

Network Bandwidth Measurement & Monitoring

How do I estimate network bandwidth for Office 365 traffic?

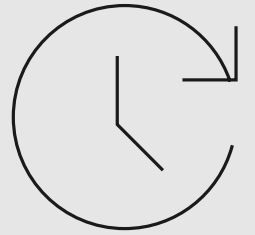
How can I measure bandwidth usage for pilot Office 365 users?

How can I measure bandwidth usage for on-premises users?

How can I continue to monitor network bandwidth usage for all users even after onboarding to Office 365 is complete?



Planning Resources & Bandwidth Calculators



[Network and Migration Planning for Office 365](#)

[Exchange Client Network Bandwidth calculator](#)

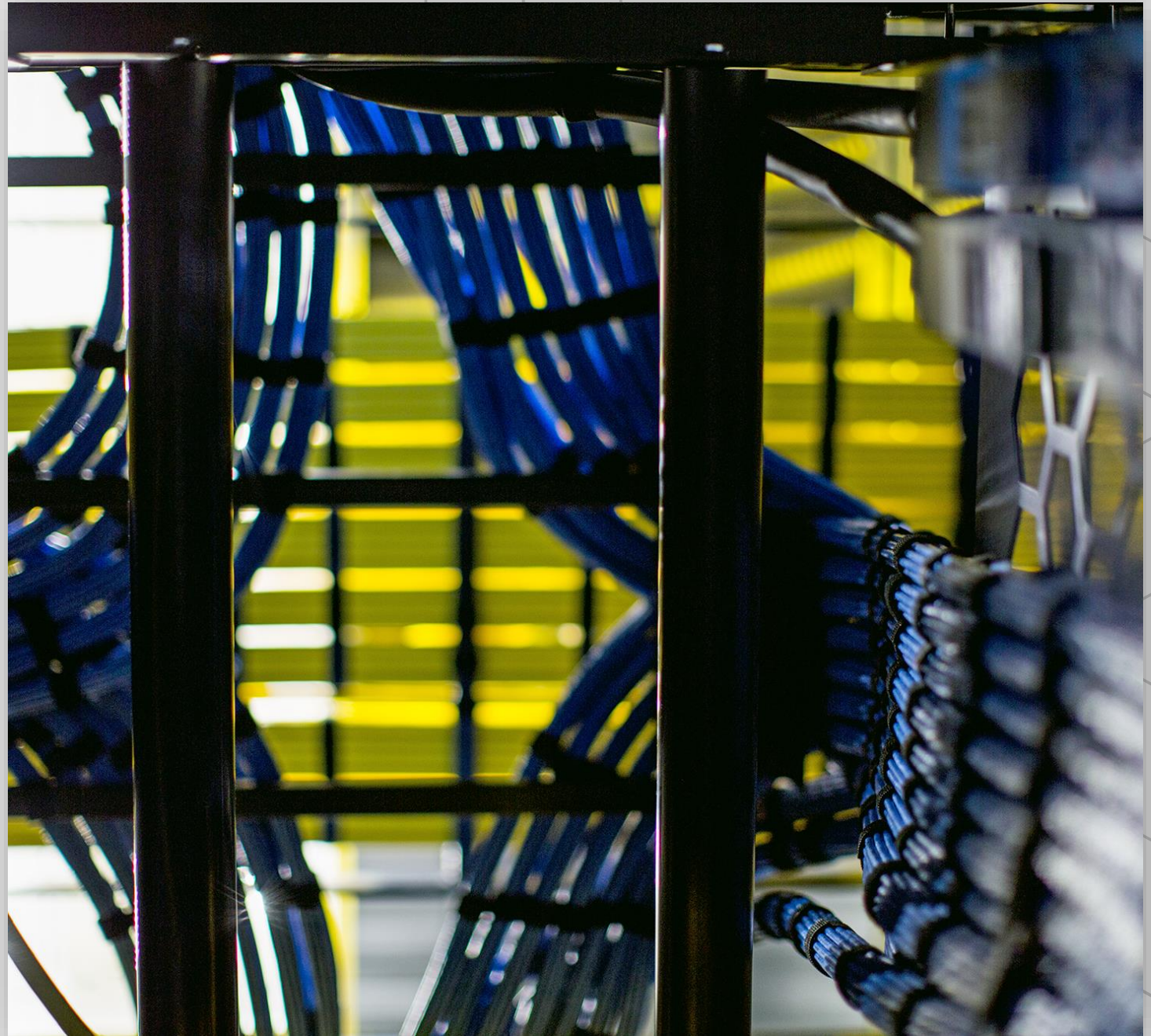
[Skype for Business Bandwidth Calculator](#)

[Network Planner](#)

[Technical Case Study from Microsoft IT](#)

Bandwidth Calculators

What is the challenge?



User Profile or Persona dependent



- Use available profiles or personas
- Define custom profiles or personas
- Map users to profiles or personas
- Output is only as accurate as the Input

Exchange Organisation Data	
	On-premises
	8 Hours
	100%
	0.5%
	3
	100 MB
	0.5%
	Availability Service
	0.5%
User Profile 1 (Light)	
	50 KB
	5
	20
	2.00 GB
	3
	0.5
%	125%
	20%
	Yes
User Profile 3 (Heavy)	
	50 KB
	20
	80
	2.00 GB
	3
	2.0
%	125%
	20%
	Yes
TimeZone Configuration	
Setting	
Morning Peak Time (24hr clock)	
Morning Peak Duration (hours)	
Afternoon Peak Time (24hr clock)	
Afternoon Peak Duration (hours)	
User Profile 2 (Medium)	
Average Message Size (KB)	
Messages Sent Per Mailbox Per Day	
Messages Received Per Mailbox Per Day	
Avg Mailbox Size (GB)	
Avg Recipients Per Meeting	
Average Meetings Per Mailbox Per Day	
Web Client/Online Mode Attachment Read %	
Mobile Client Attachment Read %	
Ensure OST download in 1 Working Day	
User Profile 4 (Very Heavy)	
Average Message Size (KB)	
Messages Sent Per Mailbox Per Day	
Messages Received Per Mailbox Per Day	
Avg Mailbox Size (GB)	
Avg Recipients Per Meeting	
Average Meetings Per Mailbox Per Day	
Web Client/Online Mode Attachment Read %	
Mobile Client Attachment Read %	
Ensure OST download in 1 Working Day	

User Profile or Persona dependent



True for Skype for Business calculator too

Personas			
<div>User Profile 1</div>		User's of Profile 1	Profile 1
		Validation	
<div>User Profile 2</div>		User's of Profile 2	Profile 2
		Validation	
Desktop Information Worker		10000	
Desktop Information Worker		7000	
Online Information Worker		1	
Desktop Information Worker		1000	
Desktop Information Worker - Online		3000	
Mobile Information Worker		5000	
Desktop Information Worker - Online		3000	
Online Information Worker		1000	

User Profile or Persona dependent



Skype for Business calculator
persona and usage model
definition

							5	6	7	8	9	10	11
P2P audio	P2P video	conf audio	conf video	desktop share	PSTN audio	Lync 2010 RTV_Type	Ren						Use
medium	medium	medium	medium	medium	medium	CIF							
medium	medium	medium	medium	medium	medium	CIF							
medium	medium	medium	medium	medium	medium	CIF							
medium	none	medium	none	none	custom 1	CIF							
medium	medium	medium	medium	medium	medium	CIF							
medium	medium	medium	medium	medium	medium	CIF							
medium	medium	medium	medium	medium	medium	CIF							

ncy at Peak Time per Modality)			Custom Thresholds (use only when dealing with small sites)		
low	medium	high	custom 1	custom 2	custom
65.00%	80.00%	90.00%	0.00%	0.00%	
0.50%	1.50%	2.50%	0.00%	0.00%	
0.10%	0.30%	0.50%	0.00%	0.00%	
1.00%	3.00%	5.00%	0.00%	0.00%	
0.10%	0.50%	1.00%	0.00%	0.00%	
0.50%	1.00%	1.50%	0.00%	0.00%	
5.00%	10.00%	15.00%	50.00%	0.00%	

Best Practices for Bandwidth Estimation

- Run a Pilot batch with mixed user profiles
- Monitor usage for Pilot batch and extrapolate
- Cross-check results against calculators (optional)
- Capacity planning should factor room for future expansion for services and users

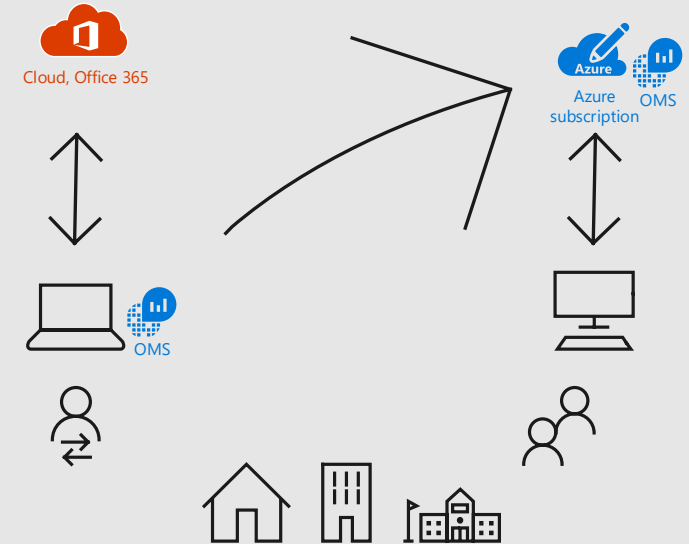


Network Bandwidth Measurement using Azure Monitoring (Service Map)



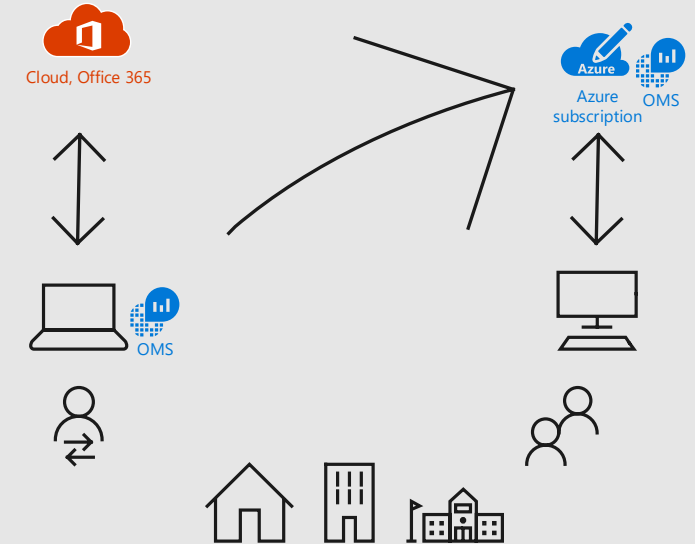
The concept: How it works?

- Pilot batch user is using Office 365 services from home, office or school
- Administrator has setup a Log analytics workspace in Azure
- Connection Metrics table has been enabled in the Log analytics workspace
- The user has Log analytics agent (MMA) & Dependency agent installed and connected to the Azure log analytics workspace
- Dependency agent is sending user connection information metadata to log analytics workspace in Azure
- Administrator can connect to the log analytics workspace and query the connection information for multiple users or a specific user



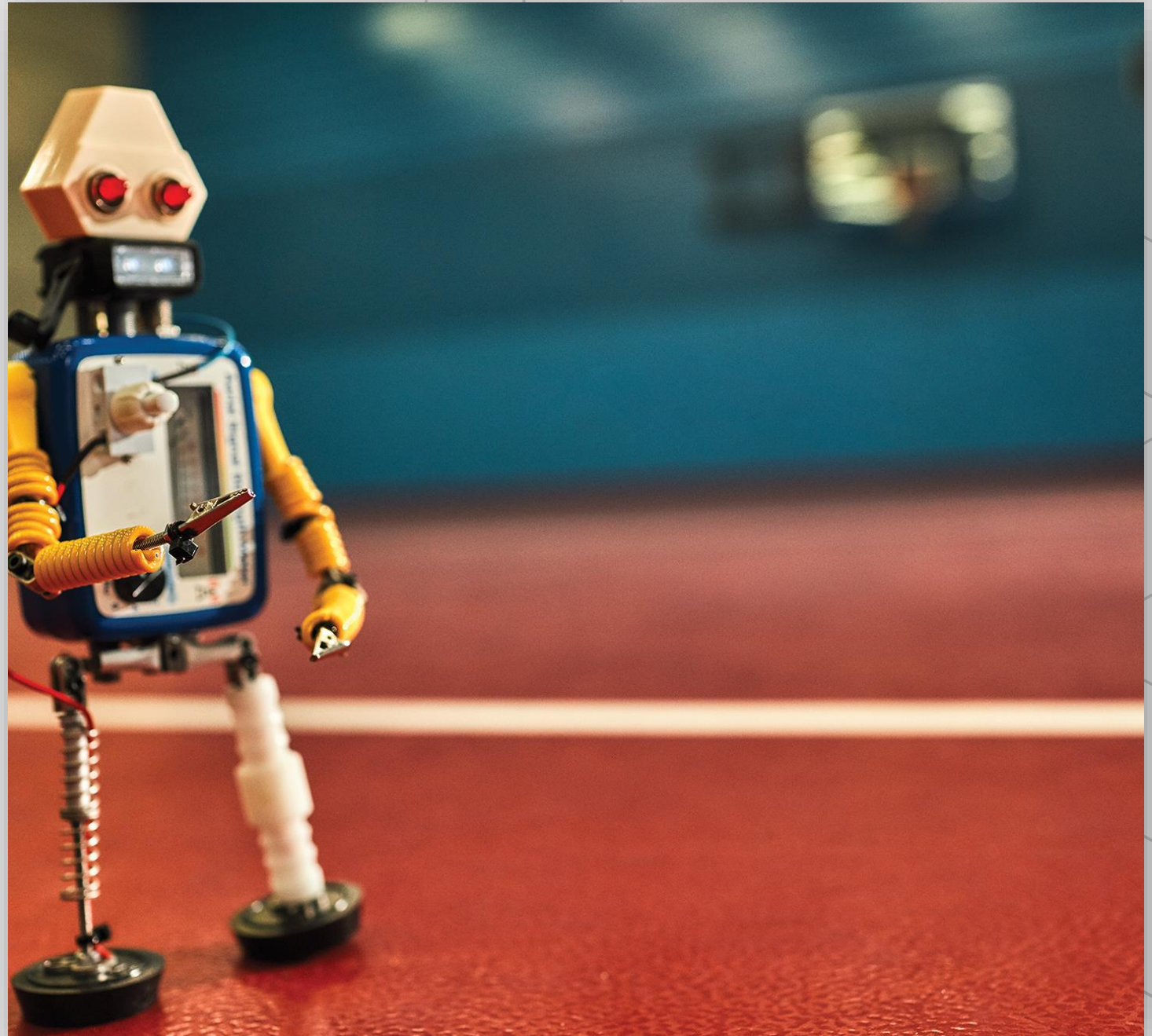
Summarizing the solution

- Azure subscription
- Log analytics workspace
- Connection Metrics table
- Pilot users for Office 365
- Log analytics agent and dependency agent
- Workspace ID and Key



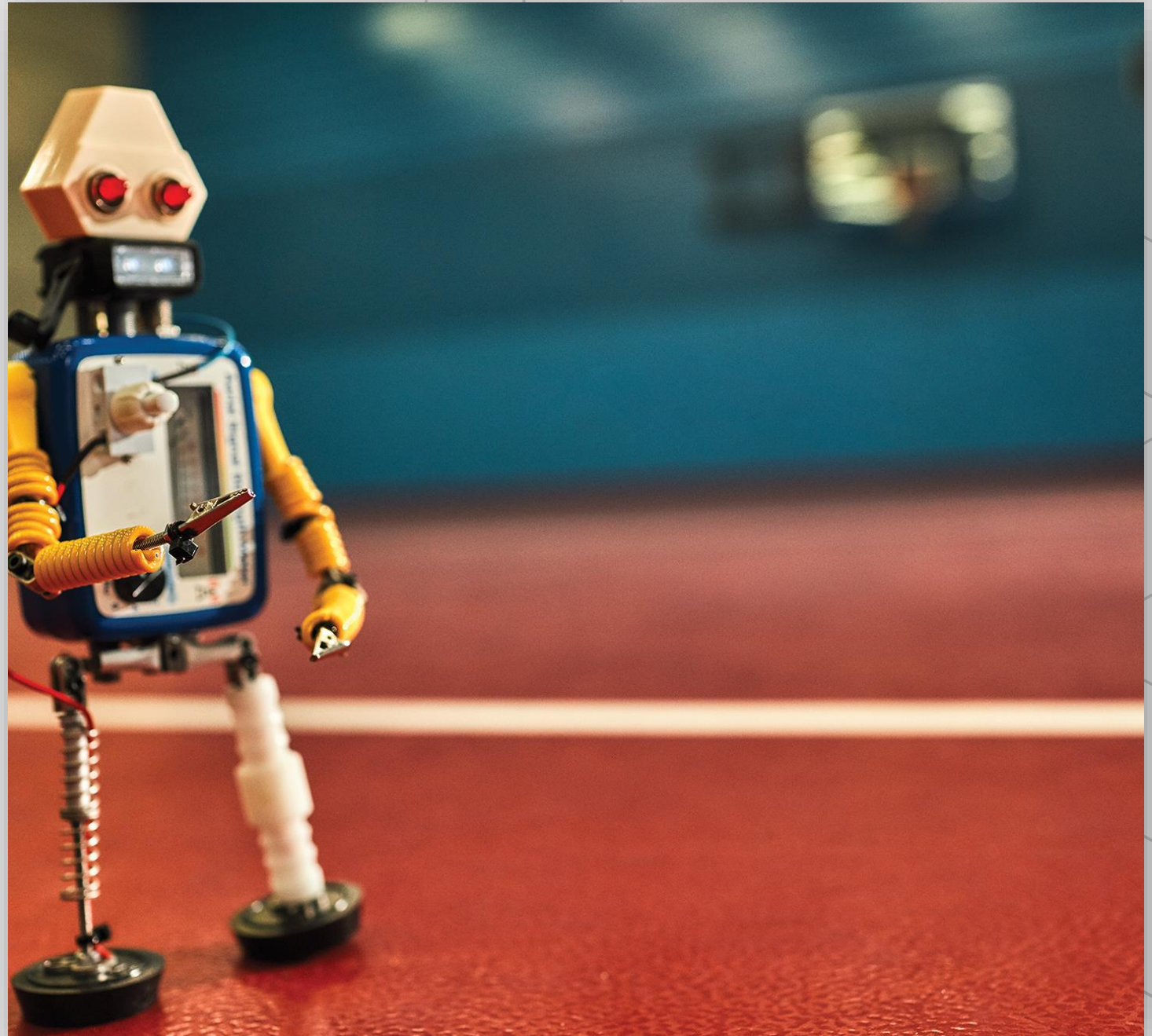
The Details

- Log connection metadata information like Bytes Sent and Bytes Received by Process
- Query connection metadata information for a specific time range or for specific users or process or destination IP range
- Requires Azure subscription containing [Log Analytics workspace](#) (Per-GB) pricing model



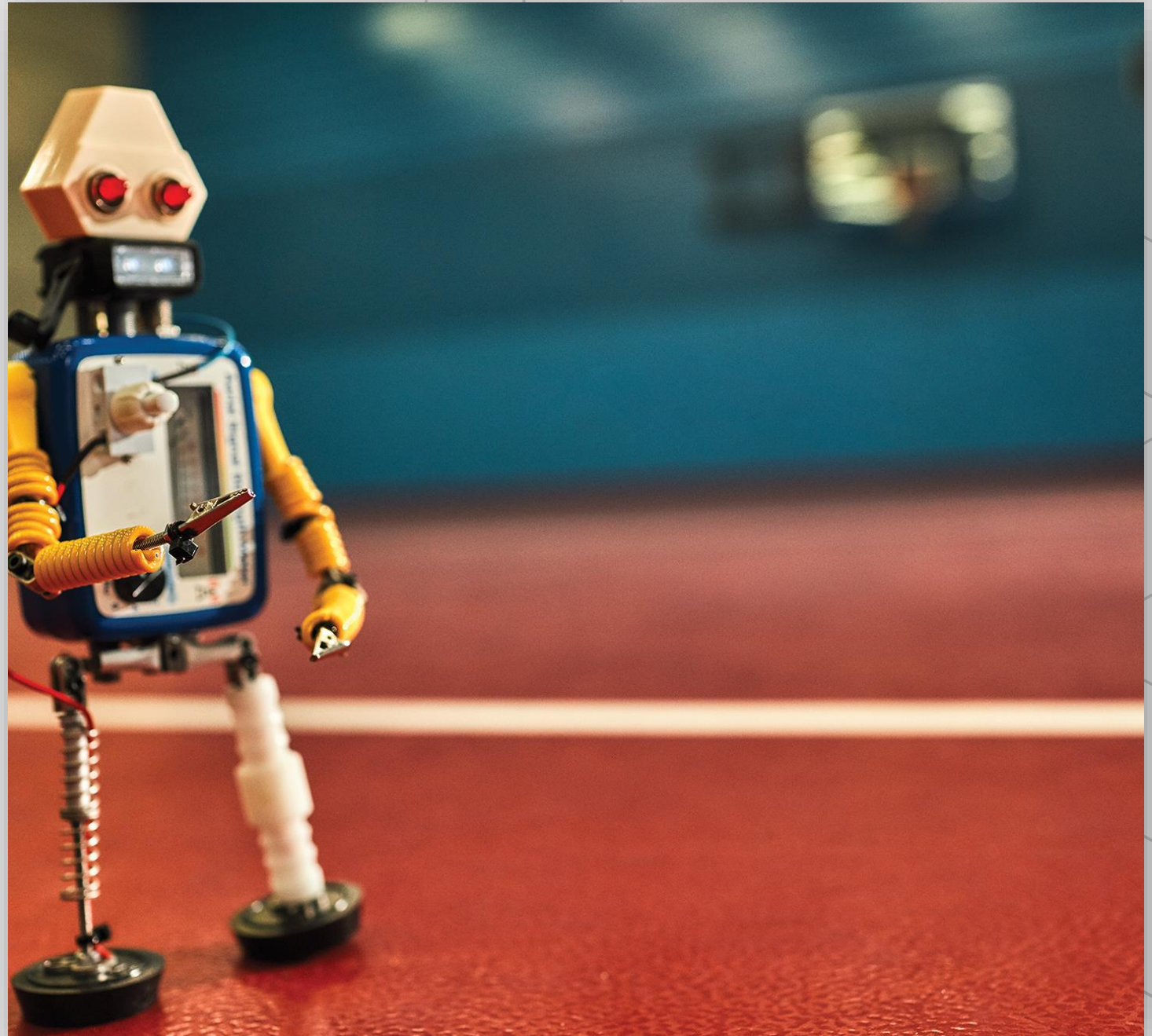
Details continued..

- Requires pilot batch with mixed user profiles
- [Microsoft monitoring agent](#) and [Dependency agent](#) to be installed on pilot users laptops/desktops
- Data collection interval is one minute
- Data aggregated for the one-minute interval
- TCP workloads covered (UDP maybe part of future release)
- IPv4 only
- IP/TCP header length not included



Continued...

- Visualize bandwidth estimation results using Power BI dashboards
- Operational insight to Office 365 traffic flow and volume



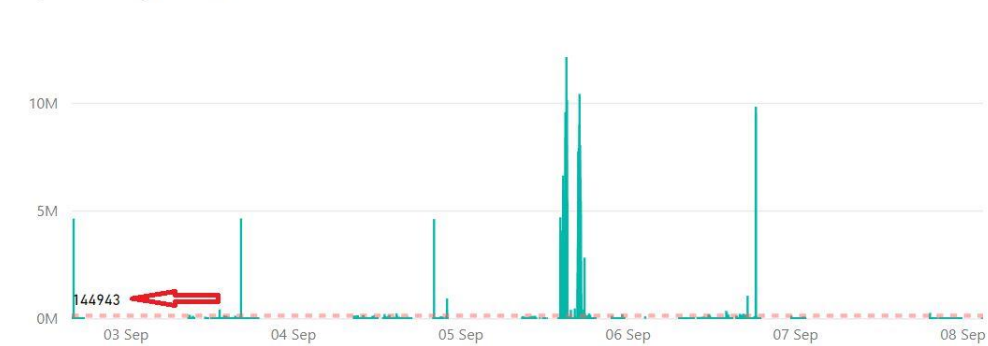
Beta Solution: Outcome & Dashboards

- Bandwidth estimation for SPO and OD4B based on one week activity for a Knowledge worker

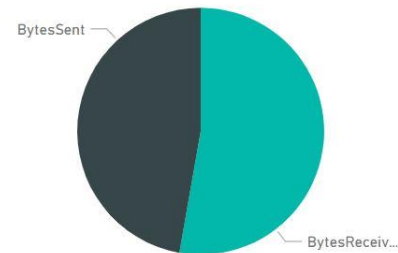
Computer	Percentile95SentKbps	Percentile95ReceivedKbps	TotalSentMB	TotalReceivedMB
Robin-DXB	9	18	342	382
Computer	Robin-DXB			
Percentile95SentKbps	9			
Percentile95ReceivedKbps	18			
TotalSentMB	342			
TotalReceivedMB	382			

LinksEstablished	DestinationIp	ProcessName	Protocol
6	13.107.136.9	IEXPLORE	tcp
2	13.107.6.168	IEXPLORE	tcp
8	13.107.136.9	MicrosoftEdge	tcp
4	13.107.136.11	MicrosoftEdgeCP	tcp
594	13.107.136.9	MicrosoftEdgeCP	tcp
239	13.107.6.168	MicrosoftEdgeCP	tcp
249	13.107.136.9	OneDrive	tcp
56	13.107.6.168	OneDrive	tcp
2	40.108.224.39	OneDrive	tcp
2132	13.107.136.9	ONENOTE	tcp
48	40.108.224.39	ONENOTE	tcp
3	13.107.6.168	OUTLOOK	tcp
2642	13.107.136.9	POWERPNT	tcp
257	40.108.224.39	POWERPNT	tcp
3	13.107.136.9	psping	tcp
2	13.107.136.254	SearchUI	tcp
2	13.107.136.9	Teams	tcp
1760	13.107.136.9	WINWORD	tcp
258	40.108.224.39	WINWORD	tcp
8267			

BytesReceived by TimeGenerated



BytesReceived and BytesSent



BytesSent by TimeGenerated



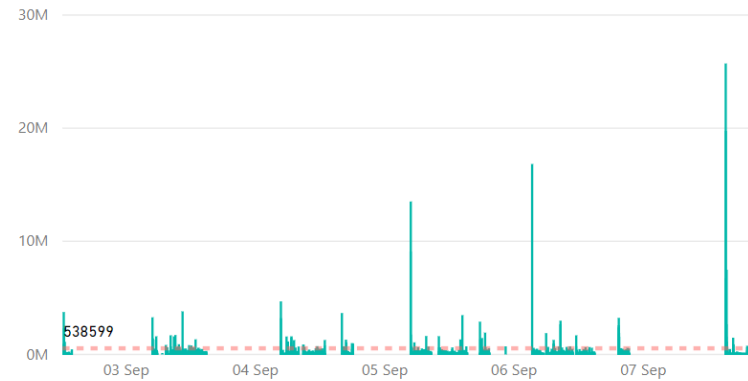
Beta Solution: Outcome & Dashboards

- Bandwidth estimation for EXO based on one week activity for a Knowledge worker

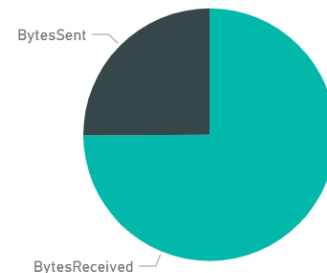
	Computer	Percentile95SentKbps	Percentile95ReceivedKbps	TotalSentMB	TotalReceivedMB
▼	Robin-DXB	30	70	150	449
	Computer	Robin-DXB			
	Percentile95SentKbps	30			
	Percentile95ReceivedKbps	70			
	TotalSentMB	150			
	TotalReceivedMB	449			

RemoteCountry	%GT LinksEstablished
United Kingdom	34.53%
Netherlands	19.93%
Ireland	18.64%
United States	11.92%
Austria	5.33%
Finland	4.18%
Japan	2.19%
U.A.E.	1.07%
	0.65%
South Africa	0.50%
France	0.28%
Germany	0.28%
India	0.25%
Singapore	0.11%
Hong Kong S.A.R.	0.07%
Italy	0.07%
Total	100.00%

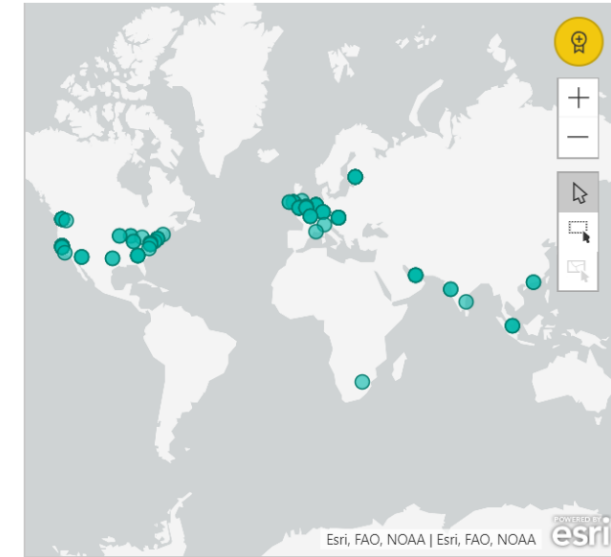
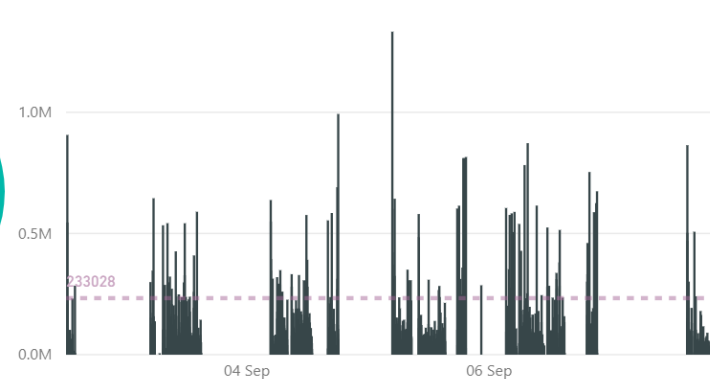
BytesReceived by TimeGenerated



BytesReceived and BytesSent



BytesSent by TimeGenerated



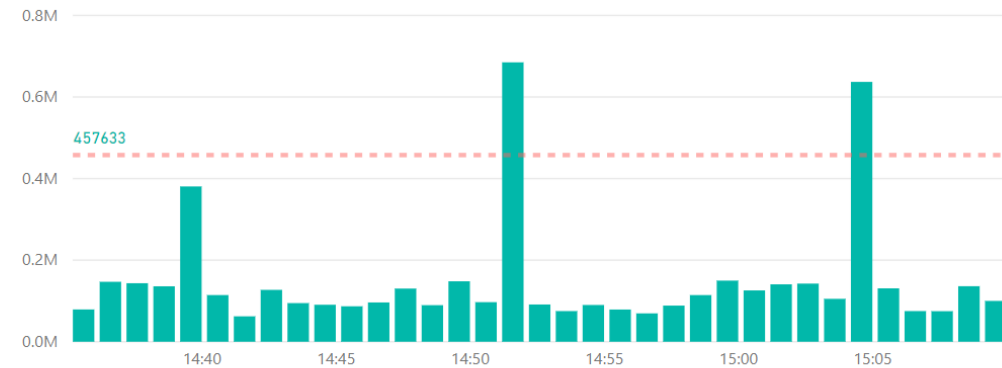
Beta Solution: Outcome & Dashboards

- Bandwidth estimation for SFBO based on specific activity for a Knowledge worker

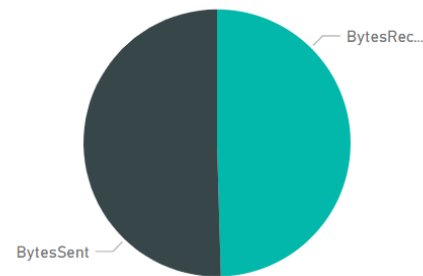
	Computer	Percentile95SentKbps	Percentile95ReceivedKbps	TotalSentMB	TotalReceivedMB
▼ Robin-DXB		24	82	4	4
	Computer	Robin-DXB			
	Percentile95SentKbps	24			
	Percentile95ReceivedKbps	82			
	TotalSentMB	4			
	TotalReceivedMB	4			

SFBO
Audio call for 34mins

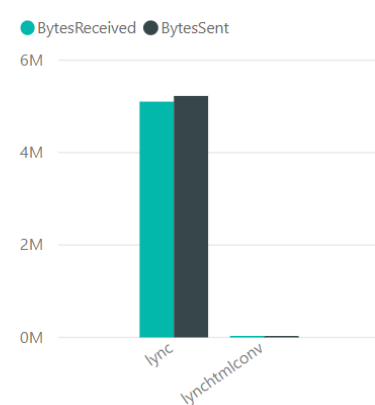
BytesReceived by TimeGenerated



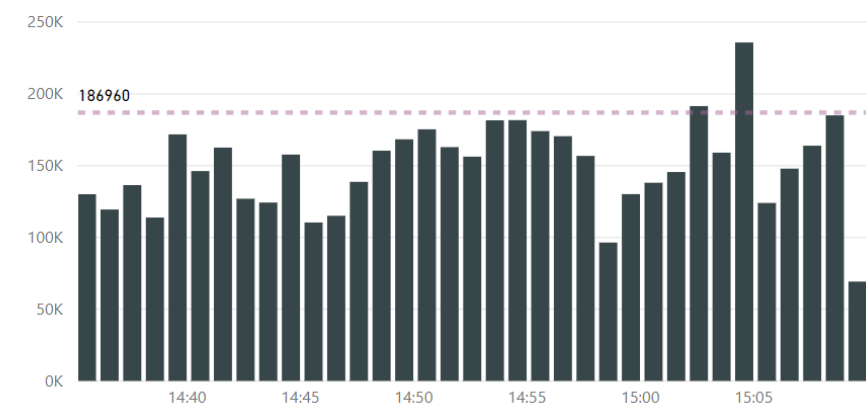
BytesReceived and BytesSent



BytesReceived and BytesSent by ProcessName



BytesSent by TimeGenerated



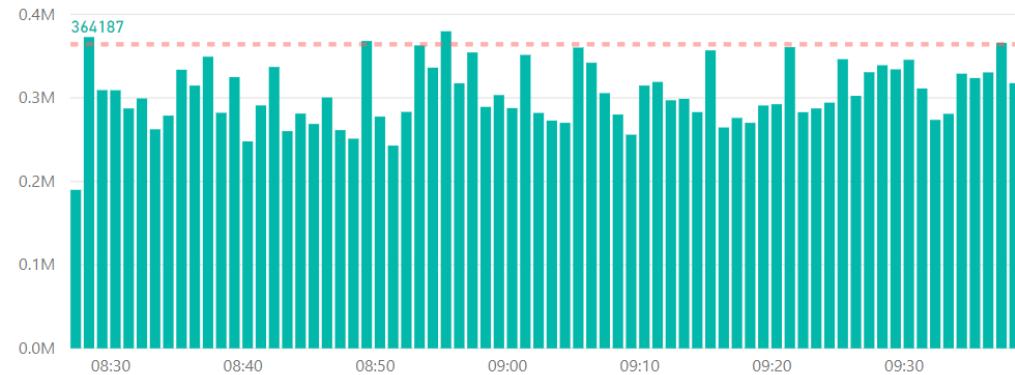
Beta Solution: Outcome & Dashboards

- Bandwidth estimation for Teams based on specific activity for a Knowledge worker

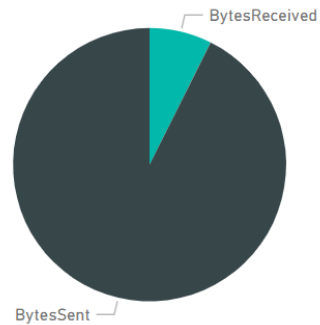
Computer	Percentile95SentKbps	Percentile95ReceivedKbps	TotalSentMB	TotalReceivedMB
Robin-DXB	922	47	263	20
Computer	Robin-DXB			
Percentile95SentKbps	922			
Percentile95ReceivedKbps	47			
TotalSentMB	263			
TotalReceivedMB	20			

Teams:
Audio call and Screen share for 72mins

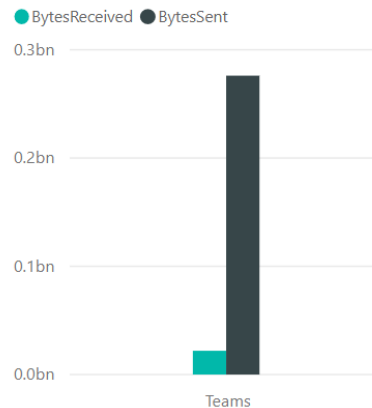
BytesReceived by TimeGenerated



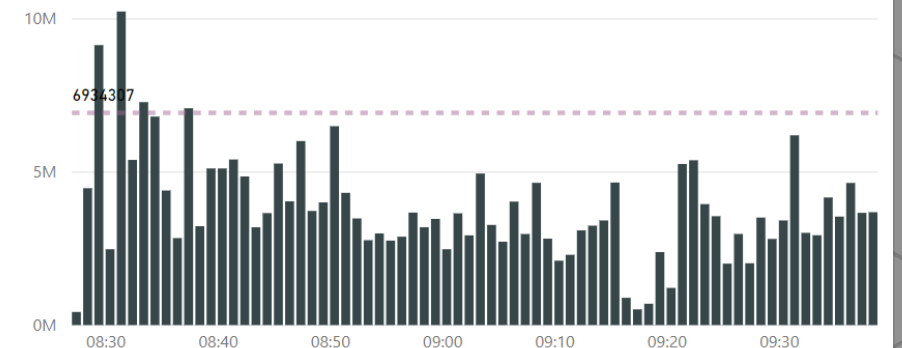
BytesReceived and BytesSent



BytesReceived and BytesSent by ProcessName



BytesSent by TimeGenerated



Beta Solution & Network Planner Comparison (SFBO)

- Here we are comparing the results from Beta solution with the results from Network Planner

Computer	Percentile95SentKbps	Percentile95ReceivedKbps	TotalSentMB	TotalReceivedMB
✓ Robin-DXB	24	82	4	4
Computer	Robin-DXB			
Percentile95SentKbps	24			
Percentile95ReceivedKbps	82			
TotalSentMB	4			
TotalReceivedMB	4			

Skype For Business

[↓ Export](#)

Site Name	Type	Impact	Audio	Video	Desktop Sharing	File Sharing	IM & Presence	PSTN
Orlando	WAN (in Mbps)	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	O365 (in Mbps)	2.949	0.088	0.968	1.345	0.546	0.002	0.000
Dubai	WAN (in Mbps)	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	O365 (in Mbps)	2.949	0.088	0.968	1.345	0.546	0.002	0.000

Beta Solution & Network Planner Comparison (Teams)

- Here we are comparing the results from Beta solution with the results from Network Planner

	Computer	Percentile95SentKbps	Percentile95ReceivedKbps	TotalSentMB	TotalReceivedMB
▼ Robin-DXB		922	47	263	20
	Computer + -	Robin-DXB			
	Percentile95SentKbps	922			
	Percentile95ReceivedKbps		47		
	TotalSentMB			263	
	TotalReceivedMB				20

Microsoft Teams

Note that these planning numbers are based on our initial learnings on Teams. As the product matures we will constantly fine tune these planning numbers based on real usage of the product

Site Name	Type	Impact	Audio	Video	Desktop Sharing	File Sharing	IM & Presence	PSTN
Orlando	WAN (in Mbps)	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	O365 (in Mbps)	3.736	0.090	2.648	0.995	0.000	0.003	0.000
Dubai	WAN (in Mbps)	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	O365 (in Mbps)	3.736	0.090	2.648	0.995	0.000	0.003	0.000

Log Analytics Play ground

Preview

Microsoft Azure

Report a bug

Search resources, services, and docs

Create a resource

All services

FAVORITES

Dashboard

All resources

Resource groups

App Services

SQL databases

SQL data warehouses

Azure Cosmos DB

Virtual machines

Load balancers

Storage accounts

Virtual networks

Azure Active Directory

Monitor

Advisor

Security Center

Cost Management + Billing

Help + support

Network Watcher

Log Analytics

Recovery Services vaults

Home > Log Analytics > roshanp-FT-PM > Overview > Logs

Logs

roshanp-ft-pm

Outlook-TC... Outlook-3... SFB-v2-UD... SFB-v2-UD...

Schema Filter

Filter by name or type...

Collapse all

ACTIVE

roshanp-ft-pm

LogManagement

NetworkMonitoring

Office365

ServiceMap

WireData2

Custom Logs

Functions

FAVORITE WORKSPACES

roshanp-ft-pm

Run

Time range: Set in query

Save

Copy link

Export

Set alert

Pin

Help

Settings

Query explorer

Filter by name or path...

Favorites

Saved Queries

BW-Test

HeartBeat - Test

Outlook-36hrs-Query

Outlook-TCP-KeyPoints-36h...

SFBOandTeams - Basic

SFB-UDP-KeyPoints

SFB-UDP-TimeRange-Specific

SFB-v2-UDP-Keypoints

SFB-v2-UDP-Keypoints-90t...

SPO-full-query-timerange

SPO-OD4B-percentilequery

VMConnection - Basic

Solution Queries

let startTime=datetime(2018-09-02T01:00:00);

let endTime=datetime(2018-09-07T23:30:00);

VMConnection

where Computer contains "robin"

where ProcessName contains "outlook"

where (ProcessName contains "lync" or ProcessName contains "teams")

where TimeGenerated > ago(24h)

where TimeGenerated > startTime and TimeGenerated < endTime

where TimeGenerated > ago(22h)

where Protocol contains "udp"

count

Completed with partial results.

00:00:02.555

10,000 records

Display time (UTC+00:00)

TABLE

CHART

Columns

Drag a column header and drop it here to group by that column

TimeGenerated [UTC]	Computer	Direction	ProcessName	SourceIp	DestinationIp	DestinationPort
2018-09-02T12:23:18.114	Robin-DXB	outbound	OUTLOOK	172.20.10.3	52.97.136.70	443
2018-09-02T12:23:18.114	Robin-DXB	outbound	OUTLOOK	172.20.10.3	40.101.43.178	443
2018-09-02T12:24:18.148	Robin-DXB	outbound	OUTLOOK	172.20.10.3	52.97.131.82	443
2018-09-02T12:24:18.148	Robin-DXB	outbound	OUTLOOK	172.20.10.3	40.100.174.194	443
2018-09-02T12:24:18.148	Robin-DXB	outbound	OUTLOOK	172.20.10.3	52.97.129.242	443
2018-09-02T12:24:18.148	Robin-DXB	outbound	OUTLOOK	172.20.10.3	40.103.46.150	443
2018-09-02T12:24:18.148	Robin-DXB	outbound	OUTLOOK	172.20.10.3	40.101.43.178	443
2018-09-02T12:24:18.148	Robin-DXB	outbound	OUTLOOK	172.20.10.3	52.97.136.70	443
2018-09-02T12:25:18.524	Robin-DXB	outbound	OUTLOOK	172.20.10.3	213.42.214.53	443

Page 1 of 200

50 items per page

1 - 50 of 10000 items