cisco live!







How ThousandEyes can save the 2:00AM call!

Yazan Albikawi, Implementation Engineer

BRKOPS-2079



Cisco Webex App

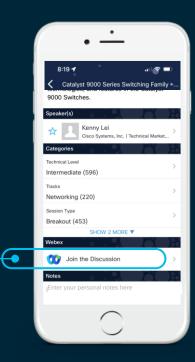
Questions?

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

How

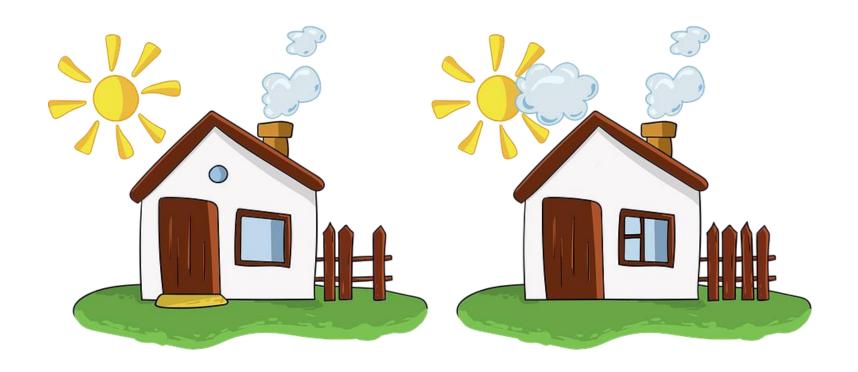
- 1 Find this session in the Cisco Live Mobile App
- 2 Click "Join the Discussion"
- 3 Install the Webex App or go directly to the Webex space
- 4 Enter messages/questions in the Webex space

Webex spaces will be moderated by the speaker until June 17, 2022.

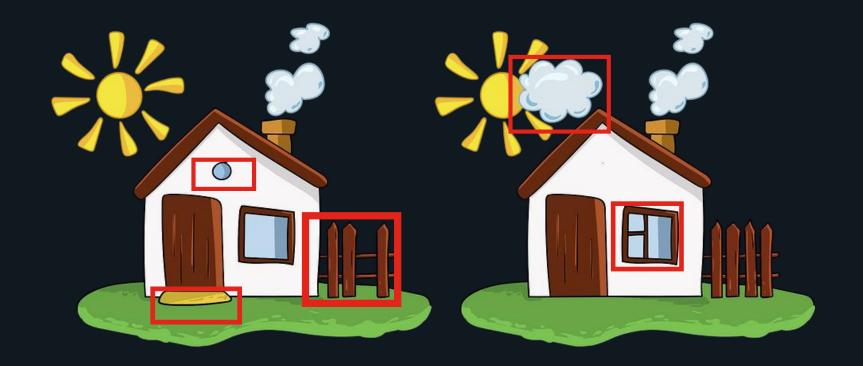


https://ciscolive.ciscoevents.com/ciscolivebot/#BRKOPS-2079











Session Objective

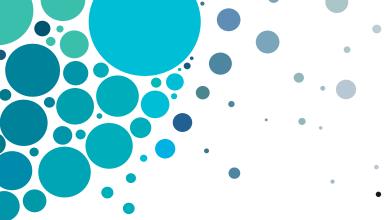
Your main key takeaways

- Increase network awareness and visibility
- SD-WAN Network performance troubleshooting
- How to troubleshoot application performance
- How to correlate events from different layers and tests

"Inside the fogs, you think better and thus you see better!" -Mehemet Murat







Agenda

- Introduction
- Central Science network overview
- Why ThousandEyes
- The Story: Clark the ThousandEyes Hero
- 2:00AM before ThousandEyes era
- Conclusion

About your speaker



Yazan Albikawi

- Focus areas: Network and Solution Design, Implementation, Consultation
- Technology Area: Security, Network observability and Design
- Based in Krakow, Poland
- I come from Jordan



Introduction



Introduction to Central Science

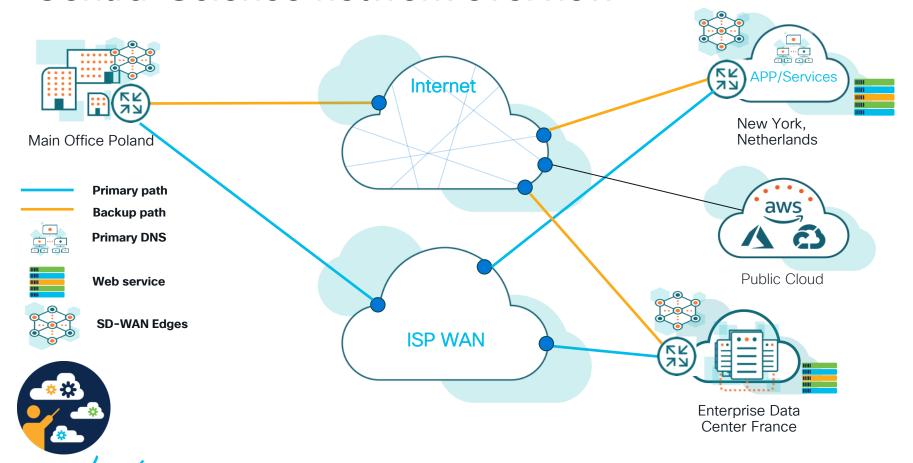
Central Science is a fictitious company focused on research and development sector for water and climate

- They had a big growth in business
- Recently moved to SD-WAN
- ThousandEyes deployed to have full network observability
- Network management is the key point for business continuity





Central Science network overview





"We want to select the best technology to enable our business growth, network monitoring and optimization using ThousandEyes will be the key" – Diana, Director of IT

Why ThousandEyes?



IT Network challenges

Visibility

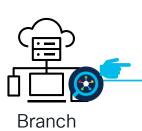
Cloud, internet, ISP and all start within your OWN network

Event correlation

Data is collected from different sources but not centralized

Collaboration

Assumption based collaboration rather than evidence based









Application



Introduction to ThousandEyes

A SaaS based I/internet and cloud intelligence solution

Network and Application Synthetics

- · Application performance, network and routing
- · Hop-by-hop path visibility across all networks

End User monitoring

- Client-based vantage point monitoring endpoint performance
- End-to-end path and performance observability

Internet Insights

- · Collecting and correlating data from different ISPs
- · Real-time internet and application outage detection

Single pane of glass

- All collected data visualized in one management console
- · Reporting and dashboard capabilities





ThousandEyes Internet and Cloud intelligence

Employee Digital Customer Digital Modern WAN Solutions Experience Experience Real-time Trending and **Eco-System** Anomaly Visualizations Detection Integration Aggregation Capabilities Timeline. Path Reports Alerts, Notifications Native REST API. Visualization **Dashboards** Integrations **Cross-Correlation and Collective Intelligence** Algorithmic Layer Global Inference Engine Network **End User BGP Application** Device **Layer Tests Layer Tests** Experience Laver Routing Data Sources LLDP and SNMP HTTP server, Page Load, L3 Paths with Endpoint vantage point Global BGP RIB Feeds Transaction. hop-by-hop metrics Tests FTP server. DNS. RTP. SIP



Collect performance data from every perspective

Enterprise Vantage Point



Cloud Vantage Point (



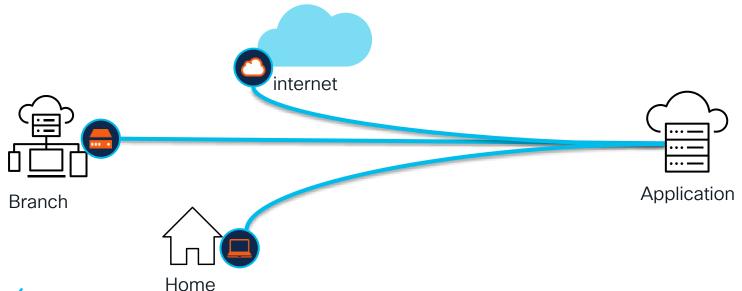
End-User Vantage Point <a>_



Inside-Out monitoring

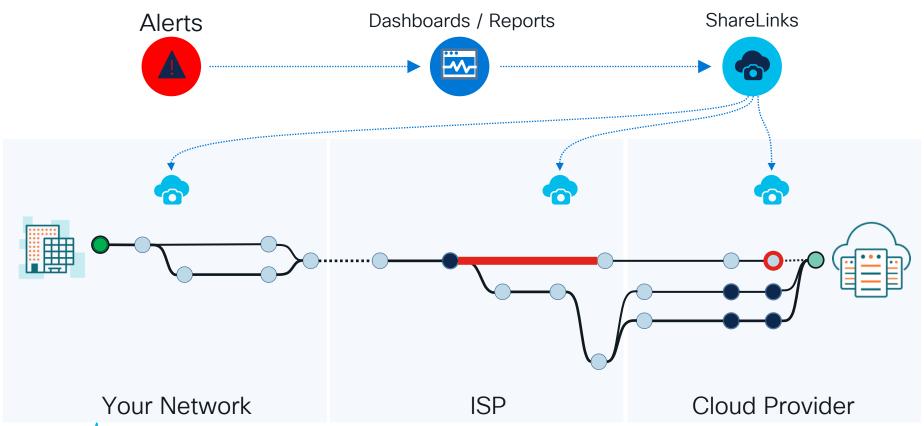
Outside-In monitoring

Last-mile monitoring





Collaborate effectively with shared data



Central Science monitoring with ThousandEyes



Central Science Network and Application Monitoring

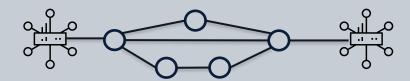
- Main application tests
 - Transaction test
 - Page load test



- Network tests
 - SD-WAN Overlay



SD-WAN Underlay

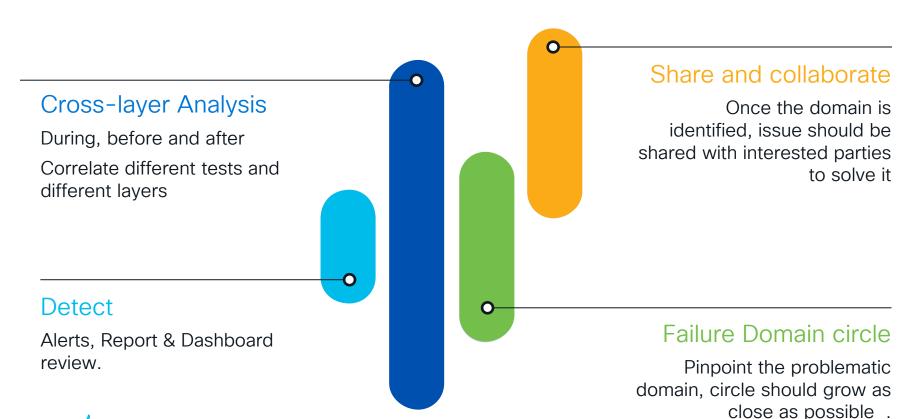




Troubleshooting Tips



Tips to troubleshoot with ThousandEyes





The Story: Clark the ThousandEyes Hero



Introduction to central science IT staff

- Clark the network admin
 - One of the top talents, he always tries to work proactively. ThousandEyes is his new favorite solution.



- Lobo from the dev team
 - He is a dedicated developer, comes with new ideas and improvements almost everyday... but sometimes he forgets to tell the network team about changes



- Raymond from the routing and infrastructure team
 - ICMP Unreachable is his worst nightmare, he is present in ever meeting



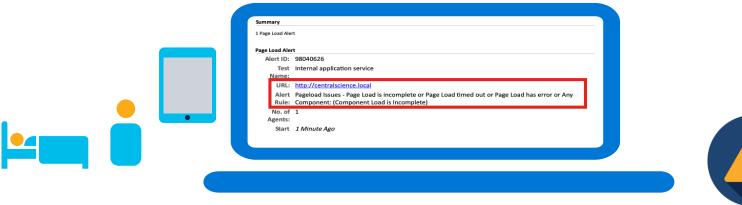


All started with a change

It's the end of the year, all projects are reaching the deadline

Part of the growth plan was to optimize the network and user experience, as such many changes are happening recently

24th of November at 12:30 AM, Clark received a notification from ThousandEyes ...





Main web page reporting issues

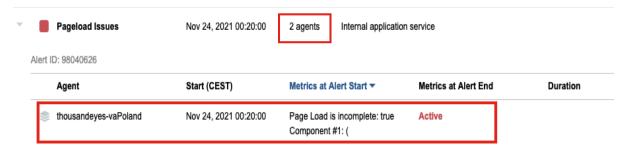




Centralscience web page should be accessed from all branches.

Checking the Alert details

- It's coming from both branches
- Started around the same time





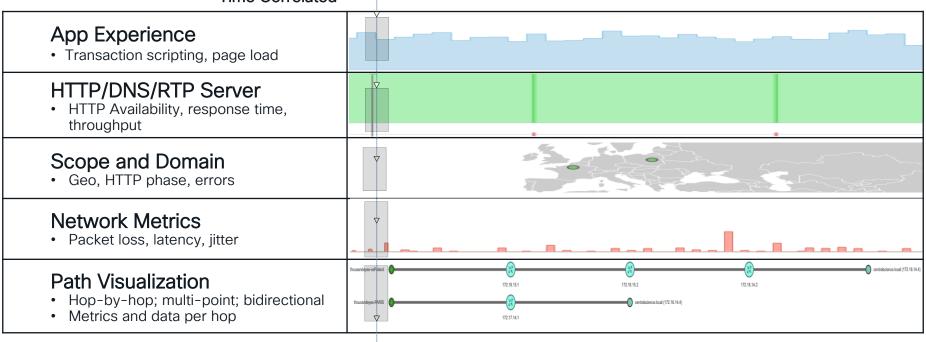


Troubleshooting Page Load test





Time Correlated





Troubleshooting Page Load test





Waterfall view

Agents load the page using Chromium browser Each component rendering at your browser will be presented.

- Object on page
- DOM Load time
- Errors







Page Load Troubleshooting video



Sh	now alerts that match all / any				
s	earch				Q
	Alert Rule	Start (CEST) ▼	Scope	Test Name	
, I	Web Response time Dyna	Nov 24, 2021 00:36:00	1 agent	Rule 11 tech	
>	_				
> /	Web Response time Dyna	Nov 24, 2021 00:36:00	1 agent	Rule 11 tech	
> <u>}</u>	Web Response time Dyna	Nov 24, 2021 00:30:00	1 agent	Rule 11 tech	
	Web Response time Dyna	Nov 24, 2021 00:30:00	1 agent	Rule 11 tech	
>	Default HTTP response time	Nov 24, 2021 00:30:00	1 agent	MS Teams Edge	
, .	Pageload Issues	Nov 24, 2021 00:20:00	2 agents	Internal application service	
> ,	Web Response time Dyna	Nov 23, 2021 23:00:00	4 agents	SalesForce	
·	MS Teams latency	Nov 23, 2021 13:34:24	1 agent	Cisco2	
· ·	MS Teams packet loss	Nov 23, 2021 13:34:24	1 agent	Cisco2	
·	MS Teams latecny/Jitter	Nov 23, 2021 13:34:24	1 agent	Cisco2	
	MS Teams latency	Nov 23, 2021 13:34:24	1 agent	Cisco	
	MS Teams packet loss	Nov 23, 2021 13:34:24	1 agent	Cisco	
	MS Teams latecny/Jitter	Nov 23, 2021 13:34:24	1 agent	Cisco	

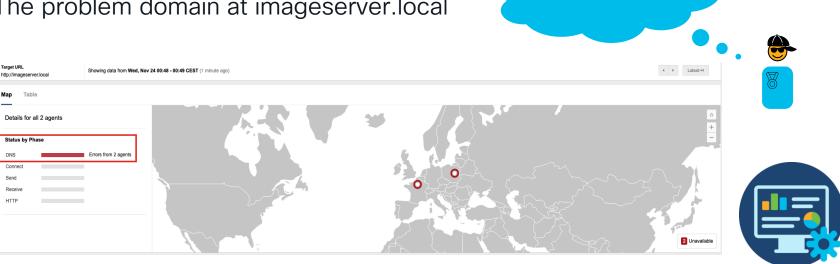
Troubleshooting Page Load test





Correlating two different tests, transaction and the page load Collecting more evidence....

The problem domain at imageserver.local





Troubleshooting Page Load test

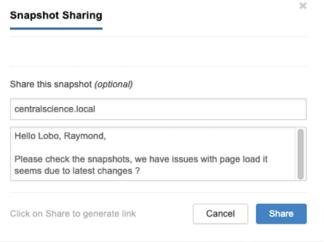


Putting the pieces together, from multiple tests we see issue narrowed

down to be in DNS Phase

Testing the main DNS sever...







Root cause of the problem: the main DNS server is not resolving imageserver.local





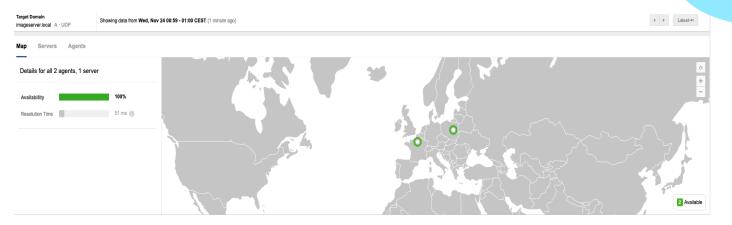
Troubleshooting Page Load Test

Lobo confirmed changes on the server, as usual, no one knows about the new imagserver.local

Raymond added the new entry to DNS server



Always, always, why he didn't tell me ?!





It's 1:00AM, everyone should go to sleep now issue resolved.

Note: SLA before managerial notification is 1.5 hours





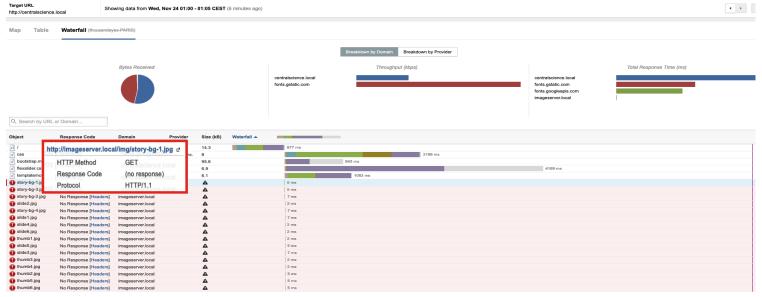
Main Web Page Reporting Issues..





Clark noticed that the alert is not cleared.

Checking page load details







Troubleshooting Page Load test - Part 2





The circle of failure domain is getting wider, the server is resolved but it's not responding.

Checking availability test







Troubleshooting Page Load test - Part 2





Failure domain

Share & collaborate

Path Visualization showing a loop!



Root cause of the problem: as part of route optimization, the more specific routes were announced by mistake.



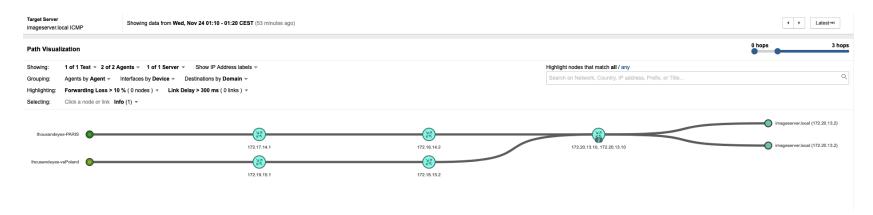








Network is converged and now all should be working fine







Main web page reporting issues...



Detect

Page load reporting the issue but intermittent Reviewing all the tests for centralscience services, loss, latency

detected	Default Network packet loss	Nov 24, 2021 01:40	:00 1 agent Pa	aris-to-Neatherland (Overlay)	00:15:00	
	Alert ID: 98053766					
	Server	Agent	Start (CEST) ▼	Metrics at Alert Start	Metrics at Alert End	Duration
	\$\bigset\$ 172.13.13.13	thousandeyes-PARIS	Nov 24, 2021 01:40:00	Packet Loss: 14%	Packet Loss: 0%	00:15:00
_	Response time	Nov 24, 2021 01:25	:00 1 agent Pa	aris-to-Neatherland (Overlay)	00:15:00	
	Alert ID: 98038176					
	Agent	Start (CEST) ▼	Metrics at Alert	Start Metrics at A	Metrics at Alert End Dura	
	thousandeyes-PARIS	Nov 24, 2021 01:20	Error: "Operation 5001 millisecond received"		00:1	10:00

As we know customer moved to SD-WAN. WAN is provided via fictitious ISP Dreamland





Main web page reporting issues...

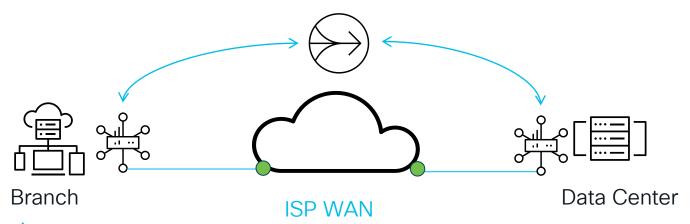




Connectivity is over SD-WAN between branches

To monitor SD-WAN for each site two tests are needed

- Overlay -> testing traffic within the tunnel
- Underlay-> going outside the tunnel to test the media







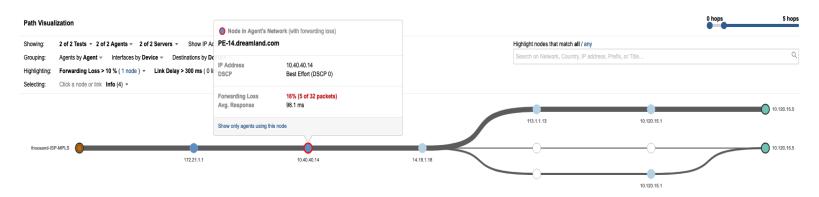
SDWAN Overlay/Underlay Video







Failure domain is narrowed down to ISP side



The nodes within ISP side are experiencing high packet loss, the failure domain identified in ISP side





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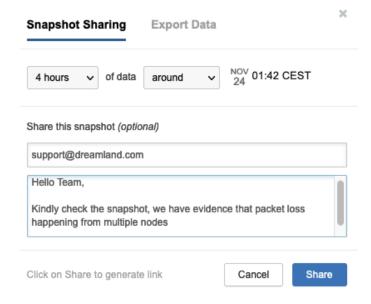


Detect Cross-layer analysis

Failure domain

Share & collaborate

Collaborating with ISP and showing evidence









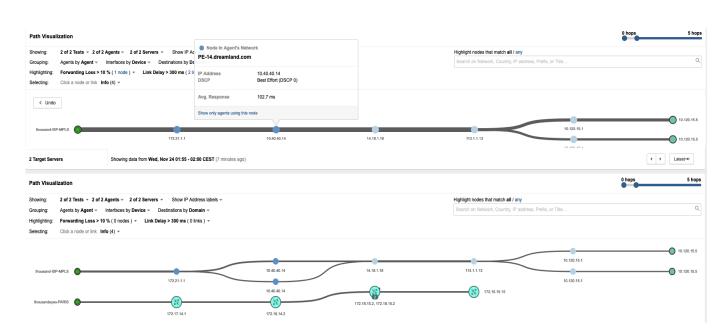
Detect

Cross-layer analysis

Failure domain

Share & collaborate

Issue resolved

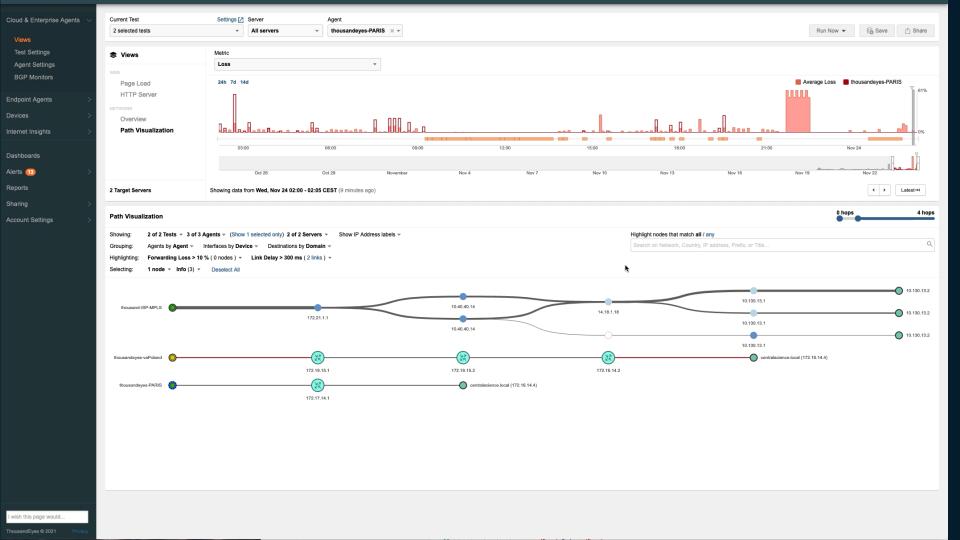






After ISP Issues Video





2:00AM Before ThousandEyes Era



All starts with a complain

Before ThousandEyes, the indicator was the actual user.

Assumptions and pointing fingers

8:00AM Troubleshooting call

Everyone is invited

Operation time



"The cost of not having the right tools, can't be predicted, make sure to have Eyes where you need them to be"-Yazan Albikawi





Conclusion





Conclusion





What is next?



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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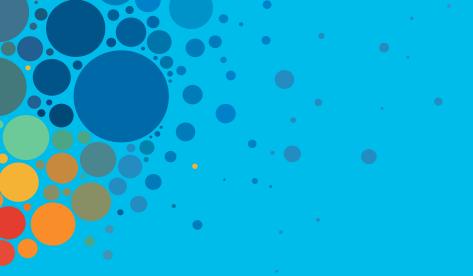
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Thank you



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