



Cloud Metro 2023 Survey Results

A Heavy Reading survey for Juniper Networks

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Agenda

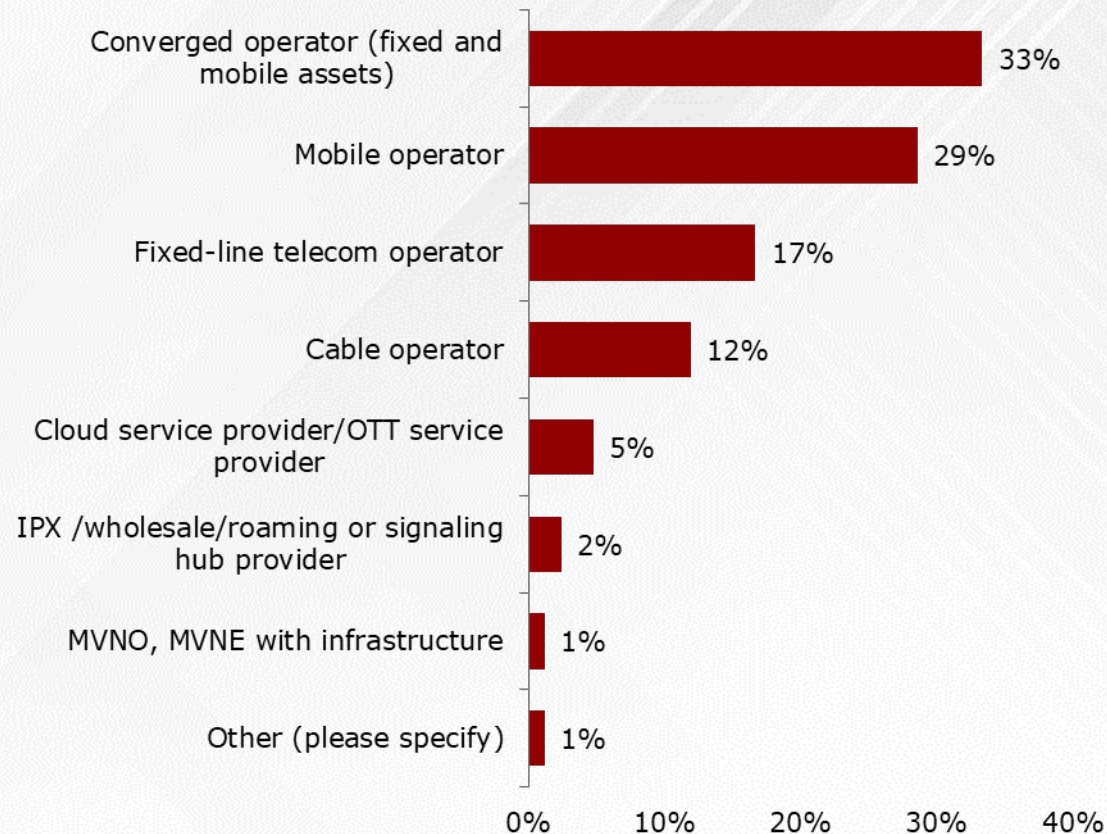
▪ Survey demographics	3
▪ Network modernization	7
▪ Network automation	15
▪ Features & functions	19
▪ Coherent pluggable optics	24
▪ Metro vendor views	28
▪ Conclusions	32



Survey demographics

Demographics (1/3)

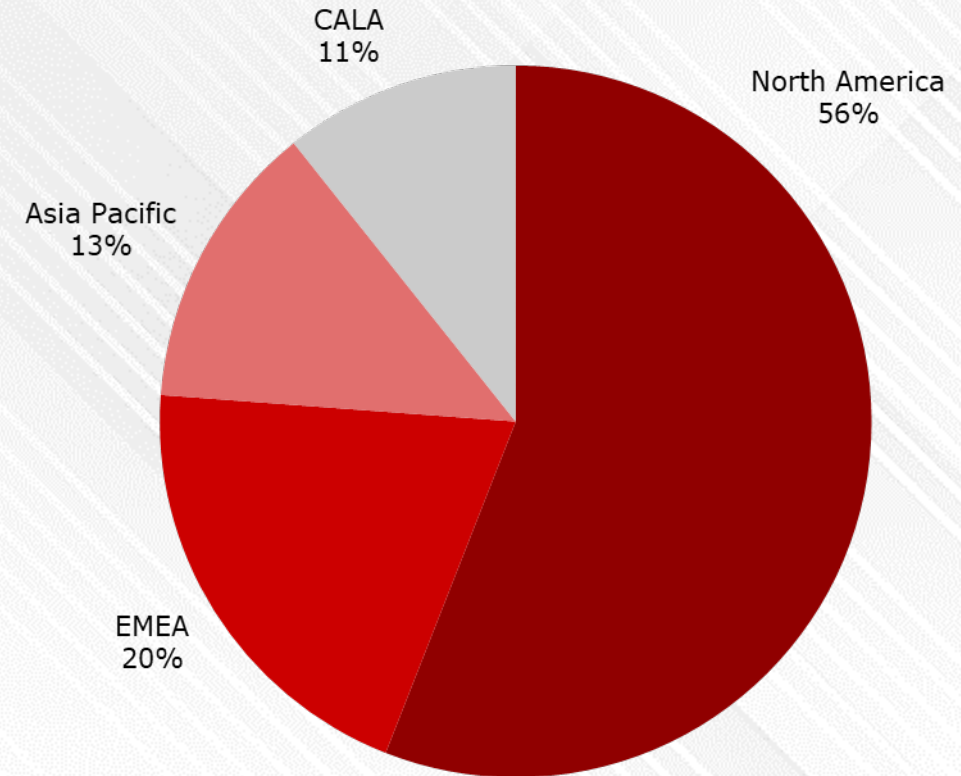
Type of service provider



n=84

Source: Heavy Reading

Geographic region



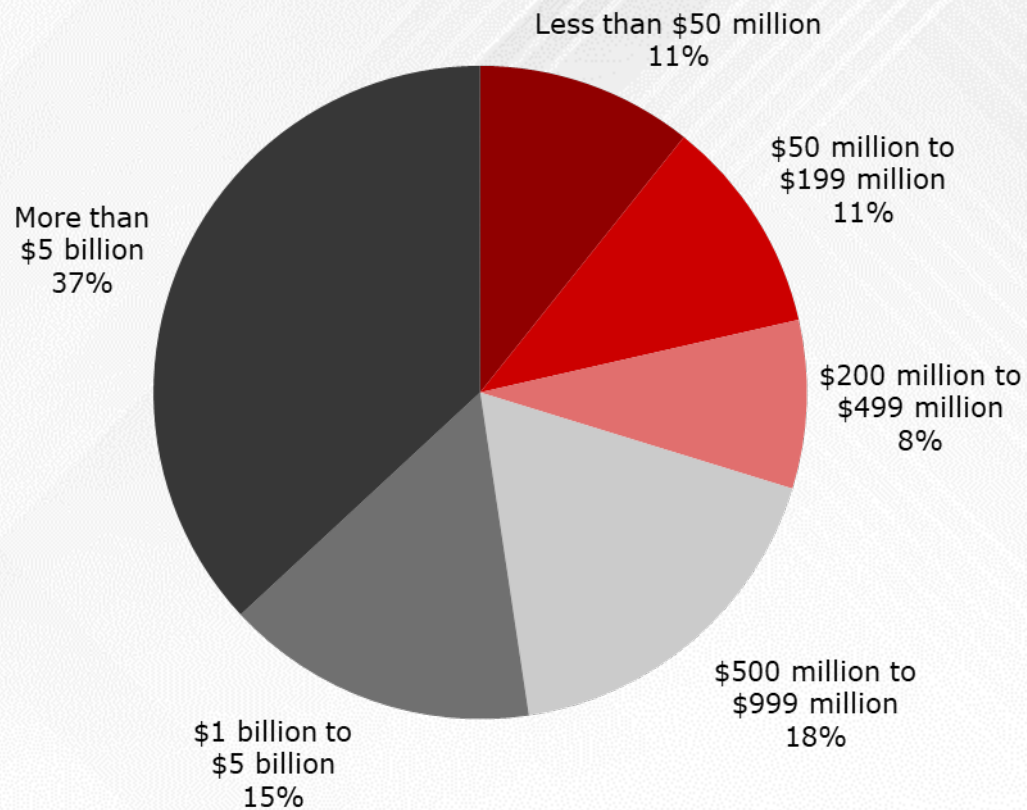
n=84

Source: Heavy Reading

Note: Numbers in figures throughout this report may not total 100 due to rounding.

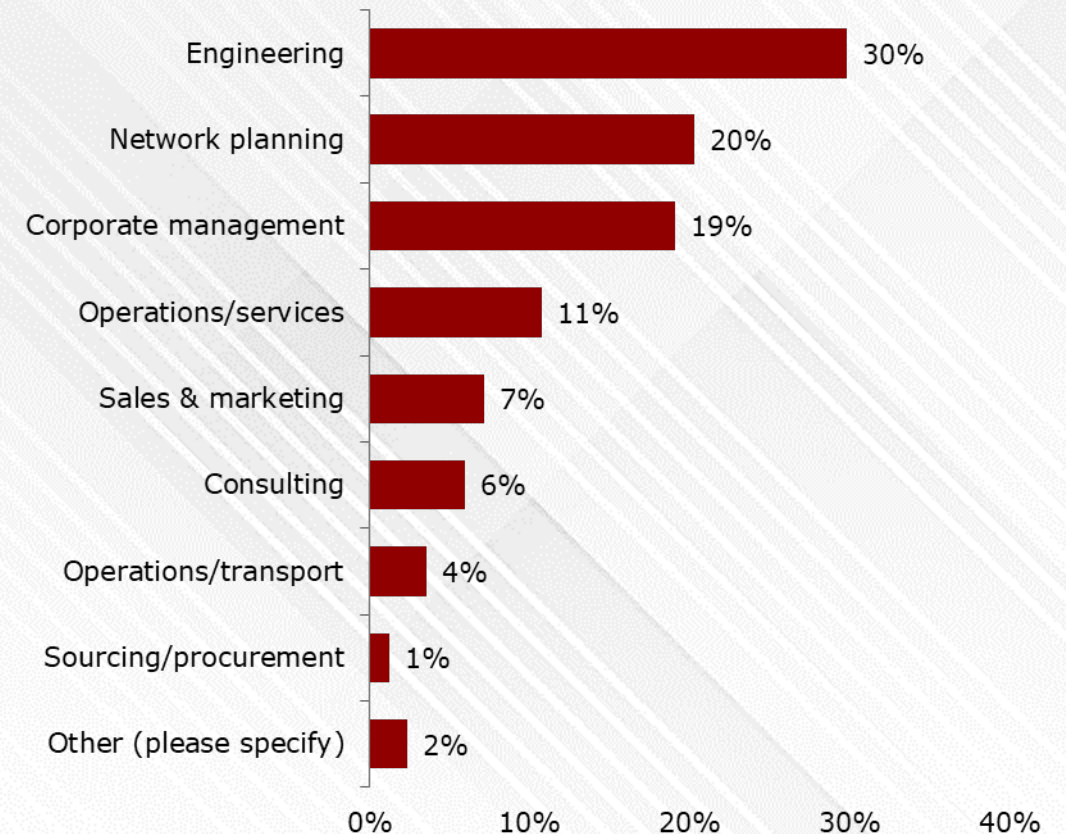
Demographics (2/3)

Annual revenue



n=84
Source: Heavy Reading

Job function*

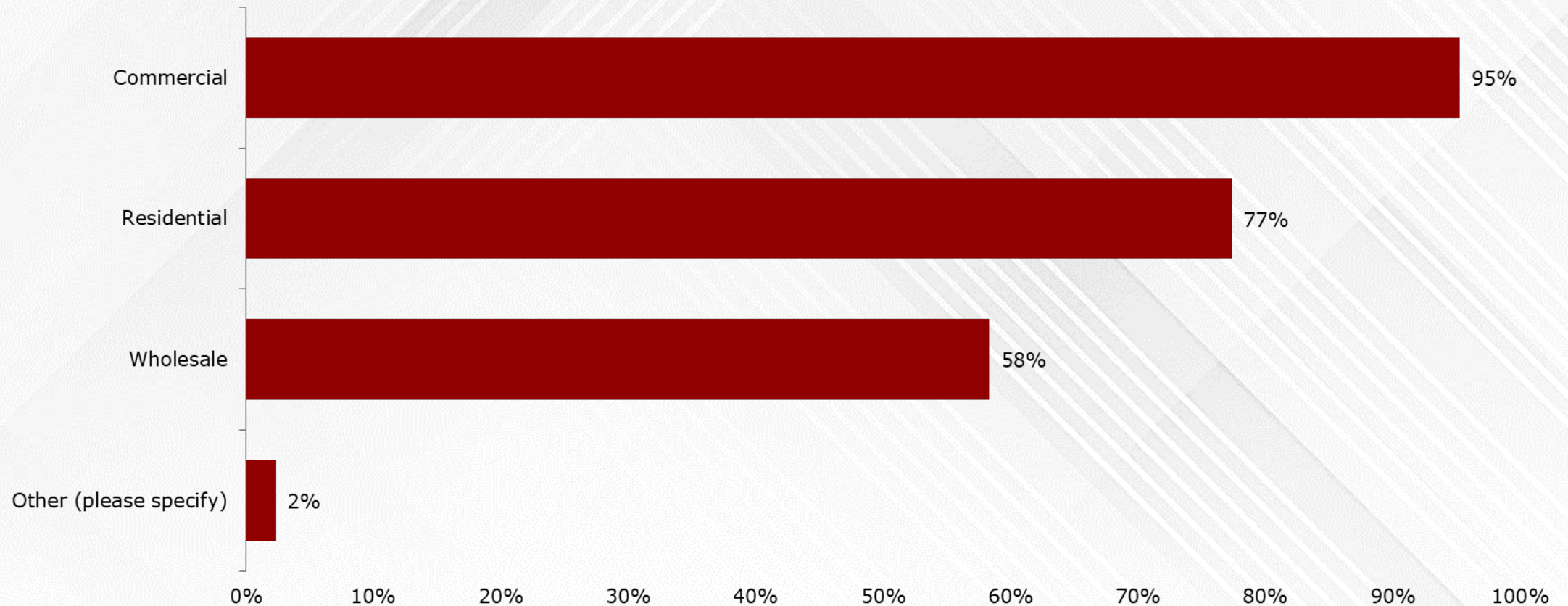


n=84
Source: Heavy Reading

*100% involved in network planning and/or purchasing

Demographics (3/3)

What types of customers does your network serve?



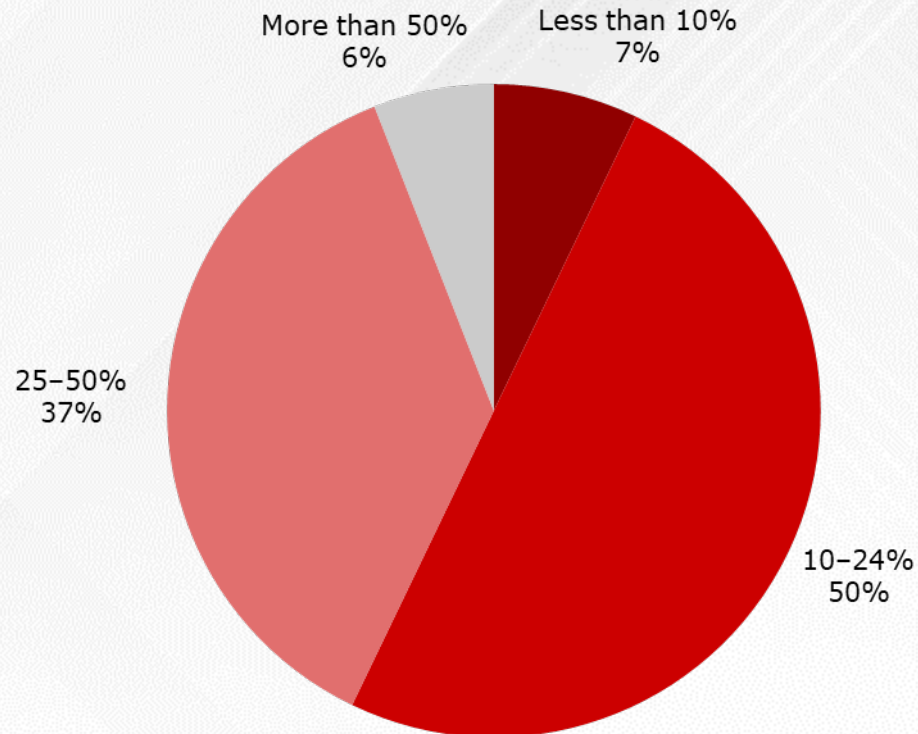
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Source: Heavy Reading



Network modernization

Metro traffic growth expectations

How much do you anticipate your metro traffic to grow per year over the next five years?

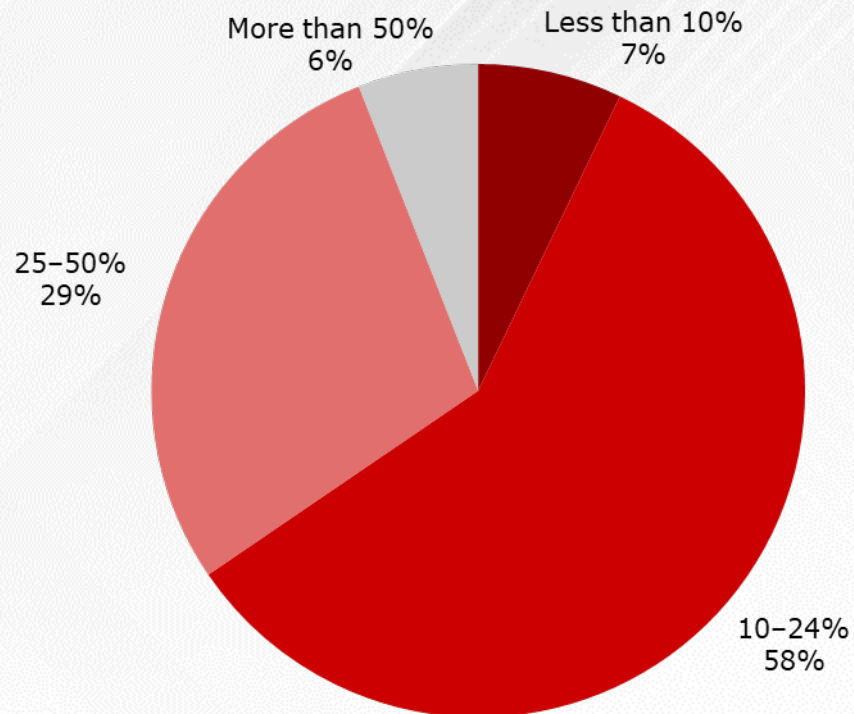


n=84
Source: Heavy Reading

- Half of communications service providers (CSPs) expect 10–24% annual growth in metro traffic
- 43% expect annual metro traffic growth of 25% or greater
- Comparing 2023 results to 2022:
 - 2023 data is closely aligned with the 2022 survey
 - Indicates consistent expectations for traffic growth

Changing metro network traffic patterns

What percent of overall metro traffic do you expect east-west traffic to account for over the next three years?

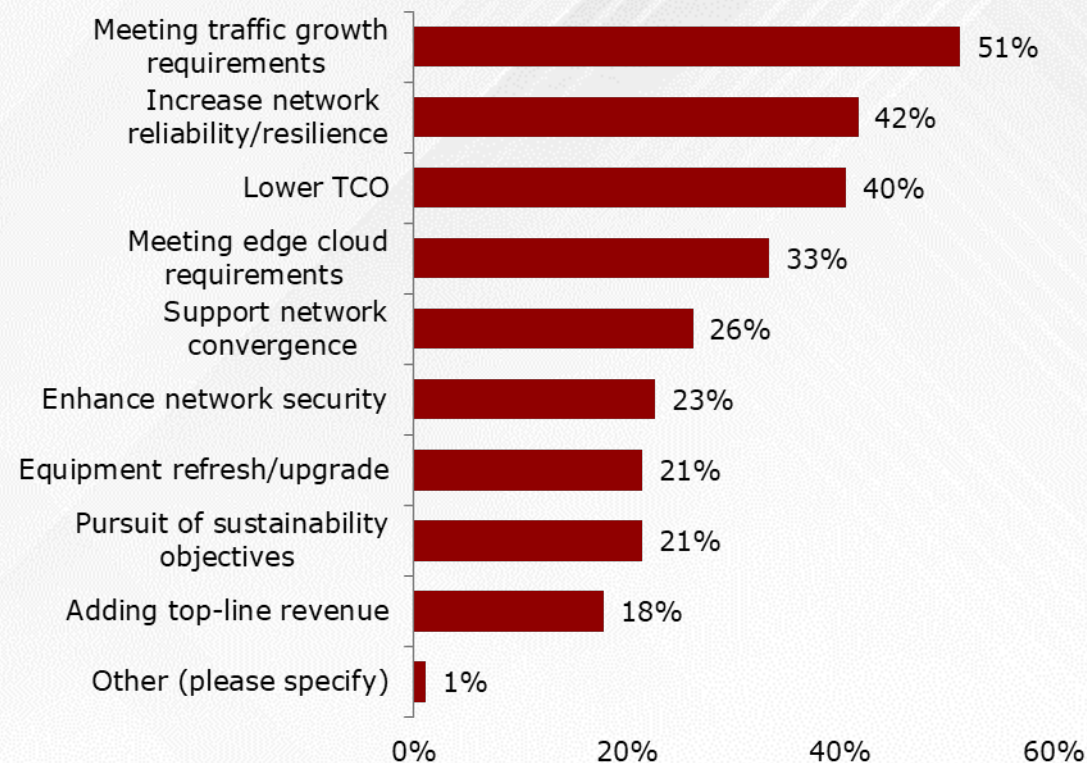


n=84
Source: Heavy Reading

- East-west describes traffic between data centers in a metro
- 58% of CSPs expect east-west will account for 10–24% of metro traffic annually
- 35% expect east-west traffic will account for 25% of metro traffic or greater
- Comparing 2023 results to 2022:
 - 2023 data is closely aligned with the 2022 survey
 - Indicates consistent expectations for east-west traffic

Metro network modernization business drivers

What are the primary business drivers to modernize your metro network?



n=84
Source: Heavy Reading

- At 51%, meeting traffic growth requirements is the top driver
- Increasing network reliability/resilience (42%) and lowering total cost of ownership (TCO) (40%) are also highly important drivers for modernization
- Sustainability is a buzzword in 2023 and was added as an option for the 2023 survey
 - Surprisingly, it registered low on the list as a primary driver
- Comparing 2023 results to 2022:
 - Traffic growth and reliability were the top two named business drivers in both 2023 and 2022

Metro network modernization use case drivers

What are the main application/use case drivers for modernizing your metro network?

Driver	Score	Overall rank
5G	141	1
Edge/cloud services	133	2
Enterprise services (including SD-WAN)	87	3
Residential broadband	75	4
IoT (Internet of Things)	68	5

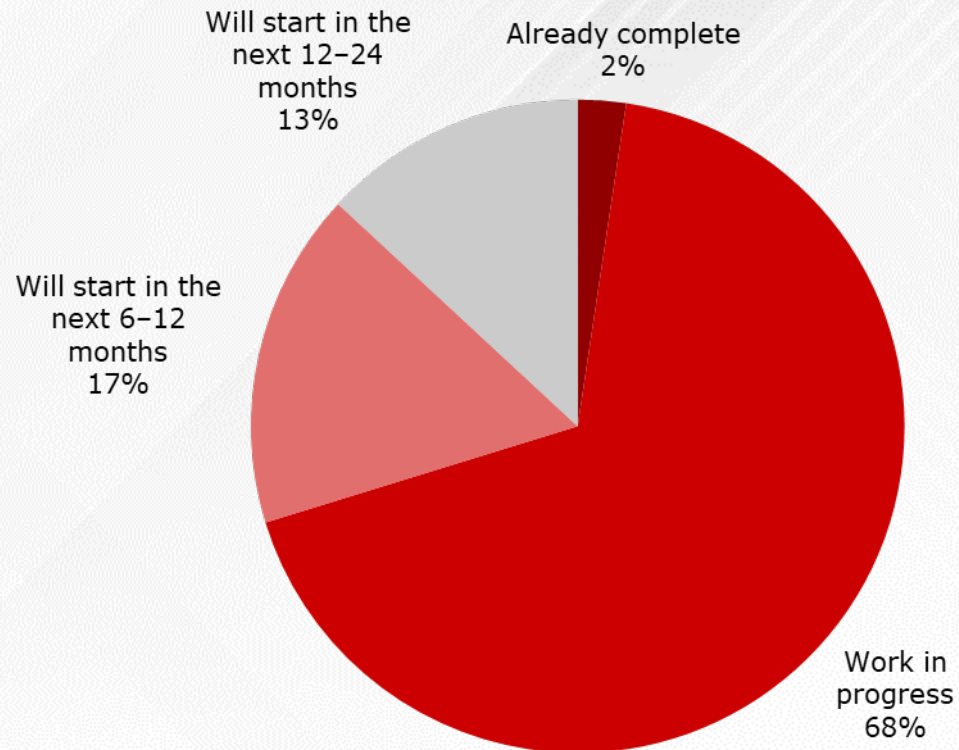
n=84

Source: Heavy Reading

- 5G ranks first as the business driver for modernization
- Edge/cloud ranks second and well ahead of other the remaining drivers listed
- Comparing 2023 results to 2022:
 - 5G and edge/cloud were also the top two choices last year
 - Residential broadband rose from fifth in 2022 to fourth position in 2023

Metro modernization timelines

What is the timeline for your metro network modernization project?

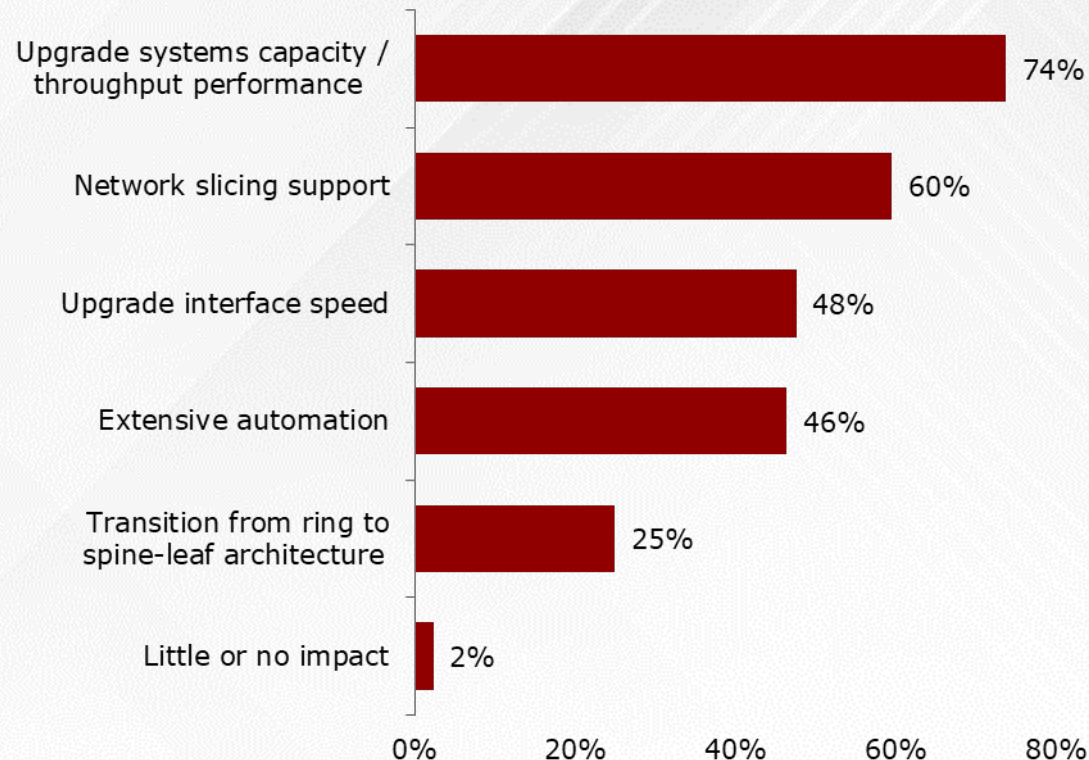


n=84
Source: Heavy Reading

- For the majority (68%), metro modernization is a work in progress
- For 30%, projects are planned but have not begun
 - 17% plan to begin in the next 6-12 months
 - 13% plan to begin in the next 12-24 months
- Comparing 2023 results to 2022:
 - Share of CSPs planning modernization in the near term is on the rise (starting in the next 6-12 months)

Expected impacts from edge cloud deployments

What are the primary impacts that edge cloud deployments will have on your metro network?



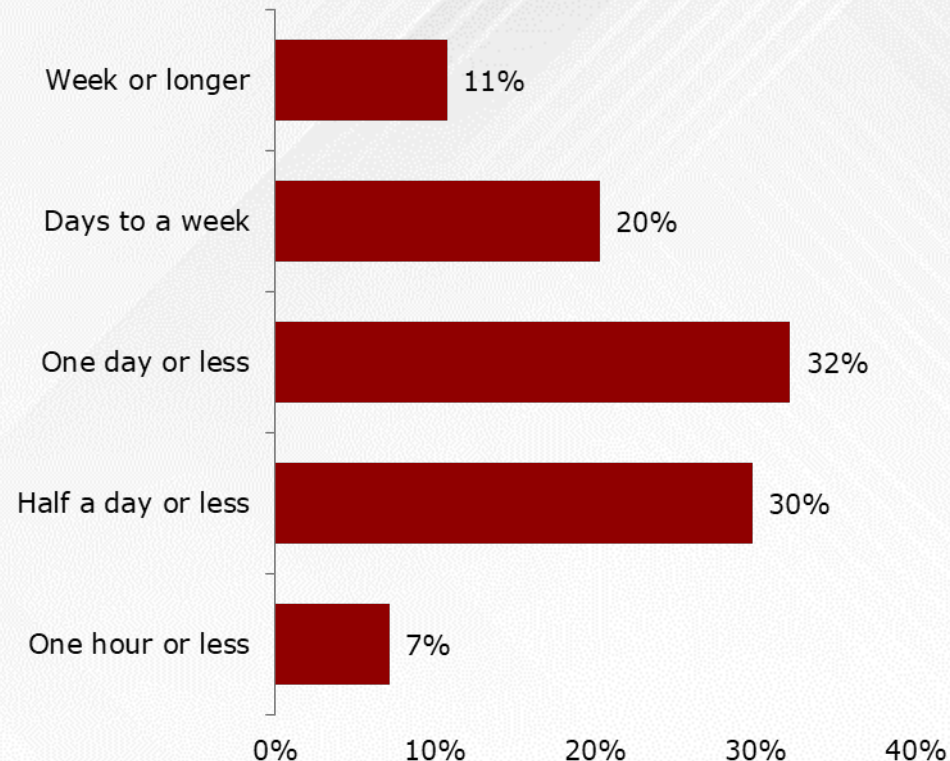
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Source: Heavy Reading

- Selected by 74%, upgrading system capacity/ throughput performance is the biggest expected impact
 - As edge puts more data within the metro, the metro network will have to scale
- Network slicing support ranks second at 60%
- Upgrading interface speeds and extensive automation are expected by many CSPs
- Comparing 2023 results to 2022:
 - Largely in line, but network slicing rises a notch in 2023
 - Result could indicate that slicing is getting a bit more “real” for many operators

Onboarding metro networking devices

How long does it take for your team to onboard a metro networking device?



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Source: Heavy Reading

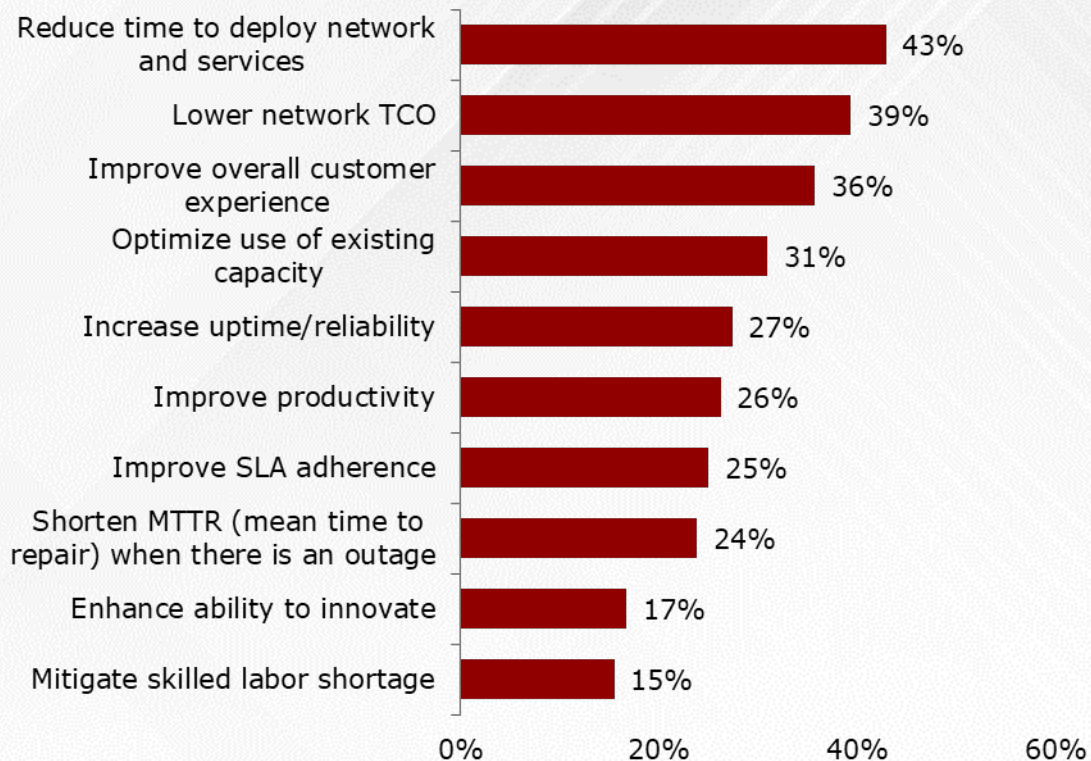
- 93% take more than one hour to onboard metro devices today
 - Just 7% onboard devices in less than one hour
- 31% take days or longer to onboard metro devices
- Results indicate a lot of room for improvement in device onboarding time (and money)
- Comparing 2023 results to 2022:
 - 2023 results show moderately longer onboarding times across the board compared to 2022



Network automation

Metro network automation drivers

What are the primary drivers for implementing automation in your metro network?

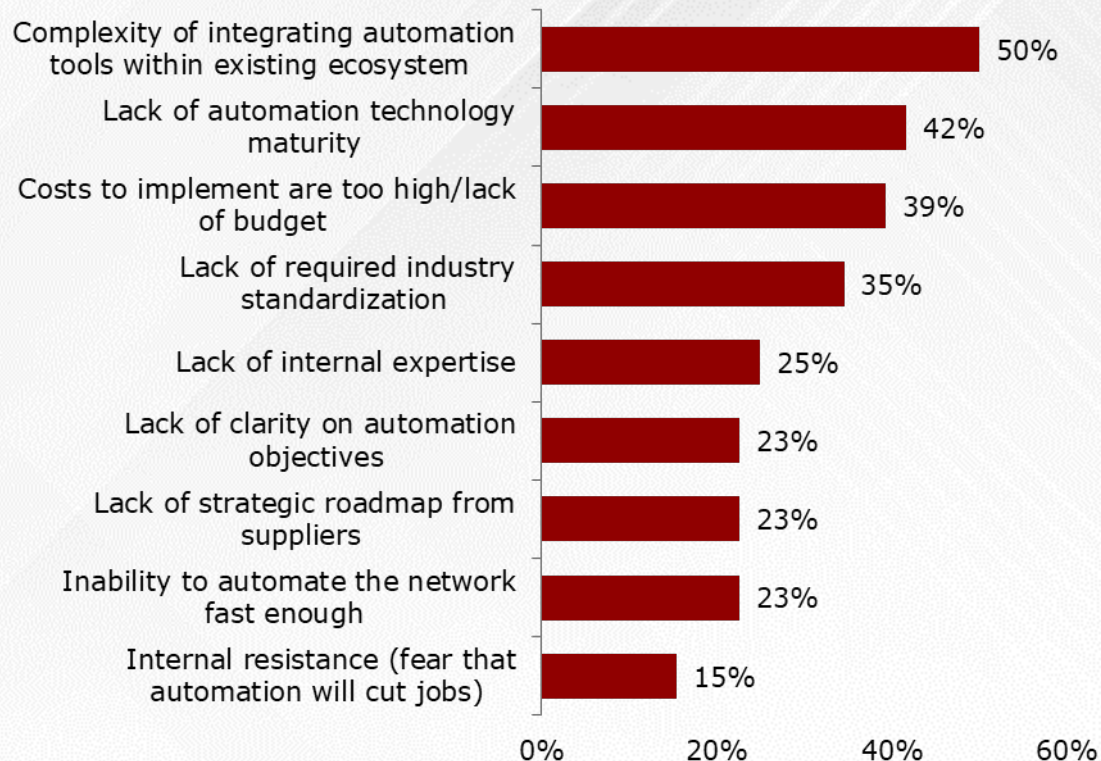


n=84
Source: Heavy Reading

- Three drivers for automation rise to the top:
 - Reducing time to deploy network and services (43%)
 - Lowering network TCO (39%)
 - Improving overall customer experience (36%)
- Although commonly discussed, using automation to address labor shortages ranked last on the list (selected by just 15%)
- Comparing 2023 results to 2022:
 - 2023 survey introduced several new options, making year-to-year comparison difficult
 - That said, reducing time to deploy was the top choice for both years

Metro network automation challenges

What are the biggest challenges to achieving your metro network automation strategy?

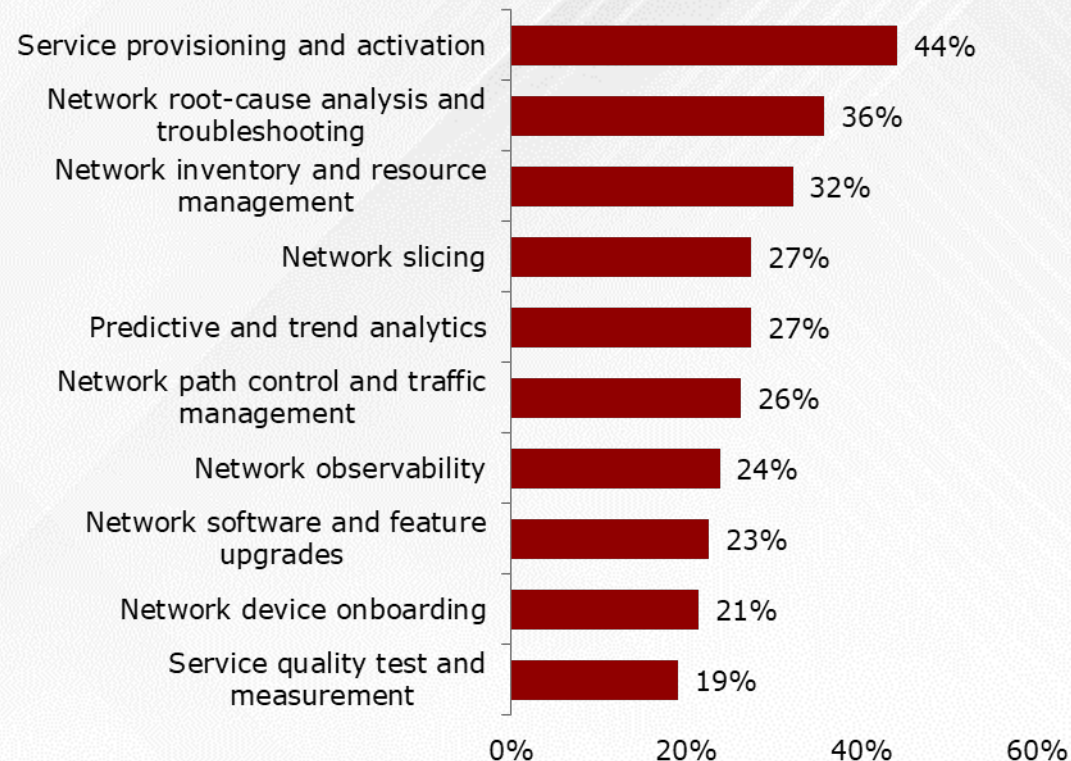


n=84
Source: Heavy Reading

- Complexity stands out as the primary automation challenge
 - Automation requires a major network shift to multi-vendor interop and openness
 - The tools and processes for managing these networks are not in place
- Lack of automation technology maturity and high costs to implement are also major hurdles
- Comparing 2023 results to 2022:
 - 2023 survey introduced three new options, but the top five options and order remain identical to 2022
 - The automation vs. jobs debate does not resonate with this CSP audience

Primary automation use cases for metro networks

What are the primary use cases for metro network automation over the next three years?



n=84
Source: Heavy Reading

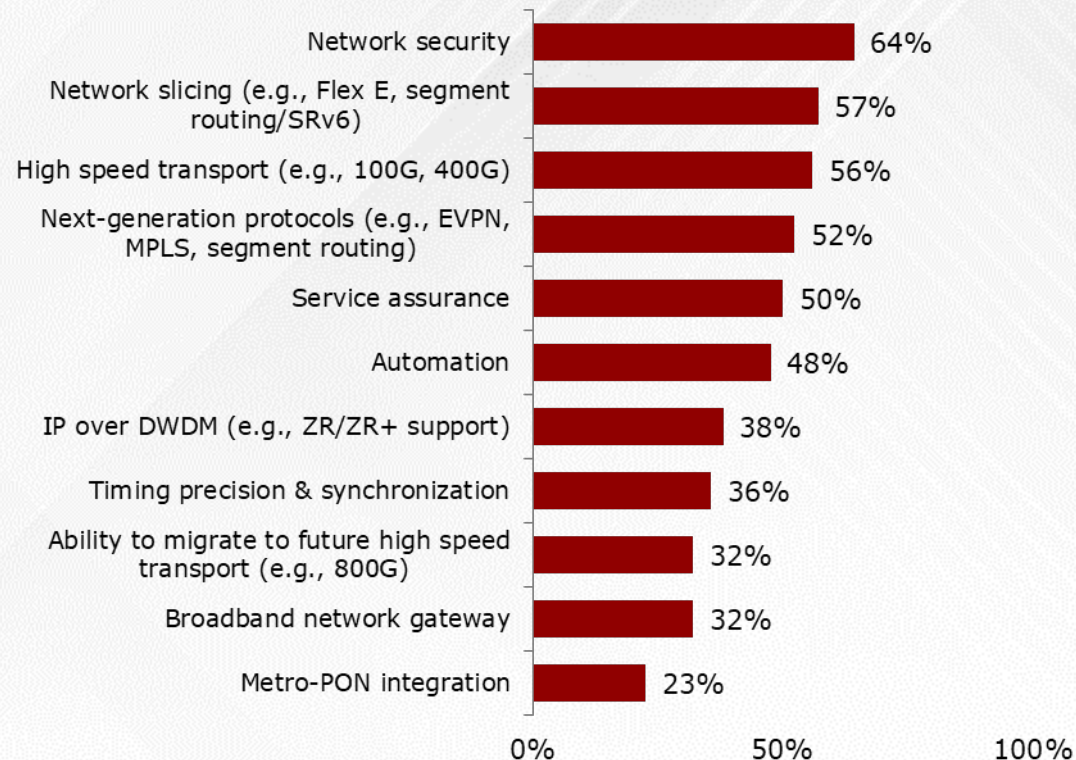
- At 44%, a plurality identified service provisioning and activation as the top automation use case
- Network root-cause analysis/troubleshooting and network inventory/resource management are also highly important
- Many use cases (including slicing) scored in the 20%+ range for the year-to-year time period given
- Comparing 2023 results to 2022:
 - Many options were changed in 2023, but service provisioning and activation was the top use case choice in both surveys



Features & functions

Most important metro networking capabilities

Which are the most important metro networking capabilities?

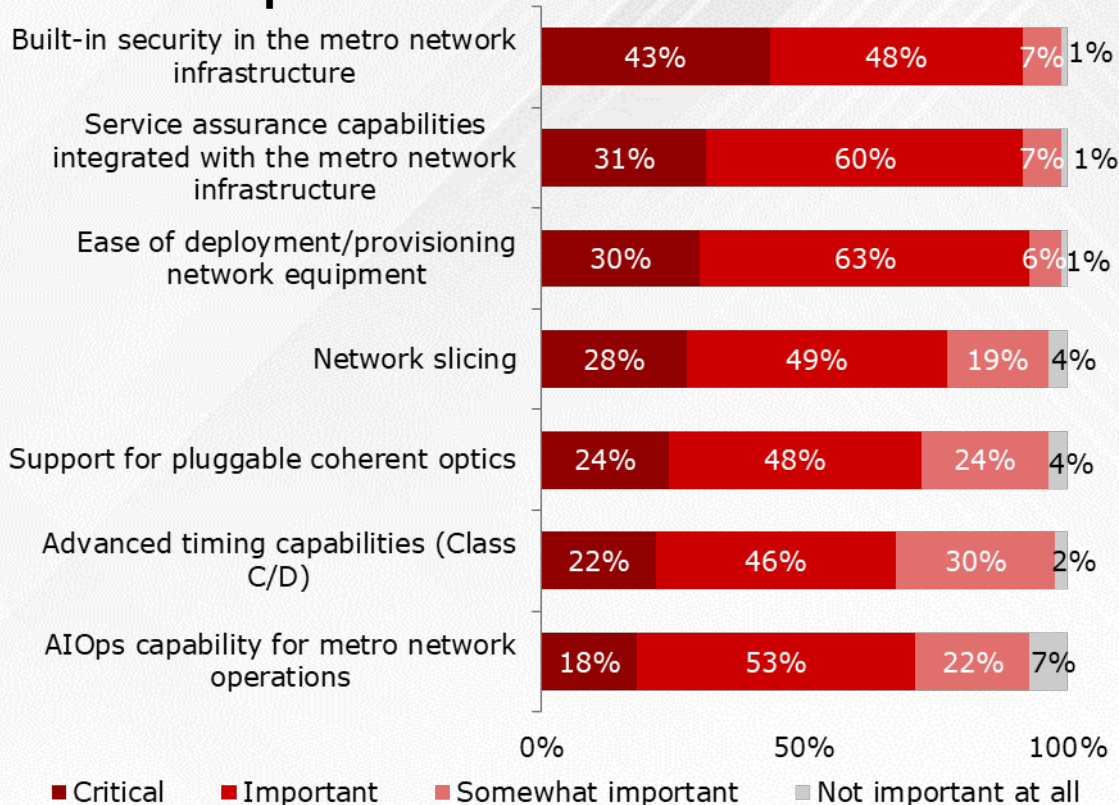


n=84
Source: Heavy Reading

- Network security tops the list of most important capabilities (selected by 64%)
- Network slicing (57%), high speed interfaces (56%), next-gen protocols (52%), service assurance (50%), and automation (48%) are all highly important
- Comparing 2023 results to 2022:
 - Security topped the list in both surveys
 - Slicing moved up a bit in 2023, while automation moved down a bit
 - IP over DWDM (IPoDWDM) scored the same for both years (38%)

Importance of metro networking capabilities

How important are the following metro network capabilities?



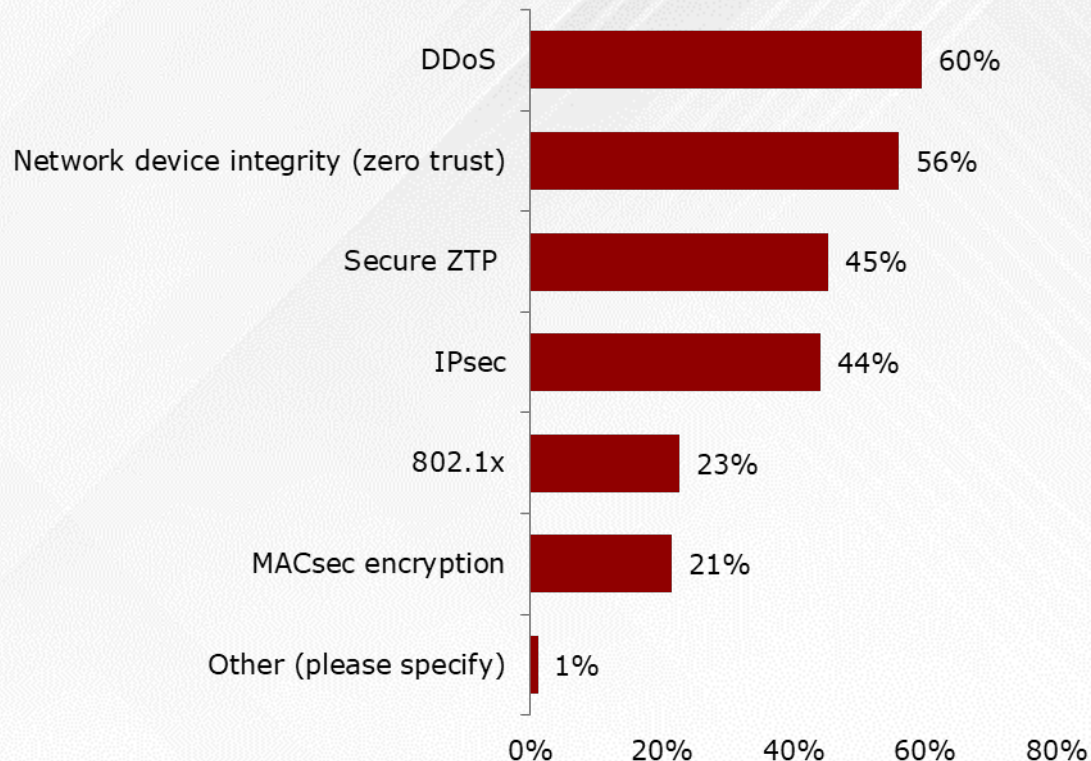
n=83

Source: Heavy Reading

- Given changes to this question in 2023, there is some overlap with the results shown on the previous slide
- Built-in security ranks the highest among the choices, selected as “critical” by 43% of CSPs
- Service assurance capabilities (“critical” for 31%) and ease of deployment (“critical” for 30%) are viewed virtually identically in terms of importance
- Artificial intelligence for network operations (AIOps)—among the big buzzwords of 2023—ranks at the bottom of the priority list
- Comparing 2023 results to 2022:
 - Many options were changed in 2023, but built-in security is still the top use case choice in both surveys

Important built-in security features

Which built-in security features are most important?

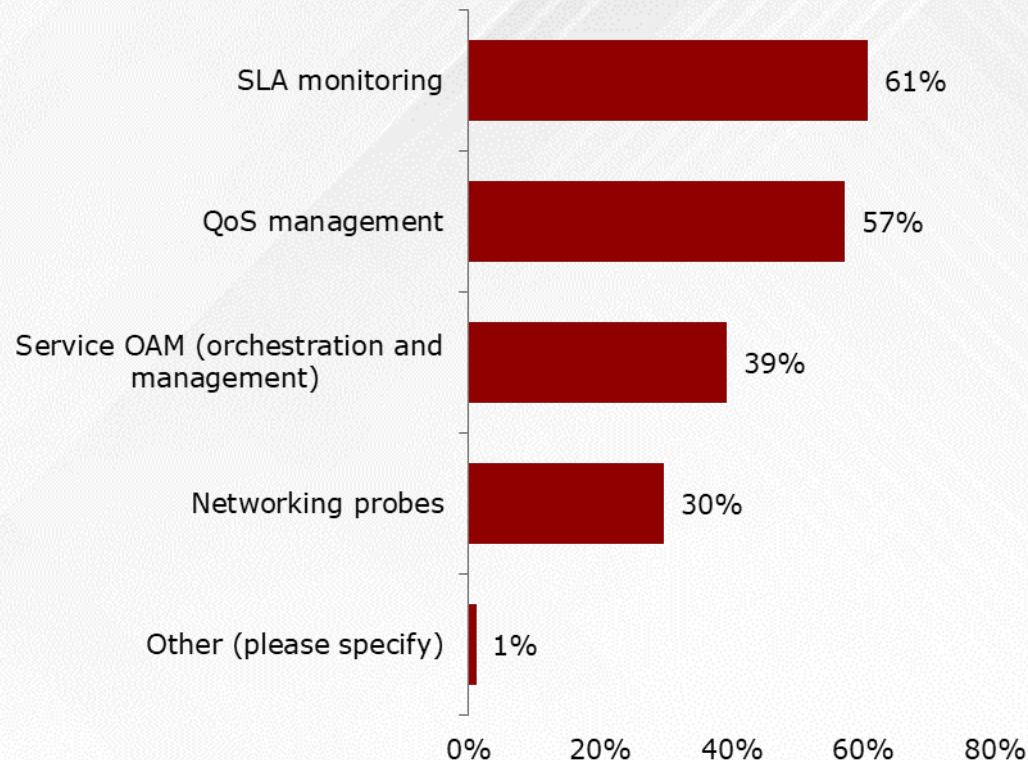


n=84
Source: Heavy Reading

- Within built-in security, distributed denial of service (DDoS) and network device integrity stand out as most important
 - DDoS selected by 60%
 - Zero trust selected by 56%
- Secure zero-touch provisioning (ZTP) and IPsec are also important for many
- Comparing 2023 results to 2022:
 - The addition of zero trust to available options in 2023 was a good decision, as it is statistically as important as DDoS for chief security officers (CSOs)

Important service assurance attributes

Which integrated service assurance attributes are most important?



n=84
Source: Heavy Reading

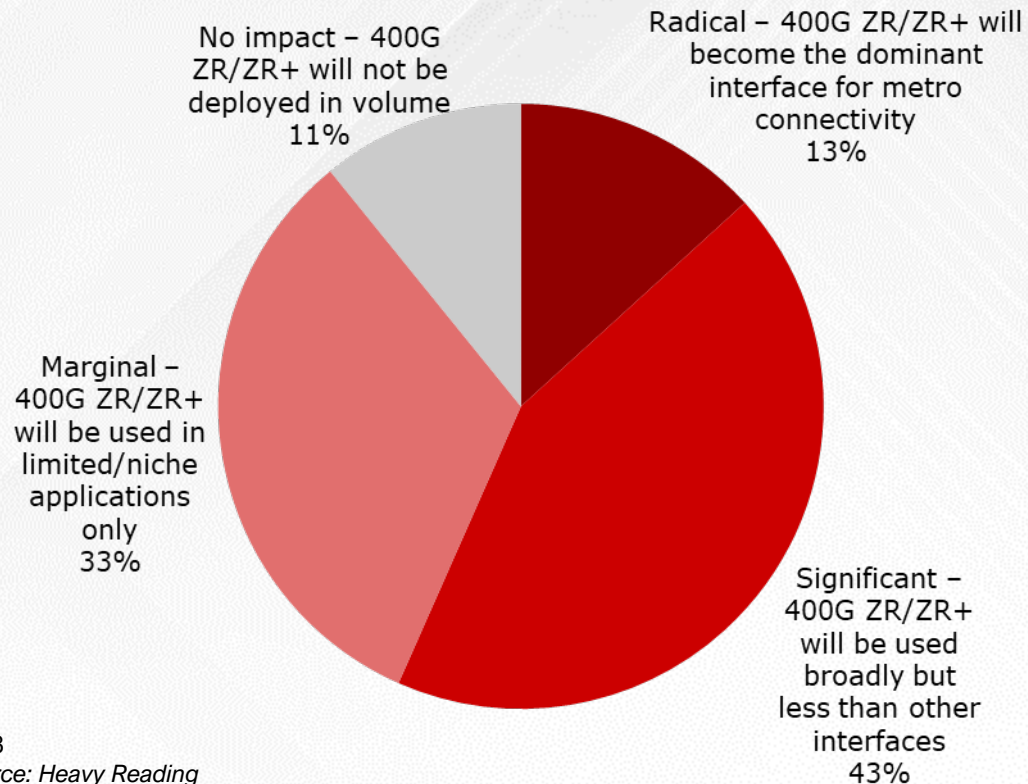
- Within service assurance, service-level agreement (SLA) monitoring and quality of service (QoS) management are the most important capabilities
 - SLA monitoring selected by 61%
 - QoS management selected by 57%
- Comparing 2023 results to 2022:
 - Very consistent survey results between the two years



Coherent pluggable optics

Expected impact from 400G ZR/ZR+ coherent pluggables

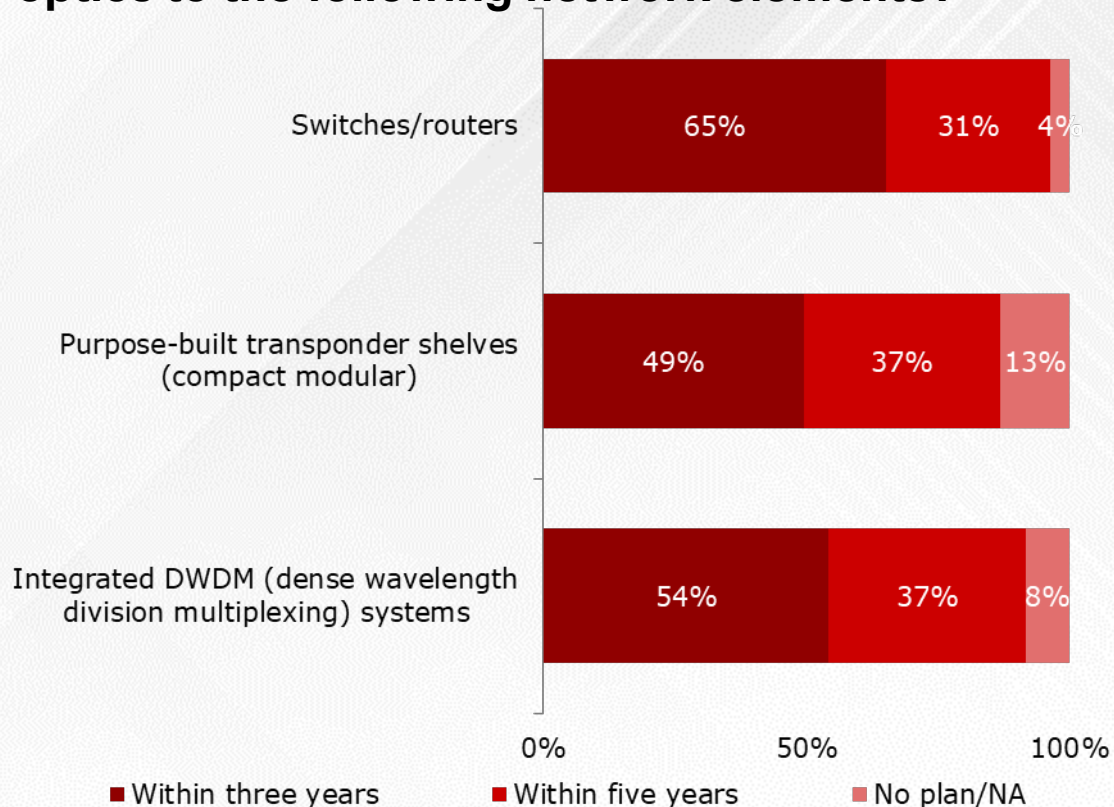
How much impact do you expect 400G ZR/ZR+ coherent pluggables to have on your metro network in the next three years?



- A majority of CSPs expect 400G ZR/ZR+ pluggables to play a major role in metros over the next three years
 - 56% report that 400G ZR/ZR+ will be at least “significant” in their networks
- However, few believe that 400G ZR/ZR+ will become the dominant interface
 - Just 13% expect a “radical” role for 400G ZR/ZR+
- Comparing 2023 results to 2022:
 - Results are similar to the 2022 survey, though with sentiment somewhat less bullish
 - “Significant” share dropped to 43% from 53%
 - “Marginal” share increased to 33% from 22%
 - Awareness of challenges and complexities may be tempering some early enthusiasm

Coherent pluggables deployment options

When will you deploy coherent pluggable optics to the following network elements?

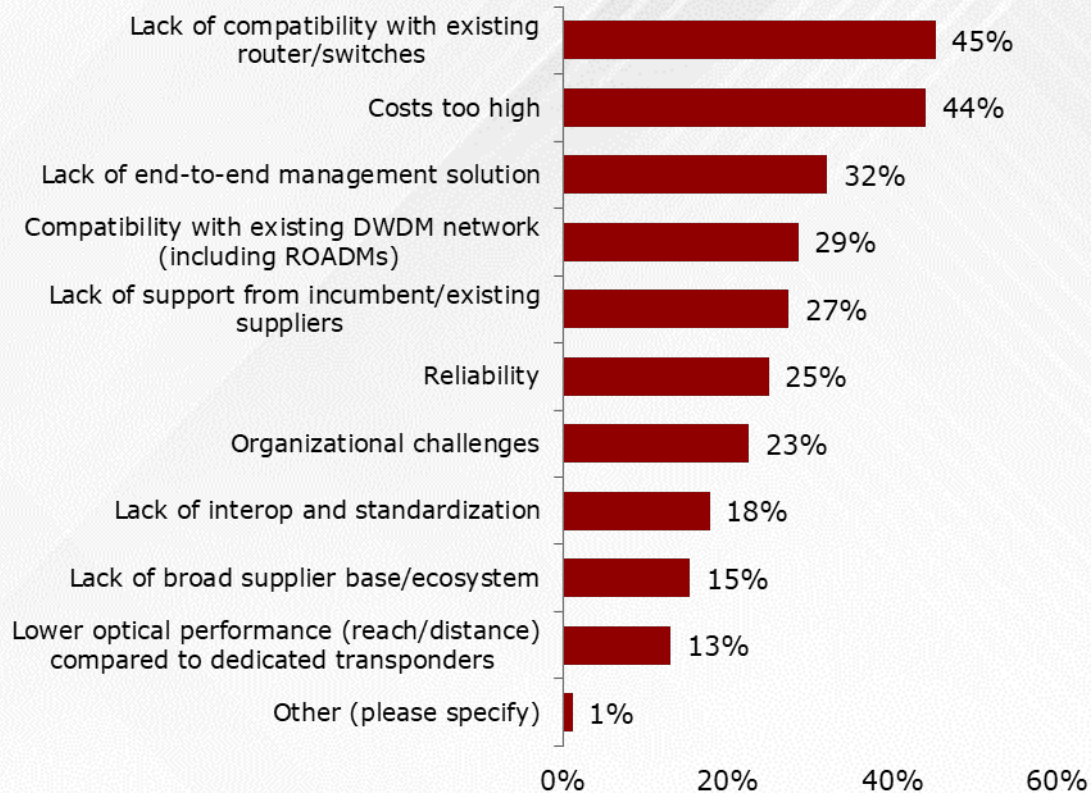


n=83
Source: Heavy Reading

- Results point to a broad mix of deployment options for coherent pluggables
 - 65% expect coherent pluggables will be housed in switches/routers within three years
 - 54% will deploy in DWDM systems
 - 49% will deploy in compact modular systems
- Comparing 2023 results to 2022:
 - The trend line and priority order remain the same in 2023 as in 2022
 - The expectation for IPoDWDM has ticked down slightly
 - 65% expecting DWDM in the 2023 survey vs. 72% in the 2022 survey
 - Consistent with a slight softening of early optimism for the technology

Barriers to coherent pluggables

What are the biggest barriers to coherent pluggable optics in metro networks?



n=84
Source: Heavy Reading

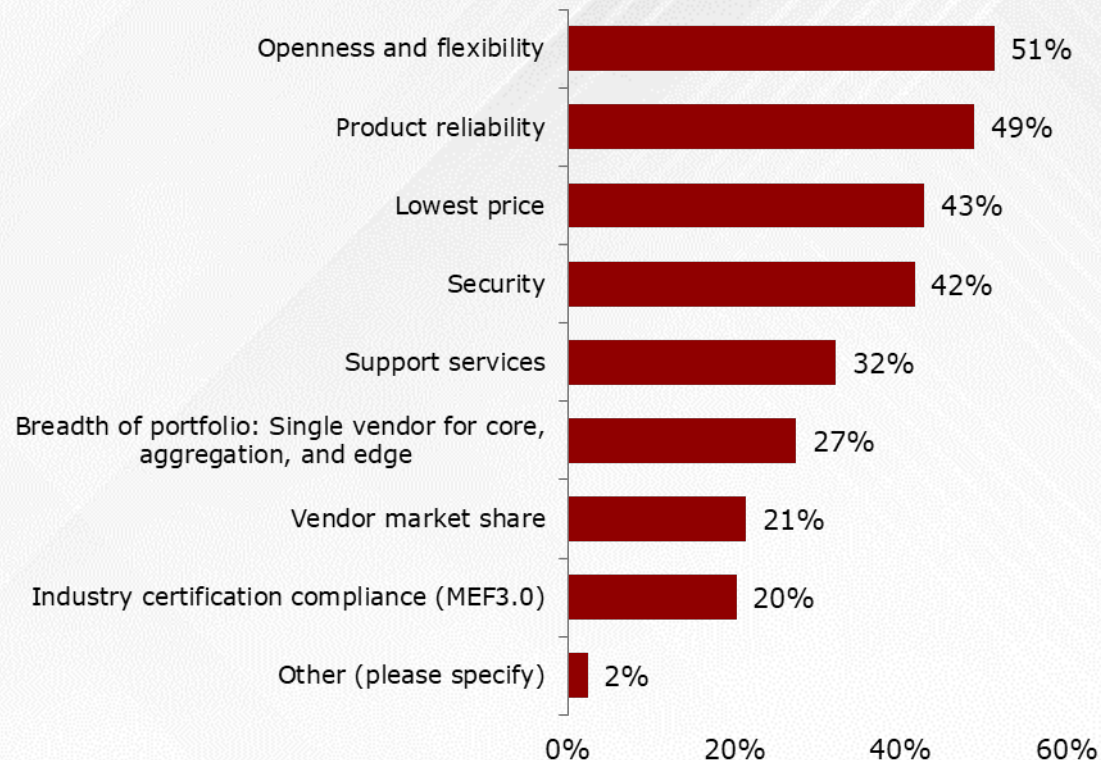
- Lack of compatibility with existing routers/switches (selected by 45%) and high costs (selected by 44%) stand as the top two barriers to coherent pluggable optics
 - Lack of router compatibility has risen as a concern over the past years, particularly from a management perspective
- Five other barriers were selected by 20%+ of the survey group; these form a clear second tier compared to the top two barriers
- Lower optical performance, somewhat surprisingly, is of least concern
- Comparing 2023 results to 2022:
 - The top two concerns remain the same in 2023, but the compatibility challenge rose sharply
 - 45% in 2023 vs. 33% in 2022



Metro vendor views

Important networking vendor attributes

What are the most critical attributes when evaluating metro network solution vendors?

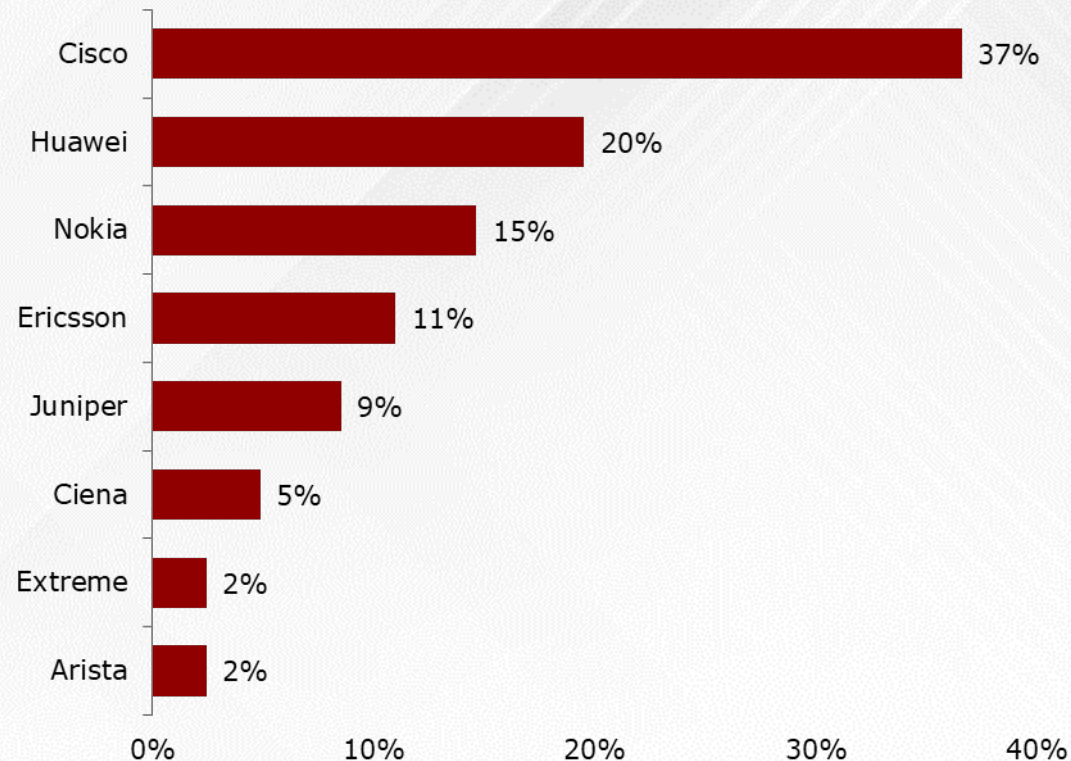


n=84
Source: Heavy Reading

- Openness/flexibility and product reliability are the top two critical vendor attributes
 - Openness/flexibility was selected by 51%
 - Product reliability was selected by 49%
- Lowest price (43%) and security (42%) also rank as highly important attributes when evaluating vendors
- Single vendor and vendor market share attributes rank near the bottom of the list
 - Best-of-breed wins out over end-to-end
- Comparing 2023 results to 2022:
 - Openness rose to the top in 2023, while security dropped
 - Lowest price also rose in the ranks in 2023

Current primary metro networking vendor

Which is your current primary vendor for metro networking?

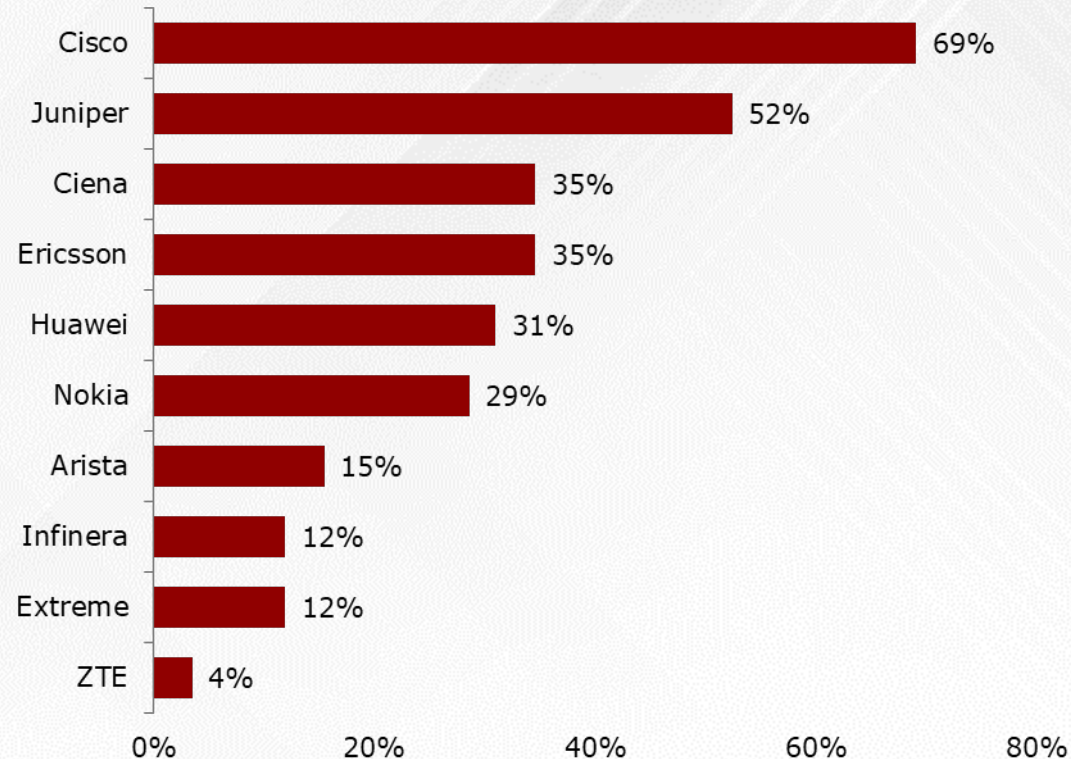


n=82
Source: Heavy Reading

- Among respondents, Cisco has a commanding lead as the primary metro supplier
- Selected by 20%, Huawei ranks a distant second
 - Note: Just 13% of respondents are from Asia Pacific
- Juniper ranks fifth on the list at 9%
- Comparing 2023 results to 2022:
 - Cisco and Huawei are the top two primary suppliers in both years
 - Ciena experienced a bit of decline, dropping to 5% in 2023 from 12% in 2022
 - Juniper occupies a similar position in both surveys
 - Primary for 9% in 2023 vs. 12% in 2022
 - Note that the respondent mix is not the same for each year, so results cannot be mapped to actual changes in global market share

Perceived leaders in metro networking

Which vendors do you perceive as the leading vendors for metro networking?



n=84
Source: Heavy Reading

- Cisco is the primary vendor for a plurality of CSPs and is also the perceived leader for the majority (selected by 69% of CSPs)
- However, for the most part, perceived leaders don't map to the primary vendors
 - Selected by 52%, Juniper ranks second behind Cisco and well ahead of the rest of the vendors
- This finding indicates a significant opportunity for Juniper to gain share
- Comparing 2023 results to 2022:
 - The stark mismatch between Juniper's primary status and its leadership perception was first identified in 2022
 - Cisco and Juniper have moved further ahead of the pack in the 2023 results



Conclusions

Conclusions (1/4)

Metro network modernization

- For the majority of CSPs surveyed, metro modernization has begun.
 - 68% report metro modernization is a work in progress.
 - For 30%, projects are planned but have not yet begun.
- At 51%, meeting traffic growth requirements is the top driver for metro network modernization.
 - Increasing network reliability/resilience (42%) and lowering TCO (40%) are also highly important drivers for modernization.
 - Sustainability is a buzzword in 2023, yet it registered surprisingly low as a primary driver.
- 5G (ranked first) and edge/cloud (ranked second) continue to be the top two business drivers for metro network modernization.
 - Both rank well ahead of the other drivers provided.

Conclusions (2/4)

Automation

- Three drivers rise to the top for implementing automation in metro networks:
 - Reducing time to deploy network and services (43%)
 - Lowering network TCO (39%)
 - Improving overall customer experience (36%)
- Although it is commonly discussed, using automation to address labor shortages ranked last on the list of automation drivers in the survey (selected by just 15%).
- Complexity stands out as the primary automation challenge. Lack of automation technology maturity and high costs to implement are also major hurdles.
- At 44%, a plurality identified service provisioning and activation as the top automation use case.
 - Network root-cause analysis/troubleshooting and network inventory/resource management are also highly important for CSPs.

Conclusions (3/4)

Coherent optics

- A majority of CSPs expect 400G ZR/ZR+ pluggables to play a major role in metros over the next three years.
 - 56% report that 400G ZR/ZR+ will be at least “significant” in their networks.
 - Comparing 2023 results to 2022, there is a slight softening of enthusiasm, perhaps due to a greater awareness of challenges.
- Results point to a broad mix of deployment options for coherent pluggables, but IPoDWDM (aka coherent routing) garnered the strongest interest.
 - 65% of CSPs surveyed expect coherent pluggables will be housed in switches/routers within three years.

Conclusions (4/4)

Vendors & functions

- A lot of capabilities are very important for a lot of CSPs.
 - Network security tops the list of most important capabilities (selected by 64%).
 - Network slicing (57%), high speed interfaces (56%), next-gen protocols (52%), service assurance (50%), and automation (48%) are all highly important.
 - In a separate question, built-in security ranks the highest among a list of seven options to rate, selected as “critical” by 43% of CSPs.
- While Juniper was selected as the primary vendor by only 9% of CSPs, the company was selected by 52% of respondents as a perceived leader in metro networking.
 - In perceived leadership, Juniper is second only to Cisco and well ahead of the rest of the vendors.
 - This same Juniper trend was identified in the 2022 study and represents a large untapped opportunity to gain market share in metro networking.



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