



Network Design Requirements

For the Visual Networking Platform

Version 1.1

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Revision History

Version	Date	Notes	Author
1.0	December 2020	Initial Release	Greg Mitchell
1.0.1	January 21, 2021	Minor fixes	Greg Mitchell
1.1	June 25, 2021	Emerald CMS Rules	Greg Mitchell

Introduction

The Useful Visual Networking Platform leverages your existing conventional network assets to deliver visual content.

This document describes how to ensure your network makes full use of Useful and is configured to allow Useful to function to its full potential.

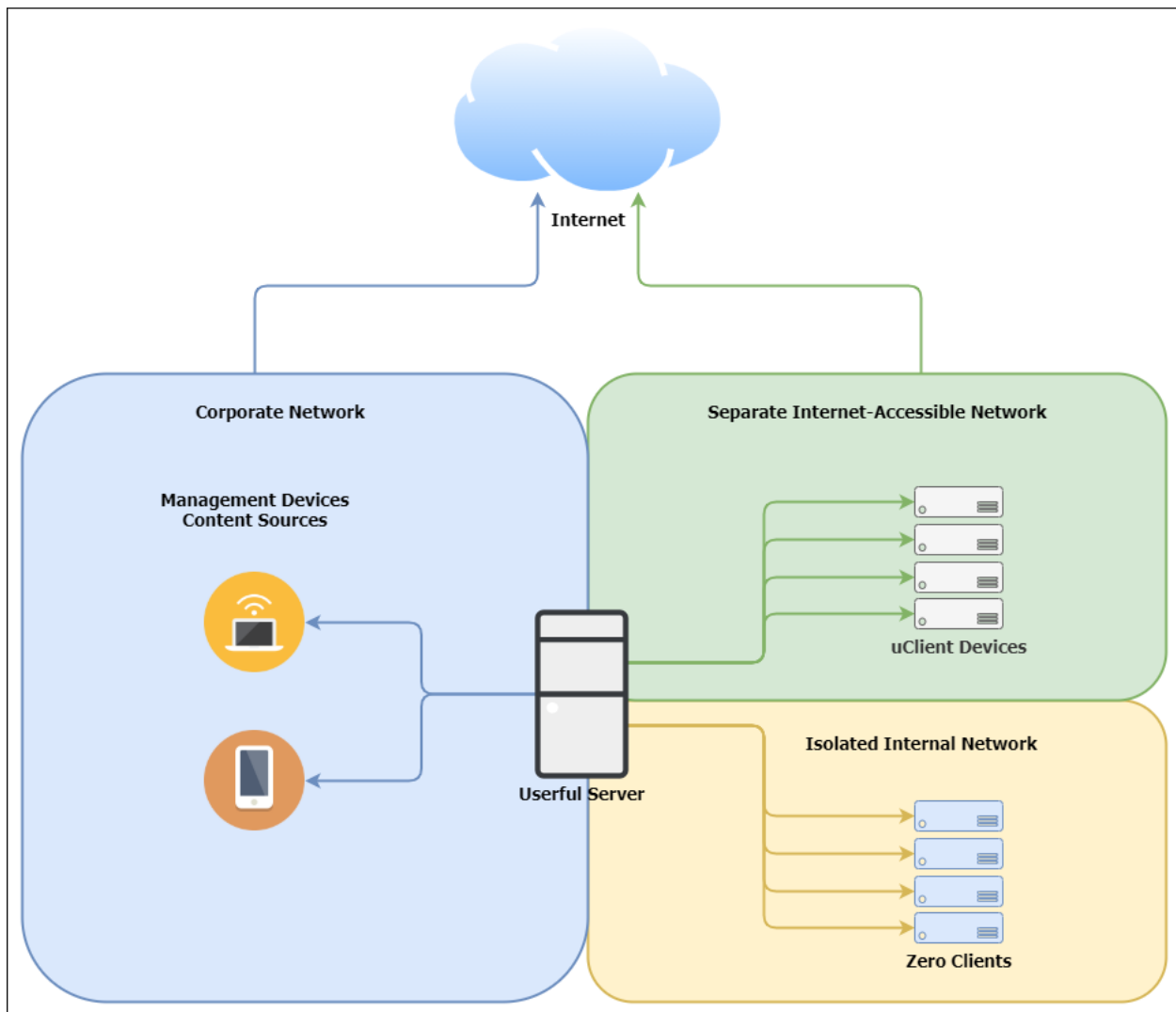
If you have any further questions or comments on this article, contact your Useful Account Manager or Useful Sales Engineer, or email info@userful.com.

Introduction	2
Userful On-Premise	4
Network Structure	4
uClients	4
Zero Clients	5
Network Addressing	5
uClients	5
Zero Clients	5
Network Capacity	6
Network Firewall	7
Server Rules	7
Zero Client Rules	8
uClient Rules	8
Userful Cloud	9
Network Structure	9
Network Addressing	10
Network Capacity	10
Network Firewall	10

Userful On-Premise

Network Structure

On-Premise servers actively stream video data to their endpoints. To do this reliably while not interfering with other network traffic, dividing traffic into separate Layer 2 network segments is a design requirement of Userful.



uClients

uClients on LG WebOS or Android must be able to access both the On-Premise server and the Internet to receive both uClient App updates and device firmware updates. They do not need to access the corporate LAN directly.

uClient can operate on a completely isolated network, however, provisions must be taken to distribute App and Firmware updates to the devices manually when the Server receives updates.

- App updates can be distributed from On-Premise servers or manually with a USB flash drive

- Firmware updates for LG WebOS are distributed from the Internet or can be installed on the device with a USB flash drive
- Firmware updates for the Userful uClient Adapter are not yet supported

uClients can also cross subnets if they have access to cloud-connect.userful.com via TCP port 443 and are still connected to the same subnet as the On-Premise server.

If the entire Userful system is going to be placed offline, with no access to updates or the Internet, then it is recommended that Zero Clients be used if possible.

Zero Clients

Zero Clients can be placed on a completely isolated network, with access to nothing except the Userful server itself. Any firmware updates for Zero Clients are distributed from the server itself, and Zero Clients require no Internet connection to function.

Network Addressing

All types of clients seek DHCP leases on their wired interfaces when new out of the box. Ideally, a DHCP server should be available to hand out leases. If not, other measures need to be taken.

uClients

uClient devices can have their network settings configured on the device itself, using attached or included peripherals.

Zero Clients

Zero Clients cannot be managed locally. They will self-assign to themselves an IP address of 10.254.10.10 if they receive no response to their DHCP query after a few minutes. In this state, they are not addressable from Userful and may assign themselves conflicting IPs.

Once zero clients have IP addresses on the same network as the Userful server, they can be managed and IP settings changed from the Userful Control Center.

Network Capacity

Zero Clients and uClients have different network specifications that must be met for reliable operation.

	Zero Clients	uClients
Stream Type	JPEG	RTSP
Bandwidth usage per device	~100Mbps @ 1080p60	~14Mbps @1080p60 ~40Mbps @4K60
Connection to endpoint	1Gbps	100Mbps
Wifi Available	No	Yes, but not supported for on-premise applications
Latency tolerance	Under 5ms	Unlimited
Displays per 1Gbps uplink	10-12	~50
Displays per 10Gbps uplink	16 independent displays* 36 in a single video wall*	100+

*Driver limitations limit network interface throughput to Zero Clients at 2.5Gbps

Network Firewall

Server Rules

The following **Internet** destinations should be accessible by the Userful server for complete connectivity and support.

Protocol	Port	Destination	Rule	Description
TCP	80	updates.userful.com updates2.userful.com umirror2.com	Out	Software Updates
TCP	443	cloud-connect.userful.com	Out	Userful Manager Licensing
TCP	443	remote.userful.com	Out	Support VPN
TCP/UDP	3478	turn.userful.com	In/Out	Remote content upload and (optional) webcam

The following **local** ports must be accessible from the **corporate LAN** to allow browser-based access and operation of Userful.

Protocol	Port	Destination	Protocol	Description
TCP	5353	LAN		Peer Discovery
TCP	5701	LAN		Failover
TCP	9000	LAN	HTTP	Userful Control Center
Multicast	54327	224.2.2.3		Failover
UDP	54327	LAN		Failover
TCP	54328	LAN		Failover

These local ports from the **corporate LAN** on an On-Premise Server are optional.

Protocol	Port	Destination	Protocol	Description
TCP	21	LAN	FTP	FTP File Transfer
TCP	22	LAN	SSH	Local SSH
TCP	80	LAN	HTTP	Redirects to 9000
TCP/UDP	137-139, 445	LAN	SMB	Windows File sharing
TCP/UDP	631	LAN	HTTP	Printer Configuration*

*Public Computing deployments only.

uClient Rules

The following ports and services must be available between a Useful On-Premise server and endpoints running uClient **and** between uClient and the Internet for proper operation.

Protocol	Port	Destination	Description
TCP	443	cloud-connect.userful.com	Userful Manager
UDP	123	Server	NTP
TCP	8554	Server	RTSP Streaming
TCP/UDP	14725	Server	Video Sync
TCP	14276	Server	Video Sync
UDP	16668	Server	uClient Discovery

Zero Client Rules

Zero Clients must be placed on a separate network from the Corporate network. They will use these ports and protocols to communicate with the Useful server. **It is strongly recommended that access be unrestricted on this network.**

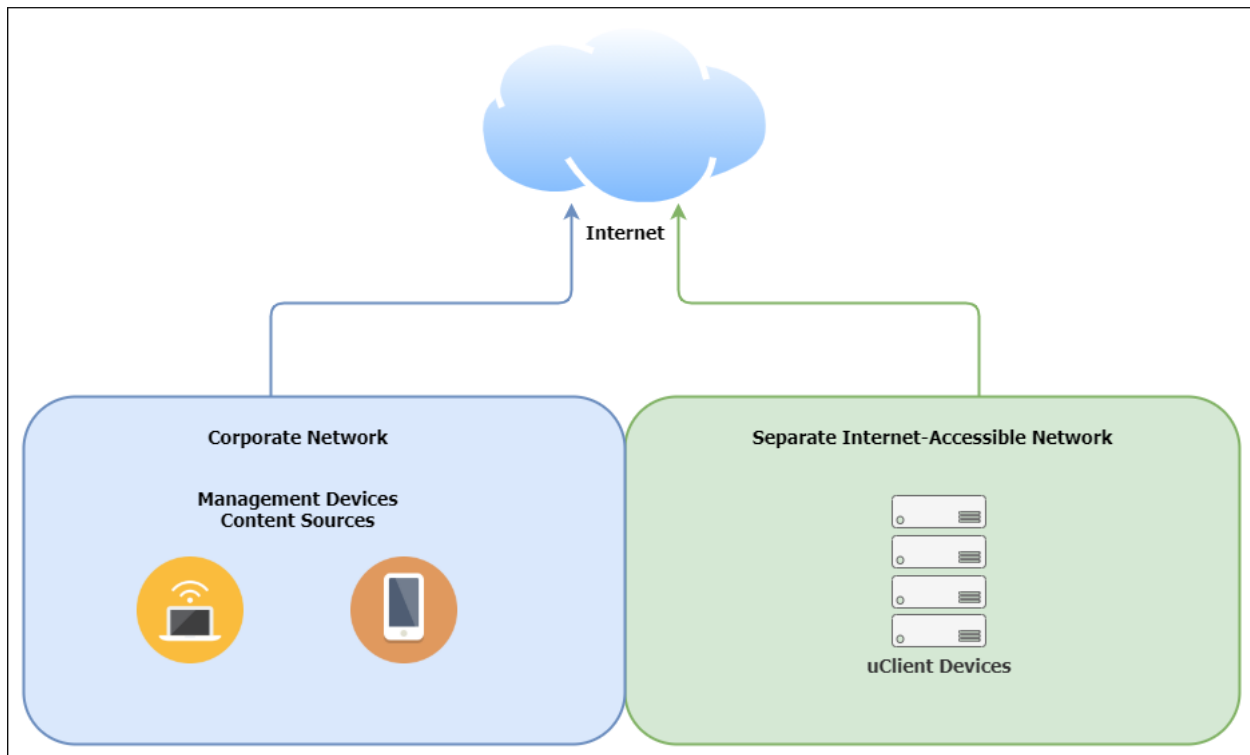
Protocol	Port	Destination	Description
UDP	26668	Zero Clients	Zero Client Discovery
TCP	52330	Zero Clients	Zero Client Discovery
UDP	52330 - 52630 incl.	Zero Clients	Zero Client Discovery
TCP/UDP	Various High Numbers	Zero Clients	Zero Client Communication

Userful Cloud

Userful uClients can sync to Userful Cloud servers without any other local hardware or server. They are synced and managed entirely from the Cloud web service, which is hosted by Userful in AWS.

Zero Clients **can not** be used with Userful Cloud, they can only be paired to a local On-Premise server.

Network Structure



uClients connecting to Userful Cloud are not required to occupy a separate network, but doing so is still a recommended best-practice.

Most uClient devices come with wireless interfaces. These are not supported for On-Premise deployments and are not recommended for Cloud deployments.

Network Addressing

uClient devices come out of the box querying for DHCP on their local wired interfaces. They can be manually locally configured with static IPs.

Network Capacity

uClients download content from Cloud servers in Useful Manager to internal storage for local playback. They do not have particular bandwidth or latency requirements, other than Internet bandwidth that is sufficient to distribute large content files, and local communication for synchronization is reliable.

Network Firewall

uClient devices must be able to communicate with the Internet to sync with Useful Manager, and also must be able to communicate with each other across the local network to maintain content synchronization.

Protocol	Port	Destination	Description
TCP	443	cloud-connect.userful.com	Userful Manager
UDP	123	Other uClients	NTP
TCP	8554	Other uClients	RTSP Streaming
TCP/UDP	14725	Other uClients	Video Synchronization
TCP	14276	Other uClients	Video Synchronization
UDP	16668	Other uClients	uClient Discovery

Emerald CMS IP Addresses

If your deployment includes the use of the Userful Emerald CMS, you will need to ensure that your On-Premise Servers and/or uClient devices are able to access the Emerald IPs on TCP port 443:

- 205.185.216.10 (Files)
- 52.217.39.148 (Files)
- 162.243.189.2 (Files)
- 45.55.116.139 (API)
- 134.209.131.177 (API)
- 172.217.2.227 (API)