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The bridge to possible

# Automation of Network Fault Management System

Automated Fault Management

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BRKOPS-2128



#CiscoLive

# 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 June 17, 2022.



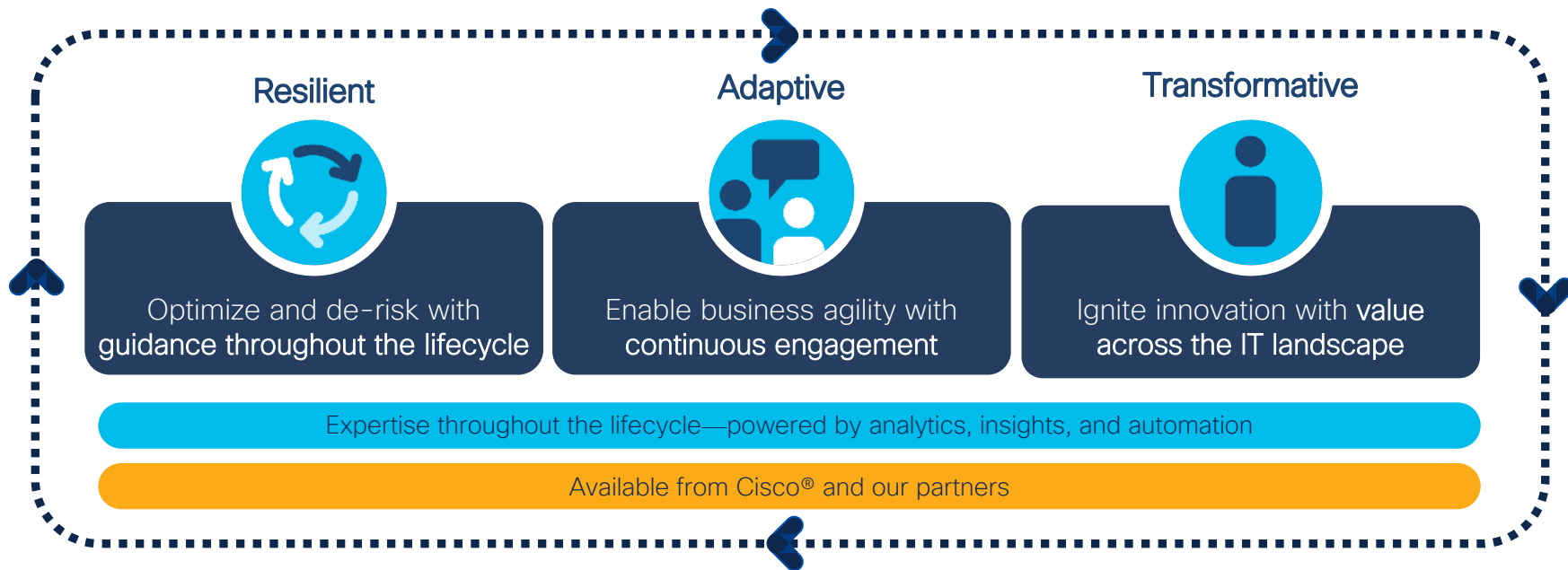
<https://ciscolive.ciscoevents.com/ciscolivebot/#BRKOPS-2128>

# Agenda

- Business Challenges and Outcomes
- Solution Architecture
- Dashboard and Demo
- Case Study
- Value Realization
- Roadmap
- Conclusion

# Cisco Business Critical Services

Accelerate outcomes and move your business forward with ongoing, expert guidance at every stage in the IT lifecycle through uniquely tailored engagement models



# Business Challenges and Outcomes

# Fault Detection – Why does it matter?

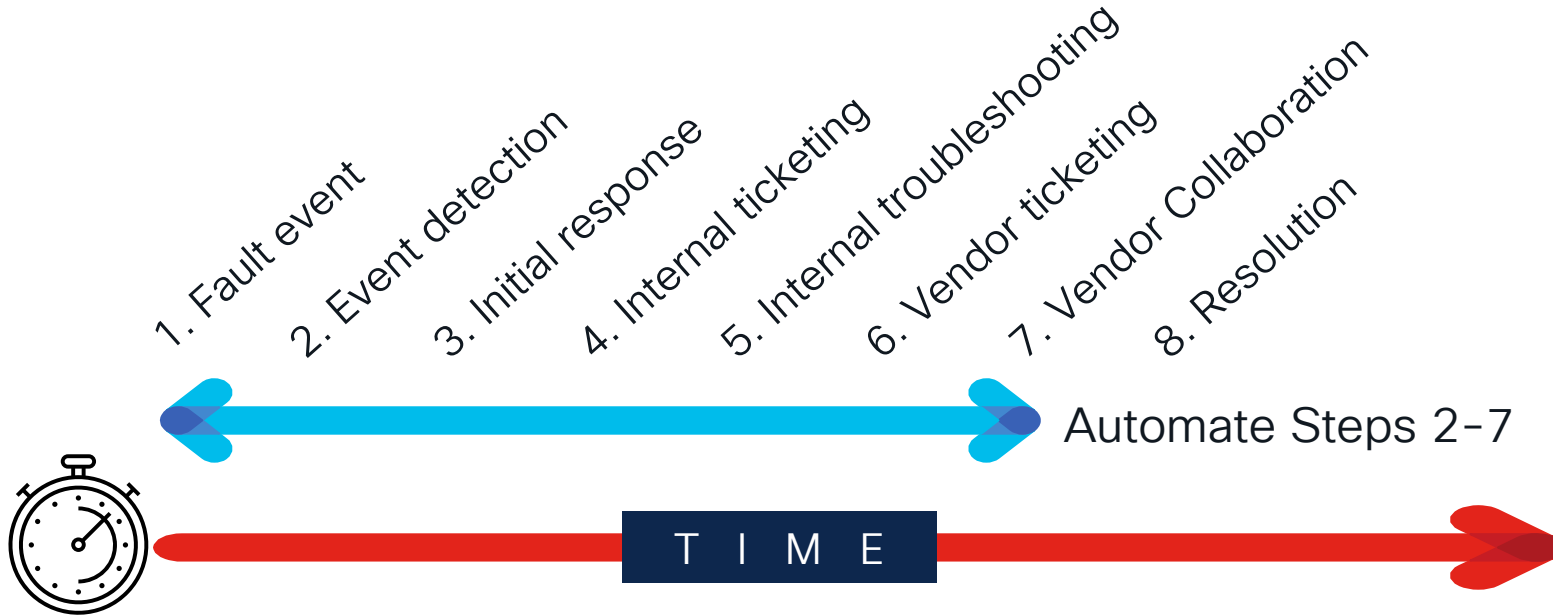
## Challenges

- Event detection time
- Time of engagement
- Response efficiency
- Supplement staff knowledge
- Total resolution duration

## Outcomes

- Improve time to resolution
- Jump start troubleshooting
- Provide Remediation notifications
- Automated collection of data
- Smart-bonding capability

# Fault Management Timeline

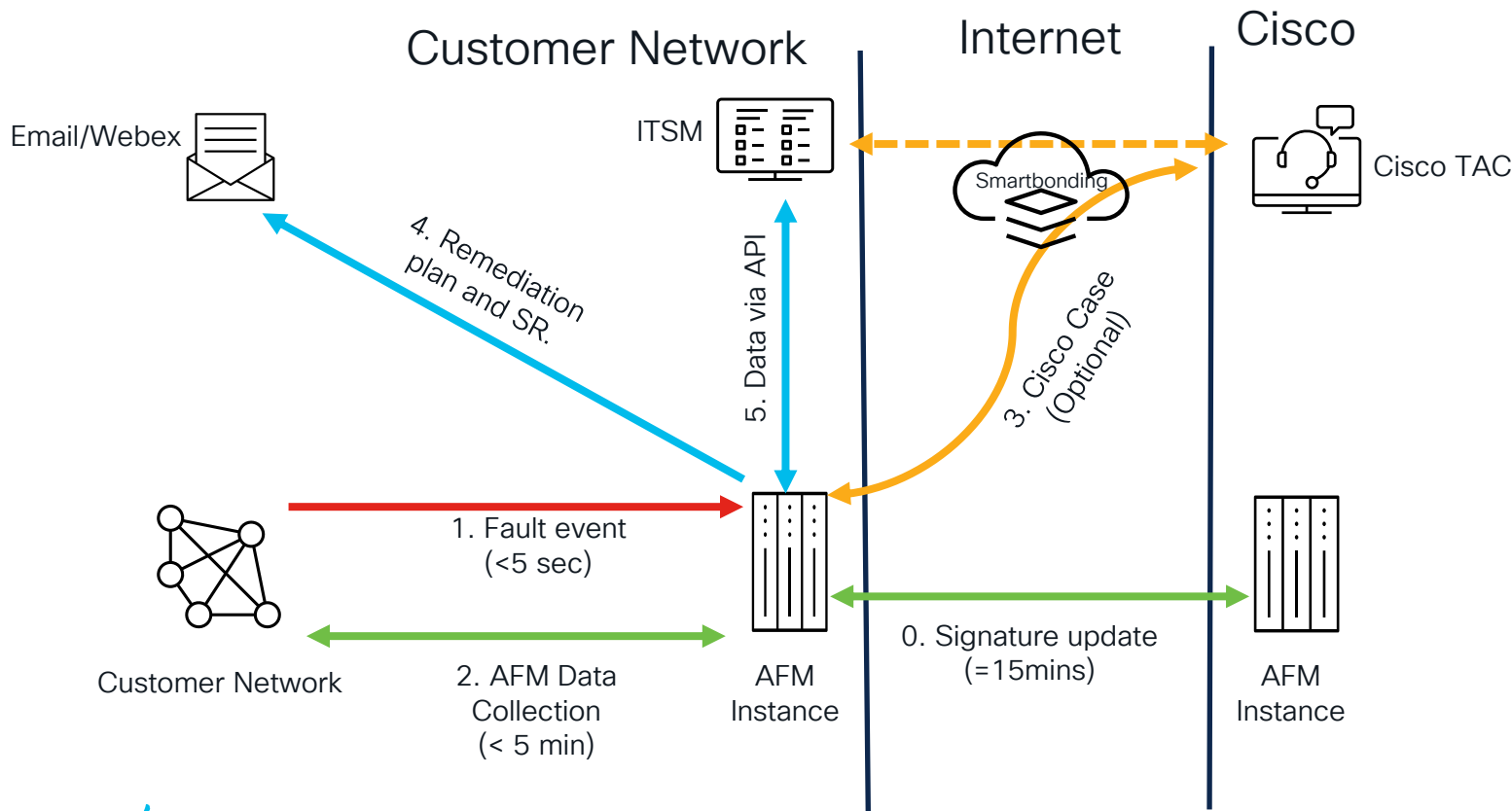


How can the ENTIRE process improve?



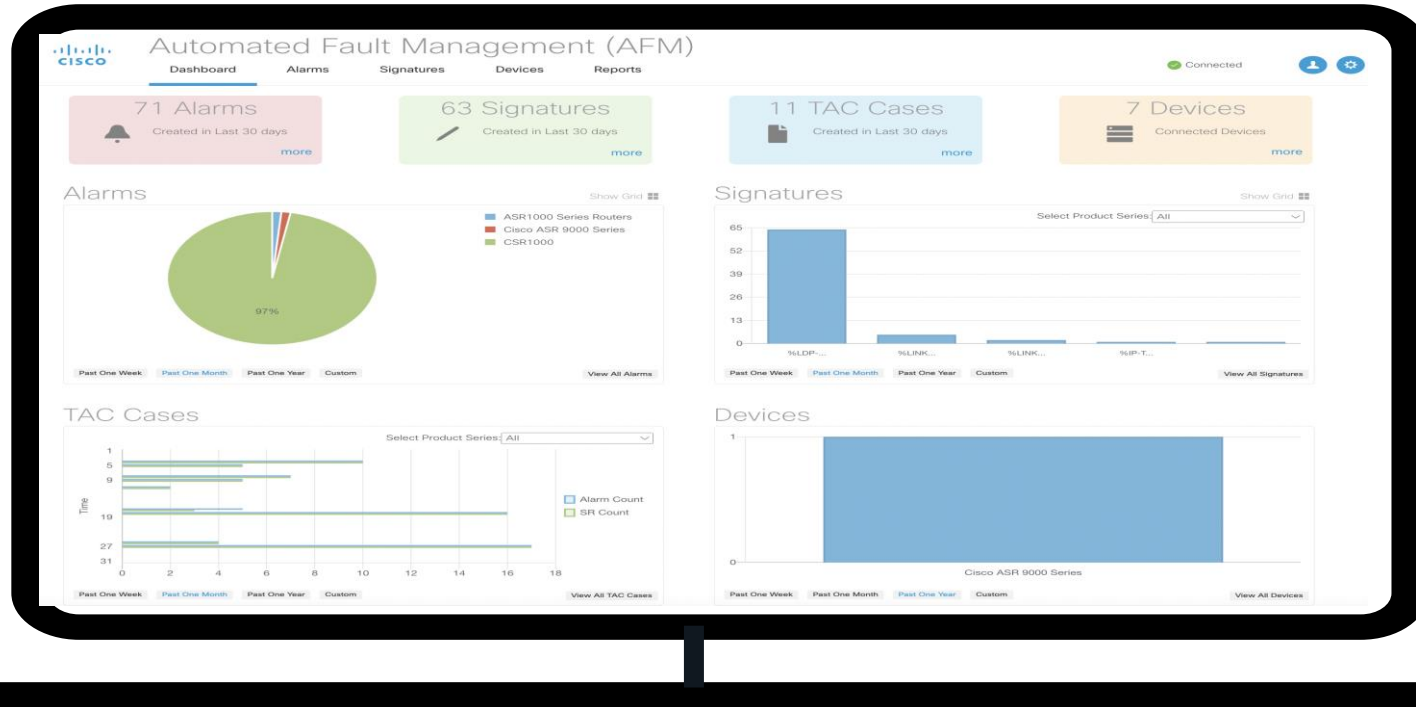
# Solution Architecture

# Automated Fault Management Architecture



# Dashboard and Demo

# Summary View



✓ This tab shows the summary of Alarms, Signatures, TAC cases and Devices

# Alarms View

Alarms(453)



Select Duration

Select Product Series

ID	Message	Device IP	Host Name	Remediati...	SR No	CLI Output
Search	Search	Search	Search	Search	Search	Search
3755	<189>May 14 11:17:58 172.16.1.75 88: *May 14 03:34:31.847: %LDP-5-N...	172.16.1.75	BCS-LAB1-RT4	<a href="#">Available</a>	<a href="#">693524797</a>	<a href="#">Available</a>
3754	<189>May 14 11:17:58 172.16.1.73 78: *May 14 03:34:32.520: %LDP-5-N...	172.16.1.73	BCS-LAB1-RT2	<a href="#">Available</a>	<a href="#">693577318</a>	<a href="#">Available</a>
3753	<189>May 14 11:11:56 172.16.1.75 86: *May 14 03:28:29.962: %LDP-5-N...	172.16.1.75	BCS-LAB1-RT4	<a href="#">Available</a>	<a href="#">693524797</a>	<a href="#">Available</a>
3752	<189>May 14 11:11:40 172.16.1.75 85: *May 14 03:28:13.286: %LDP-5-N...	172.16.1.75	BCS-LAB1-RT4	<a href="#">Available</a>	<a href="#">693524797</a>	<a href="#">Available</a>
3751	<189>May 14 11:11:40 172.16.1.73 76: *May 14 03:28:13.968: %LDP-5-N...	172.16.1.73	BCS-LAB1-RT2	<a href="#">Available</a>	<a href="#">693577318</a>	<a href="#">Available</a>
3750	<189>May 14 11:11:17 172.16.1.75 84: *May 14 03:27:50.214: %LDP-5-N...	172.16.1.75	BCS-LAB1-RT4	<a href="#">Available</a>	<a href="#">693524797</a>	<a href="#">Available</a>
3749	<189>May 14 11:11:17 172.16.1.73 75: *May 14 03:27:50.905: %LDP-5-N...	172.16.1.73	BCS-LAB1-RT2	<a href="#">Available</a>	<a href="#">693577318</a>	<a href="#">Available</a>
3748	<187>May 14 11:10:28 172.16.1.73 59: *May 14 03:26:55.768: %LINK-3-...	172.16.1.73	BCS-LAB1-RT2	<a href="#">Available</a>	<a href="#">693577318</a>	<a href="#">Available</a>

show ip route summary

Load for five secs: 0%/0%; one minute: 0%; five minutes: 0%  
No time source, \*11:44:00.443 GMT Wed Dec 16 2020

IP routing table name is default (0x0)  
IP routing table maximum-paths is 32

Route Source	Networks	Subnets	Replicates	Overhead	Memory (bytes)
application	0	0	0	0	0
connected	0	13	0	1248	3952
static	1	0	192	608	

## AFM Event Remediation

Event	<189>May 10 12:25:14 172.16.1.75 267: *Dec 16 11:43:07.719: %LDP-5-NBRCHG: LDP Neighbor 2.2.2.2:0 (1) is UP
Impact	BACKBONE LDP NEIGHBORSHIP DOWN
Description	AFM CUSTOMER DEMO Service Request Number: 693524797
Recommendation	NA Recommendation Description: AFM CUSTOMER DEMO



If an event matches a signature on a device, then an alarm is created on this tab.

# Signature View

Signatures(1052)



Search Signature in IC Repository

Signature Name	Signature Alias	Reque...	Raise...	Product Series	Sever...	IC
Search	Search	Search	Search	Search	Search	Search
%GTPC47595ERROR-3-GTPC_ER...	62580223a2695d881ff37bd2	nsailaks	Yes	Cisco ASR 5000 Series	3	Global
%SESSMGR12861ERROR-3-SESS...	6258025ecc7542f759b8a84a	namits	No	Cisco ASR 5000 Series	3	Global
%VPN5902ERROR-3-VPN_ERROR ...	6258007ebab39b6f9ff3c8c0	namits	No	Cisco ASR 5000 Series	3	Global
%SESSMGR10018ERROR-3-SESS...	625504781db606084d25d8...	namits	No	Cisco ASR 5000 Series	3	Global
%MME_APP147036ERROR-3-MM...	62550aac1db60633db25ee3e	nsailaks	Yes	Cisco ASR 5000 Series	3	Global
%GMM88101ERROR-3-GMM_ERR...	62550b6f13d7f54bdd25cfd0	nsailaks	Yes	Cisco ASR 5000 Series	3	Global
%HAT3083CRITICAL-2-HAT_CRITI...	6255093513d7f5d34725c9aa	nsailaks	Yes	Cisco ASR 5000 Series	3	Global

## Edit Signature

Requestor Name*	nsailaks	Requestor Email*	
Signature/Mnemonic* ⓘ	%GTPC47595ERROR-3-GTPC_ERROR s*:*UPC.*Handoff fail	Signature/Alias* ⓘ	62580223a2695d881ff37bd2
Product Series*	ABC_PROD APIC-SERVER-M3 ASR1000 Series Routers ASR5000 ASR6000	Severity	3 ▾
Description* ⓘ	This message occurs when the DBReq (Delete Bearer Request) for the default bearer is initiated by PGW (Packet Data Network Gateway) and simultaneously update PDP (Packet Data Protocol) request is received by PGW for GnGp handoff (4G (Fourth Generation) to 3G (Third Generation)).	Commands to Support* ⓘ	show support details#show version verbose#show pgw-service all#show gtpc statistics verbose#show session disconnect-reasons verbose
Remediation Steps* ⓘ	Collect PCAP (Packet Capture) for the IMSI (International Mobile Subscriber Identity) mentioned in the syslog message for a specified timeframe to analyze further on failure cause and engage with the support engineer to resolve the issue.	Impact* ⓘ	Due to this issue, the subscriber session gets disconnected. This might affect the device services.
Sample Message* ⓘ	Nov 15 18:51:28 <<ipaddress>> evlogd: %GTPC47595ERROR-3-GTPC_ERROR: 4/2/11189 <sessmgr:627> p_fsm_handler.c:467] Recvd UPC Req from peer X.X.X.X for GP Handoff - Handoff failed GGSN svc(YYYY) - IMSI: NA.	Regular Expression ⓘ	
Raise SR*	<input checked="" type="radio"/> Yes <input type="radio"/> No		



Signatures are created/modified and mapped to a product series in this tab.

# Devices Tab



## Automated Fault Management (AFM)

[Dashboard](#)[Alarms](#)[Signatures](#)[Devices](#)[Reports](#)Connected[Reload](#)

Devices(7)

[Get Device Exception ...](#)[Retry All](#)[Delete Alarm\(s\)](#)[Search](#)

✓	IP Address	Host Name	Serial Number	Product ID	Product Series	Alarms ...	Contract Number ...	Operating System ...	Device Group	
	<a href="#">Search</a>	<a href="#">Search</a>	<a href="#">Search</a>	<a href="#">Search</a>	<a href="#">Search</a>		<a href="#">Search</a>	<a href="#">Search</a>	<a href="#">Search</a>	
✓	10.82.140.196	RP/0/RSP0/CPU0:F...	FOC1808NF4P	ASR-9001	Cisco ASR 9000 Series	0		IOSXR	DEFAULT	S
✓	10.75.61.33	93108TC-FX1	FDO24090GZ5	N9K-C93108TC-EX	Nexus9000	0		NXOS	DEFAULT	S
✓	10.75.49.102	RP/0/RP0/CPU0:NC...	FOC2238R1ZY	NCS-5001	Cisco NCS5000 Series	1		IOSXR	DEFAULT	S
✓	10.75.49.65	RP/0/RSP1/CPU0:9...	FOX2250P6EC	ASR-9910	Cisco ASR 9000 Series	3		IOSXR	DEFAULT	S
✓	172.16.1.73	BCS-LAB1-RT2	9TNWM5WT5LF	L-CSR-1G-IPB-1...	CSR1000	87	203308677	IOSXE	DEFAULT	S
✓	172.16.1.77	BCS-LAB1-RT7	96Y0ENM04VV2KOG0...	ASR1000	ASR1000 Series Routers	432		IOSXE	DEFAULT	S
✓	172.16.1.75	BCS-LAB1-RT4	92ENF5RPAT2	L-CSR-1G-IPB-1...	CSR1000	78	203308677	IOSXE	DEFAULT	S

✓ Devices being monitored by AFM can be seen in this tab.

VM Maestro

100%

Projects

- My Topologies
- Sample Topologies

360sp04-wkb-fc01-initial-FWLvha-XII\_GZ

Simulations

Last updated: Thu May 19 20:49:37 IST 2022

CSPC

- 360sp04-wkb-fc01-initial-FWLvha-XII\_GZ
  - RT1-XR [ACTIVE - UNREACHABLE]
  - RT2 [ACTIVE - UNREACHABLE]
  - RT3 [ACTIVE - UNREACHABLE]
  - RT4 [ACTIVE - UNREACHABLE]
  - RT5 [ACTIVE - UNREACHABLE]
  - RT7 [ACTIVE - UNREACHABLE]
- lxc-flat
  - External Address [172.16.1.79]
  - Forwarding Port on Server [10001]
  - ~mgmt-lxc interface [eth0]
  - ~mgmt-lxc [ACTIVE - REACHABLE]
- jumpost
  - jumpost [ACTIVE - REACHABLE]
- jumplink
  - External Address [172.16.1.55]
  - Forwarding Port on Server [10000]
  - jumpost interface [eth1]

RT7

RT1-XR

RT2

RT4

RT3

RT5

RT4 (Console) - 360sp04-wkb-fc01-initial-FWLvha-XII\_GZ (Console)

```
RT4#
RT4#
RT4#
RT4#
RT4#
RT4#
RT4#sh clo
RT4#sh clock
Load for five secs: 0%/0%; one minute: 0%; five minutes: 0%
No time source, *10:11:12.104 GMT Fri May 20 2022

*10:11:12.104 GMT Fri May 20 2022
RT4#
RT4#
RT4#
RT4#
```

CSPC



# Case Study

# Use Case : Large Service Provider and Bank

## High Operational Expense

- Time to detect
- Time to diagnose and remediate
- Technical Resource costs

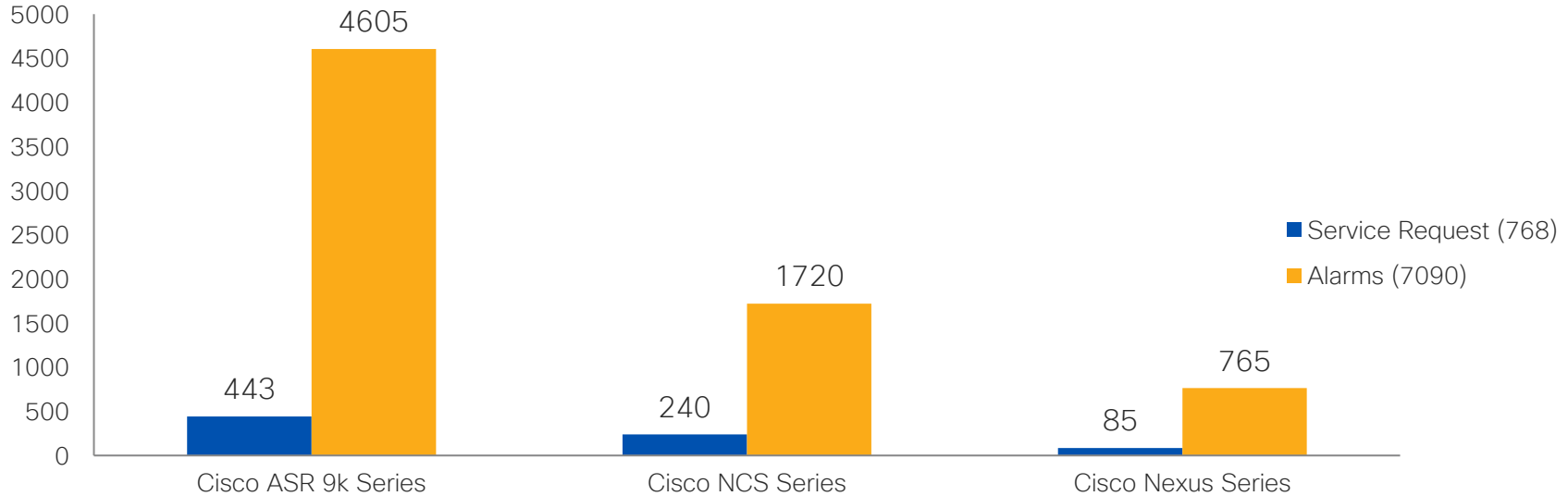
## High Time To Resolution

- Time to detect
- Manual diagnosis and remediation
- Limited Technical Resources with deep work Queues

## Solution

- Near real time automated outage detection
- Automated collection of detailed failure data
- Cisco Intellectual Capital supplied remediation steps
- Automated support case creation and problem notification

# SP AFM Delivery over a period of 12 month



- 40%– 50% cases are currently being opened by AFM
- Average fault detection time reduced by 30–60 minutes
- Case opening and queuing time essentially eliminated saved approx. 45 mins
- Average remediation time reduced to less than 10 minutes



*“\$8 million outage reduction saving over 12 months”*

*“Outage detection times reduced by 75%.”*

Major Service Provider, US



*“\$5 million projected savings in labor costs, over 12 month”*

*Problem resolution cut by 50% per incident.*

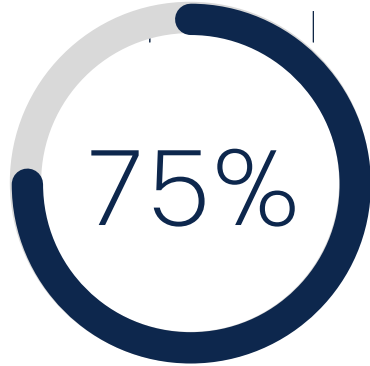
Large Bank, US

# Value Realization

# Value Realization



Significant savings in  
outage and labour costs



Outage detection time  
reduced by 75%



Resolution time  
reduced by 50%



~+7.9k hours saved  
compared to manual  
case opening

# Winner of TSIA 2021 Award

## Innovation in Support Services Automation – AFM

<https://www.tsia.com/tsia.public.dev/media/pdf-file-storage/STAR-Application-Submissions-2021/2021-star-award-innovation-support-services-automation-cisco.pdf>

## Innovation in Customer Success – CX Cloud

<https://www.tsia.com/tsia.public.dev/media/pdf-file-storage/STAR-Application-Submissions-2021/2021-star-award-innovation-customer-success-cisco.pdf>

## Innovation in Customer Portals – CX Cloud

<https://www.tsia.com/tsia.public.dev/media/pdf-file-storage/STAR-Application-Submissions-2021/2021-star-award-innovation-customer-portals-cisco.pdf>



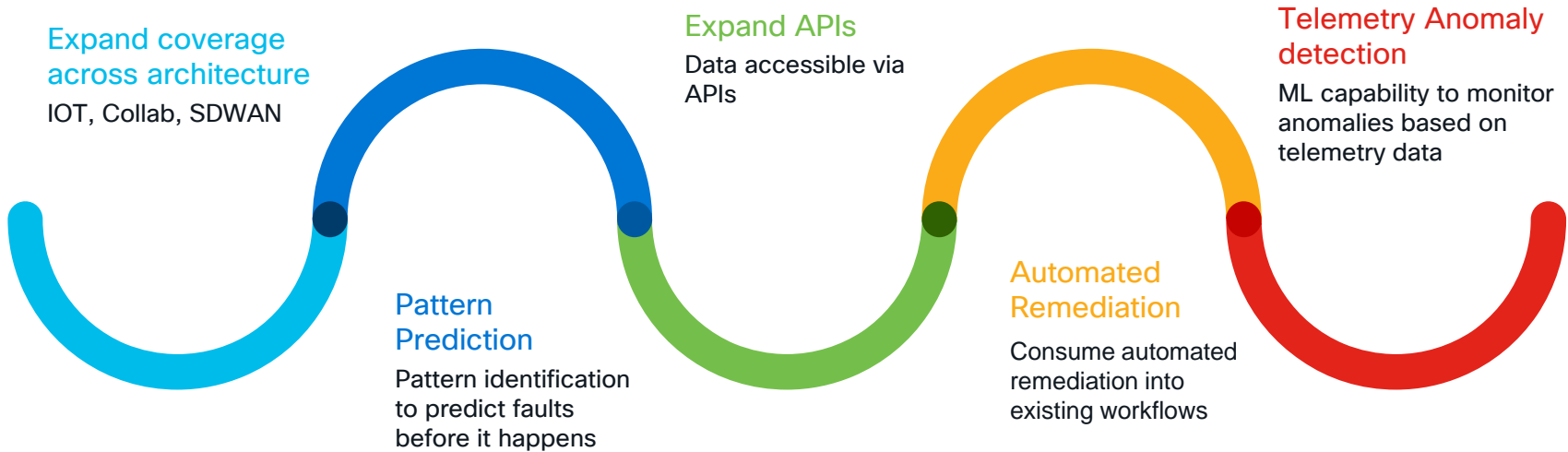
\*TSIA Technology & Services Industry Association –

<https://www.tsia.com/certifications-and-awards/star-awards/tsia-star-award-winners>



# Roadmap

# Roadmap



# What is Automated Fault Management?



Combines automation detection and machine learning, powered by Cisco intellectual capital to speed fault detection, troubleshooting and resolution times

# Technical Session Surveys

- Attendees who fill out a minimum of four session surveys and the overall event survey will get Cisco Live branded socks!
- Attendees will also earn 100 points in the Cisco Live Game for every survey completed.
- These points help you get on the leaderboard and increase your chances of winning daily and grand prizes.



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## Pay for Learning with Cisco Learning Credits

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## Learn

### Cisco U.

IT learning hub that guides teams and learners toward their goals

### Cisco Digital Learning

Subscription-based product, technology, and certification training

### Cisco Modeling Labs

Network simulation platform for design, testing, and troubleshooting

### Cisco Learning Network

Resource community portal for certifications and learning



## Train

### Cisco Training Bootcamps

Intensive team & individual automation and technology training programs

### Cisco Learning Partner Program

Authorized training partners supporting Cisco technology and career certifications

### Cisco Instructor-led and Virtual Instructor-led training

Accelerated curriculum of product, technology, and certification courses



## Certify

### Cisco Certifications and Specialist Certifications

Award-winning certification program empowers students and IT Professionals to advance their technical careers

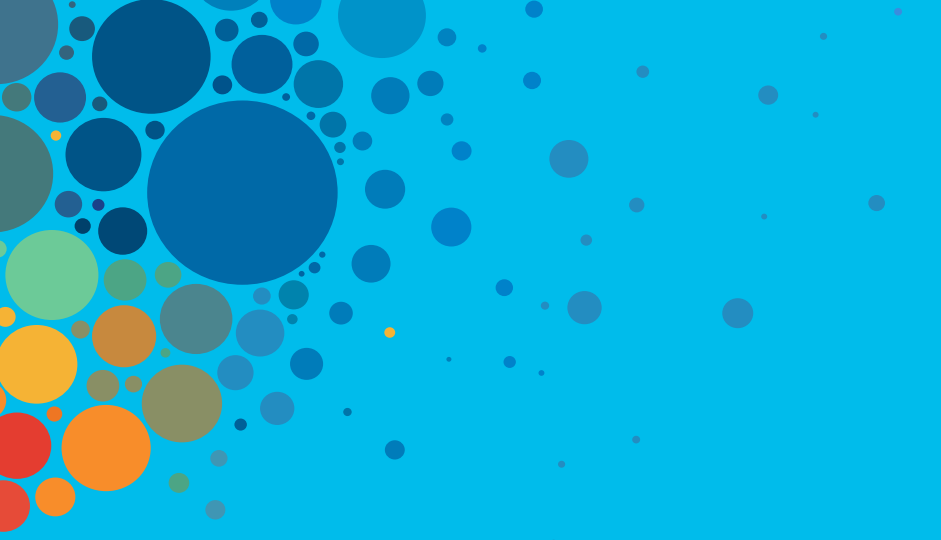
### Cisco Guided Study Groups

180-day certification prep program with learning and support

### Cisco Continuing Education Program

Recertification training options for Cisco certified individuals

Here at the event? Visit us at **The Learning and Certifications lounge at the World of Solutions**



# 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](https://www.CiscoLive.com/on-demand)



The bridge to possible

# Thank you

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