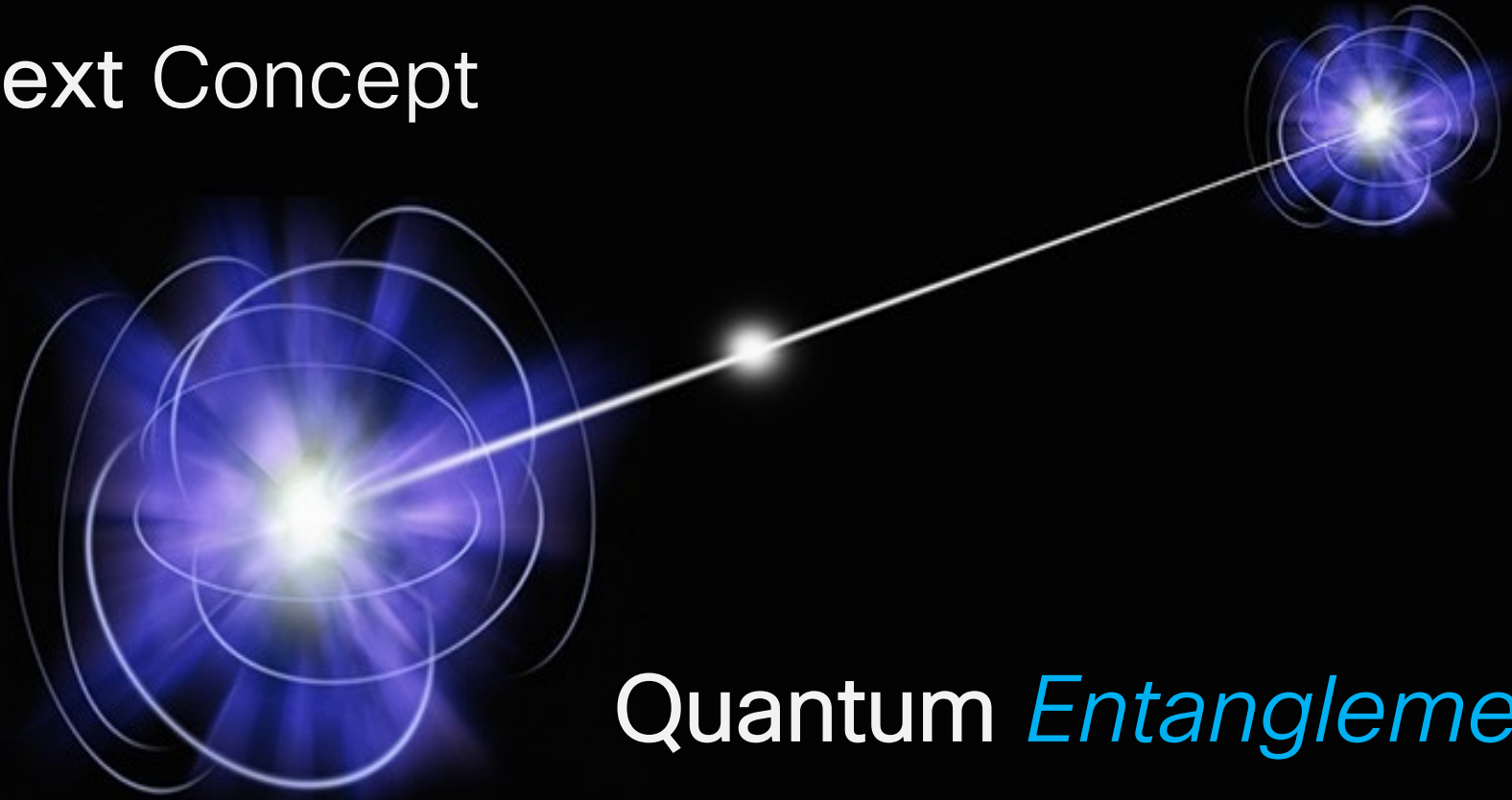
170,000,000,000,000,000,000,000,000,000,000,000,000,000

Just how fast is a Quantum Computer?

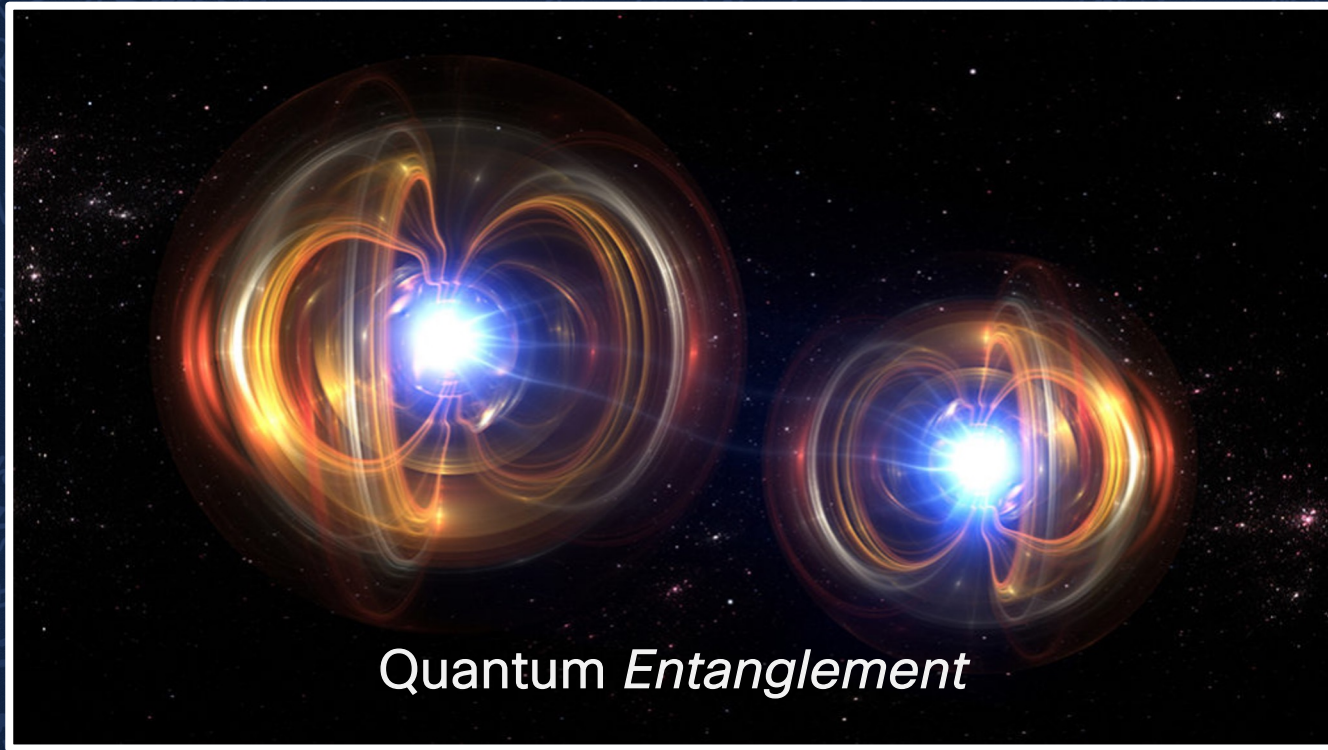
158M Times Faster

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

This *breaks* Einstein's rule

That nothing can travel faster than the speed of light

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

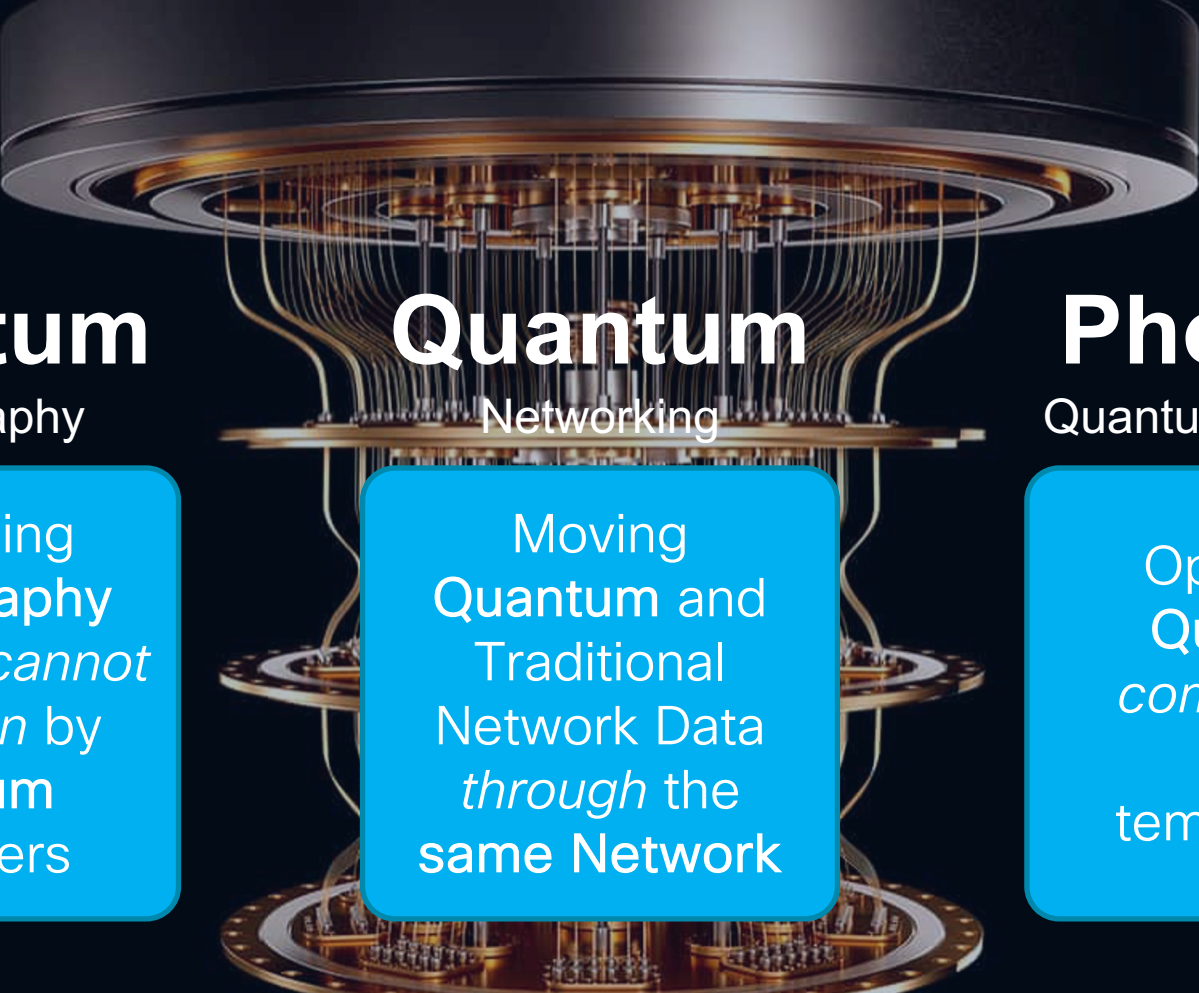
Logical Error Corrected
Qubits

AES-256 Bit Encryption is
Quantum Resistant until then!

IBM Quantum *Roadmap*

2019	2020	2021	2022	2023	2024	2025
Falcon 27 Qubits	Hummingbird 65 Qubits	Eagle 127 Qubits	Osprey 433 Qubits	Condor 1121 Qubits	Flamingo 1386 Qubits	Kookaburra 4158 Qubits

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

Cisco Quantum Lab (Opened March in 2023)



Developing quantum network simulations the easy way

Streamline the process of building quantum network simulations and effortlessly construct, analyze, and optimize quantum networks with exceptional simplicity.

Get started



Canvas 1

Canvas 2

Canvas 3



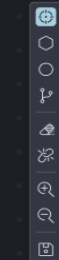
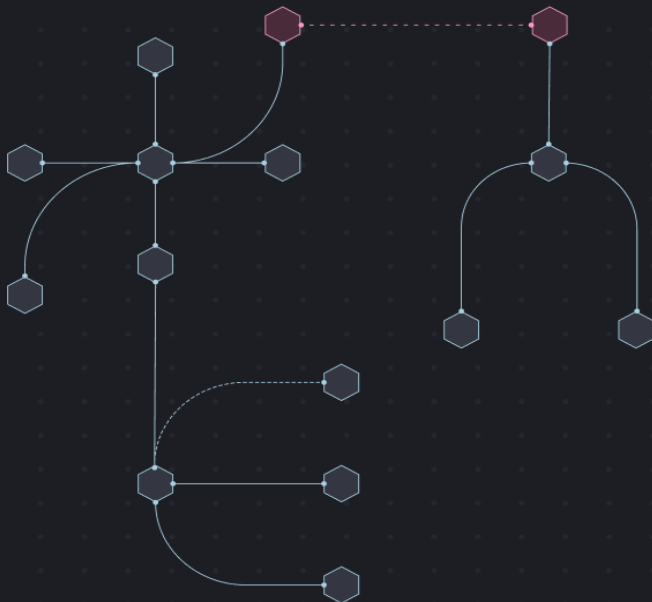
Canvas settings



Protocol Builder



Run Simulation



Routing Algorithm: Multi-flow

100%

Save and close

Quantum State Teleportation

Read only

Python

```
1 #!/usr/bin/python
2
3 import Queue
4 import threading
5 import time
6
7 exitFlag = 0
8
9 class myThread (threading.Thread):
10     def __init__(self, threadID, name, q):
11         threading.Thread.__init__(self)
12         self.threadID = threadID
13         self.name = name
14         self.q = q
15     def run(self):
16         print "Starting " + self.name
17         process_data(self.name, self.q)
18         print "Exiting " + self.name
19
20 def process_data(threadName, q):
21     while not exitFlag:
22         queueLock.acquire()
23         if not workQueue.empty():
24             data = q.get()
25             queueLock.release()
26             print "%s processing %s" % (threadName, data)
27         else:
28             queueLock.release()
29             time.sleep(1)
30
31 threadList = ["Thread-1", "Thread-2", "Thread-3"]
32 nameList = ["One", "Two", "Three", "Four", "Five"]
33 queueLock = threading.Lock()
34 workQueue = Queue.Queue(10)
35 threads = []
36 threadID = 1
37
38 # Create new threads
39 for tName in threadList:
40     thread = myThread(threadID, tName, workQueue)
41     thread.start()
42     threads.append(thread)
43     threadID += 1
44
45 # Wait for all threads to complete
46 for t in threads:
47     t.join()
48 print "Exiting Main Thread"
```


Summary and Key Takeaways

Summary & Key Takeaways

- Outshift by Cisco is taking an entrepreneurial approach to driving innovation and incubation into new markets
- Recently incubated solutions include:
 - [Panoptica—Simplifying Cloud Native Application Security](#)
- Cisco is also researching and developing solutions in many other technology areas, including [Next Generation AI](#) and [Quantum](#)



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one-on-one session with
a technical expert!

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to meet, greet, whiteboard & gain
insights about your unique questions
with the best of the best.



Meet the Expert Opening Hours:

Tuesday	3:00pm – 7:00pm
Wednesday	11:15am – 7:00pm
Thursday	9:30am – 4:00pm
Friday	10:30am – 1:30pm

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- Complete a minimum of four session surveys and the overall event surveys to claim a Cisco Live T-Shirt



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- Book your one-on-one Meet the Expert 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



#CiscoLiveAPJC

The background of the slide is a vibrant, abstract graphic. It features a series of overlapping, wavy bands of color in a rainbow spectrum, transitioning from red and orange on the left to yellow, green, and blue on the right. On the right side, there is a bright, multi-colored sunburst or starburst effect that radiates outwards, creating a sense of energy and excitement.

cisco *Live!*

Let's go

#CiscoLiveAPJC