



Introduction to Collaboration Edge
Communicating outside the walls of your organization

Toby Sauer

Instructor/Consultant

February 21, 2024

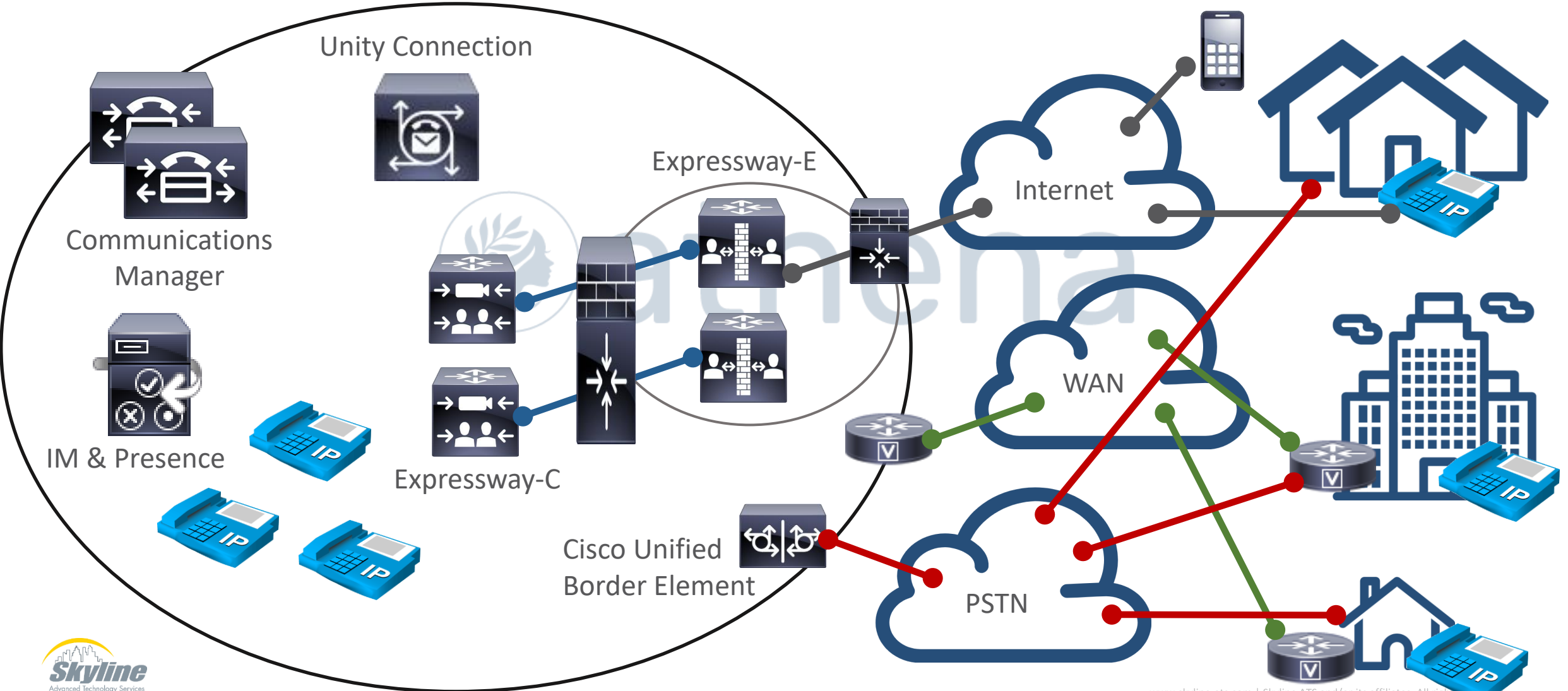
Agenda

- Collaboration Edge Overview
 - Architecture
 - Cisco Unified Border Element (CUBE)
- Mobile and Remote Access (MRA)
- Service Discovery
- Deploying MRA
- Business to Business (B2B) Communication

Collaboration Edge Overview



Collaboration Edge Architecture



Collaboration Edge Options

PSTN

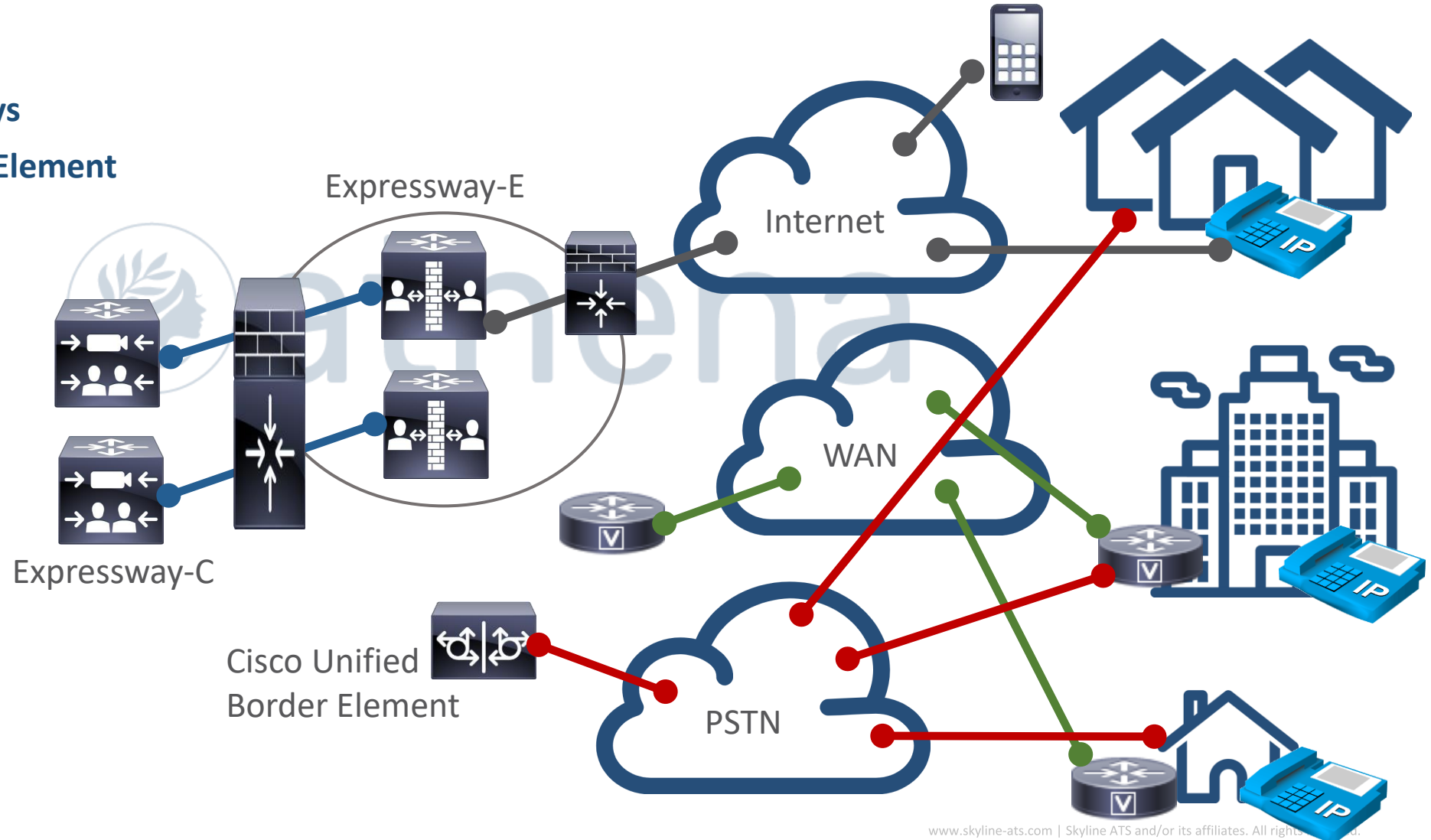
- MGCP or SIP Gateways
- Cisco Unified Border Element

WAN

- Private Network
- Secure
- VPN

Internet

- Furthest Reach
- Security Exposure
- Expressways
- MRA



Cisco Unified Border Element (CUBE)



Cisco Unified Border Element

- The “new” Gateway

SIP Trunks

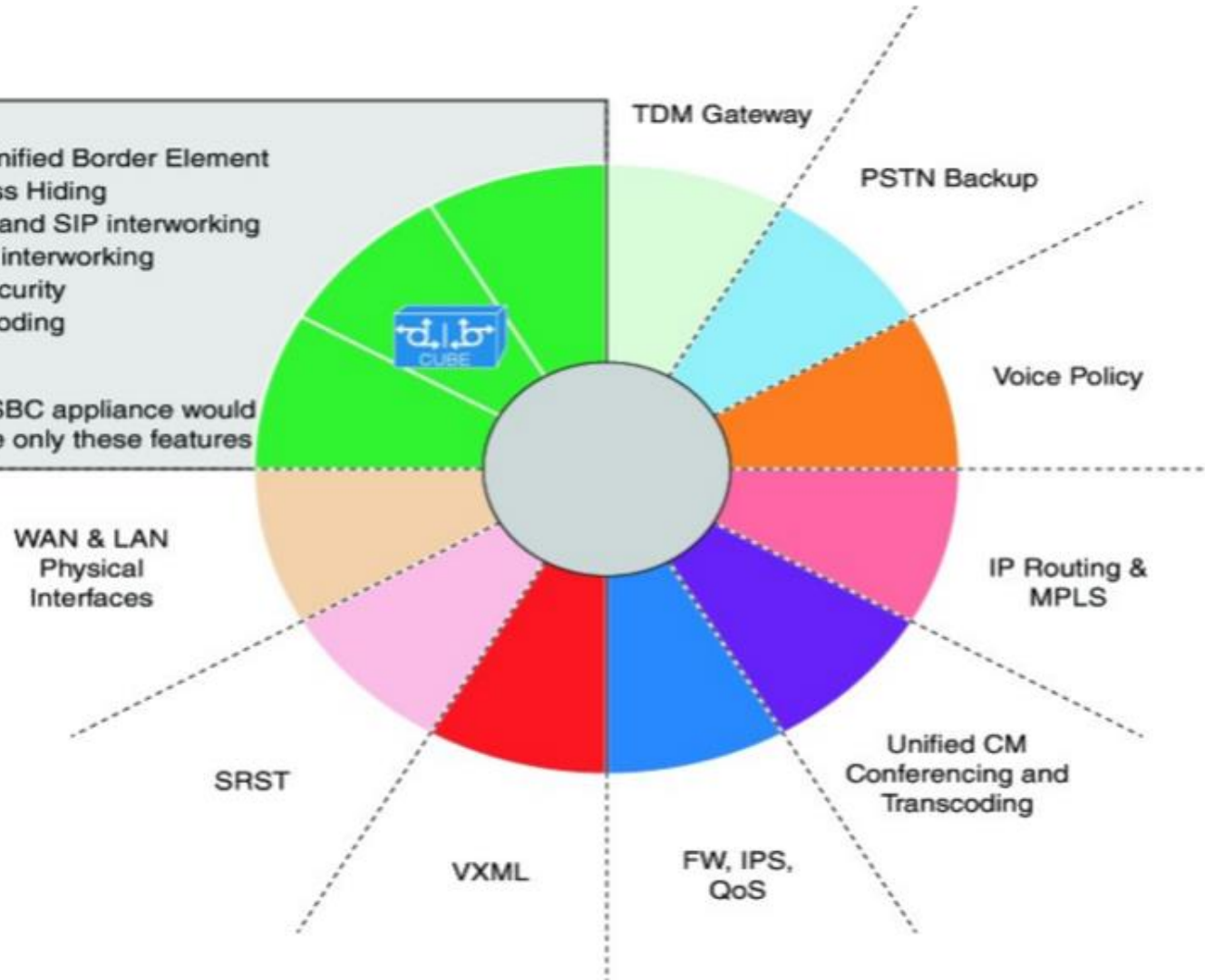
- Security
- DTMF Relay
- Address Hiding



Cisco Unified Border Element

- Address Hiding
- H.323 and SIP interworking
- DTMF interworking
- SIP security
- Transcoding

Note: An SBC appliance would have only these features



CUBE Features

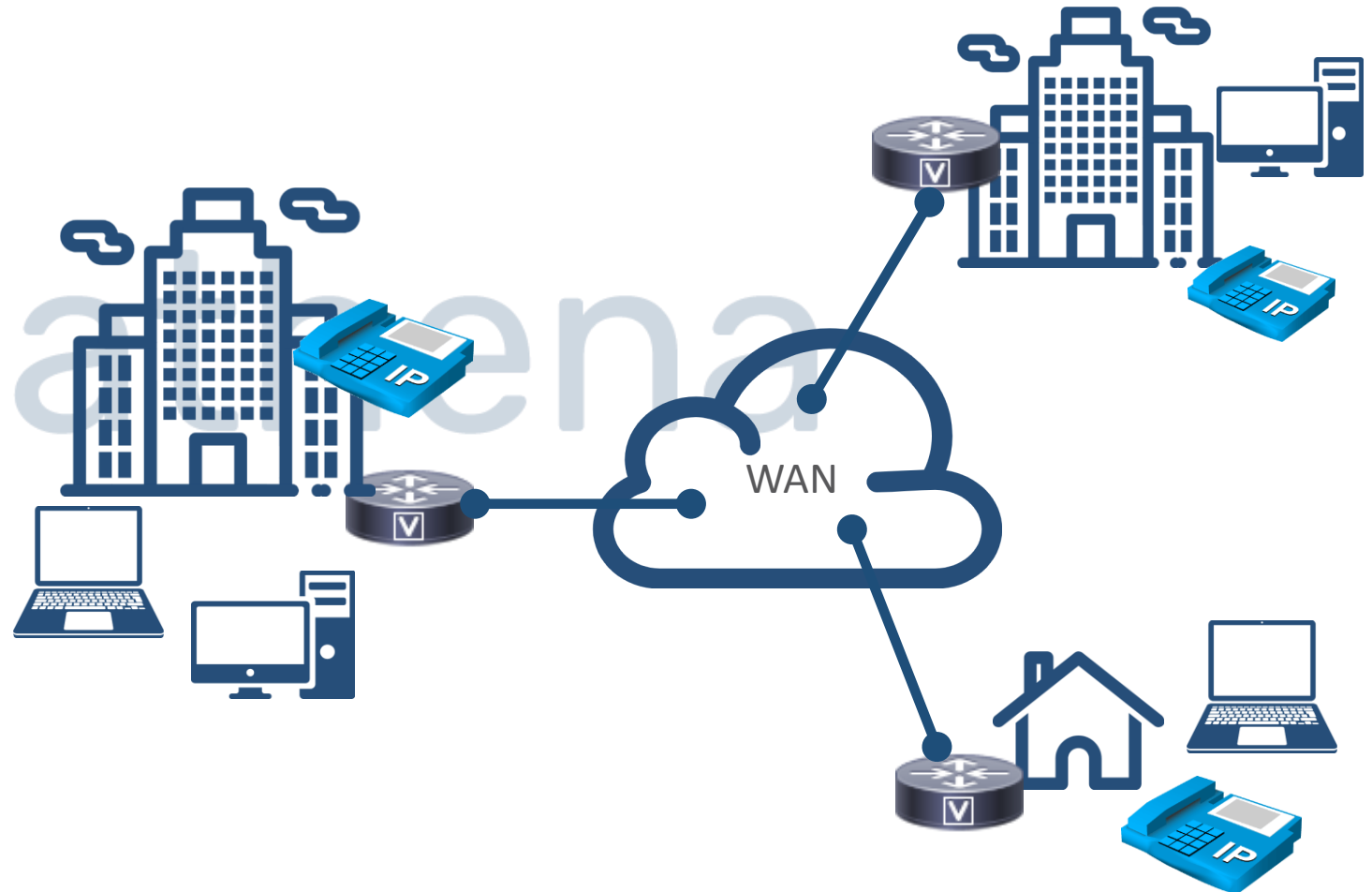


CUBE Functionality



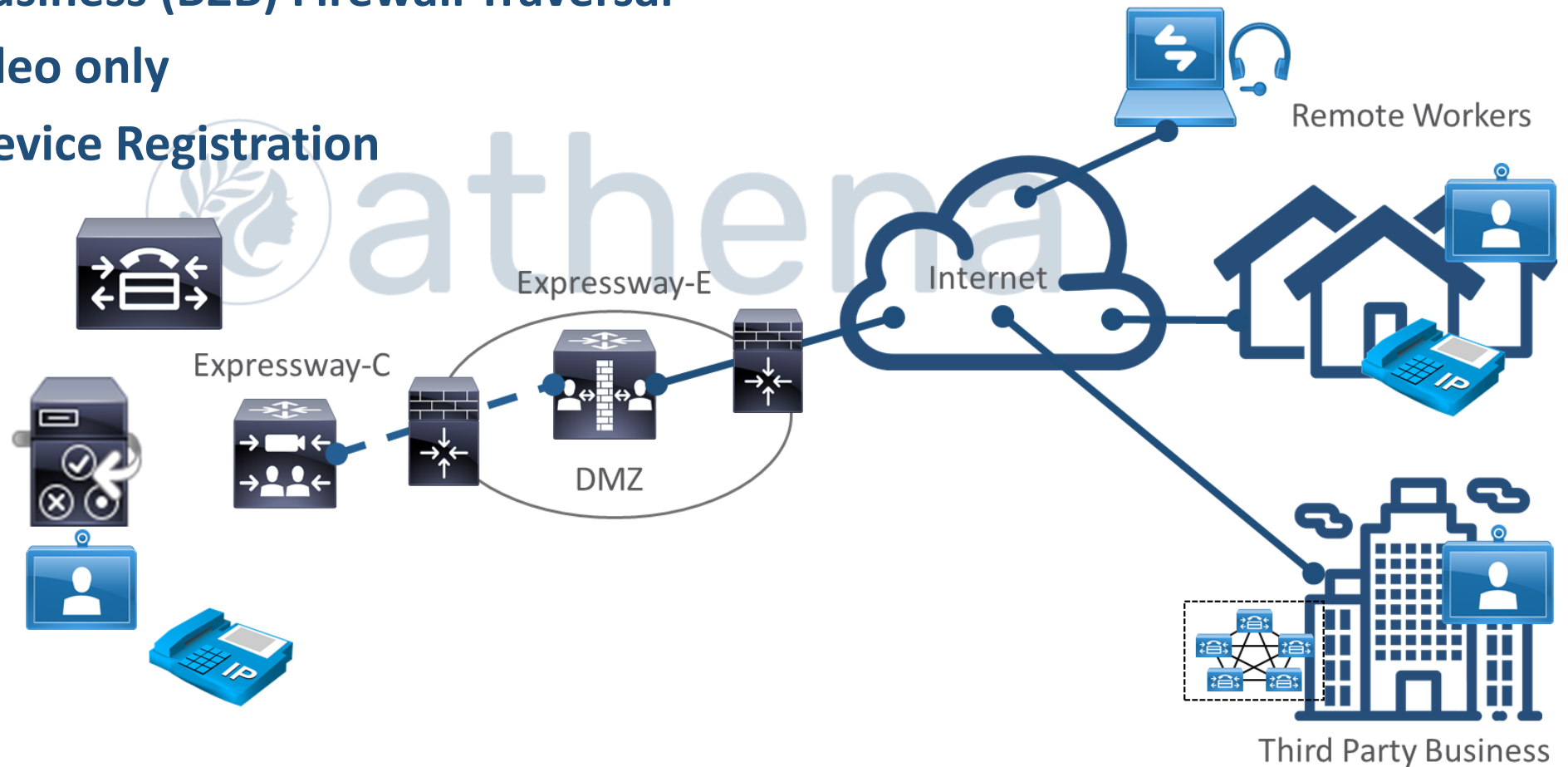
Virtual Private Networks (VPN)

- Establishes a secure site-to-site connection
- Provides all features
- Requires a VPN device at both ends of the connection
- Can carry both voice and data traffic



Expressways

- Mobile and Remote Access – MRA
- Business to Business (B2B) Firewall Traversal
- Audio and Video only
- Third-party Device Registration



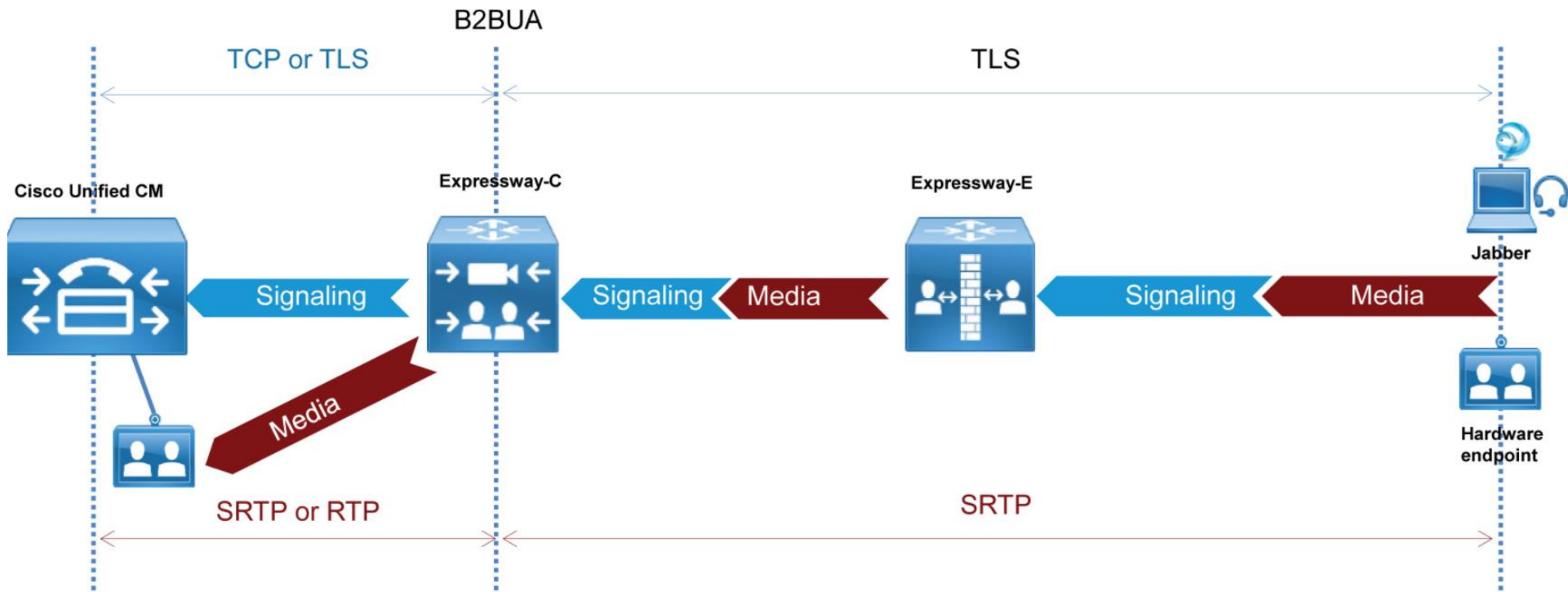
Mobile and Remote Access (MRA)



MRA Overview

- **Communications Manager-Registered devices only**
 - Jabber, IP Phones, Video Endpoints

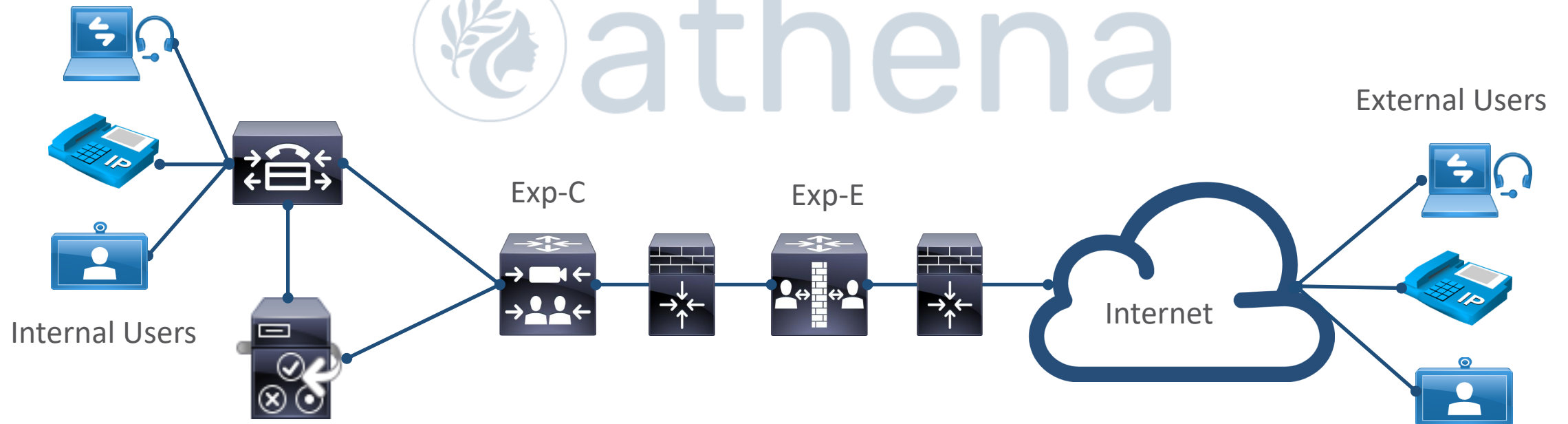
- **Some features not supported**
 - Busy Lamp Fields
- **Most “new” phones supported**



MRA Architecture – Single Network



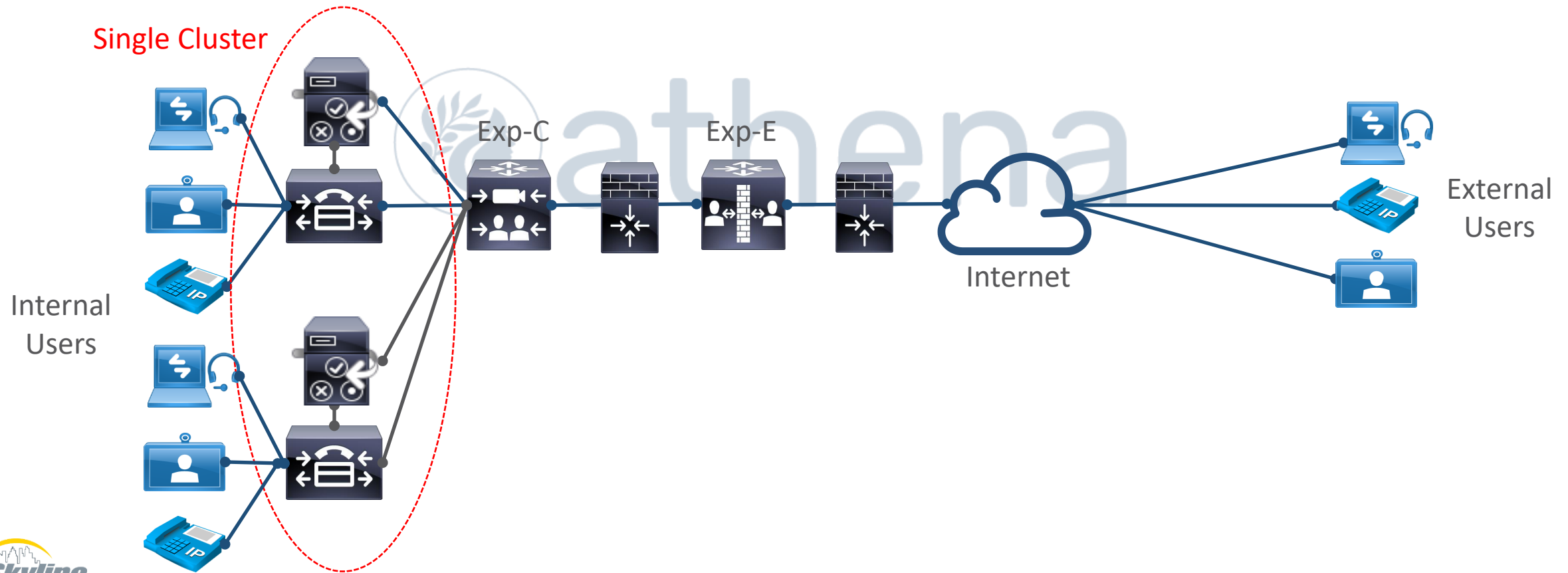
- Single instance of each device
- Small deployments
- No redundancy



MRA Architecture – Clustered CM / IMP

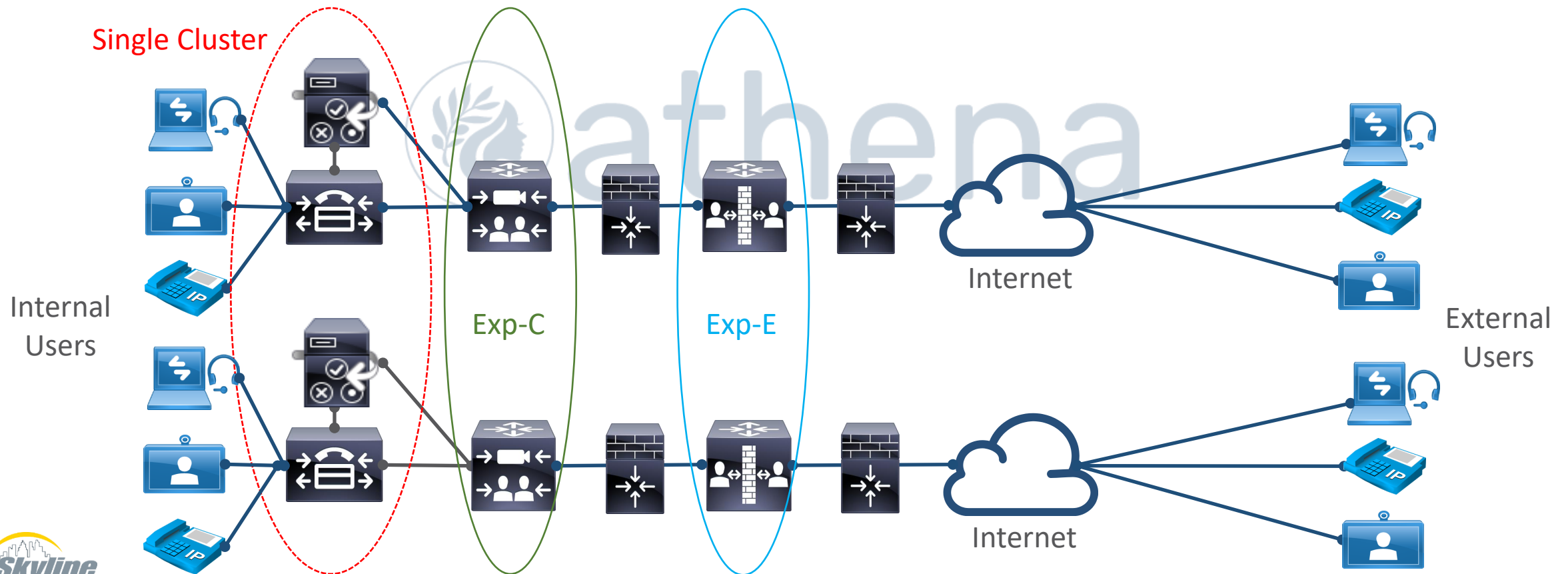


- Redundant Call Control
- Suitable for larger local deployment
- Single point of failure for external devices



MRA Architecture – Multiple Clustered Network Elements

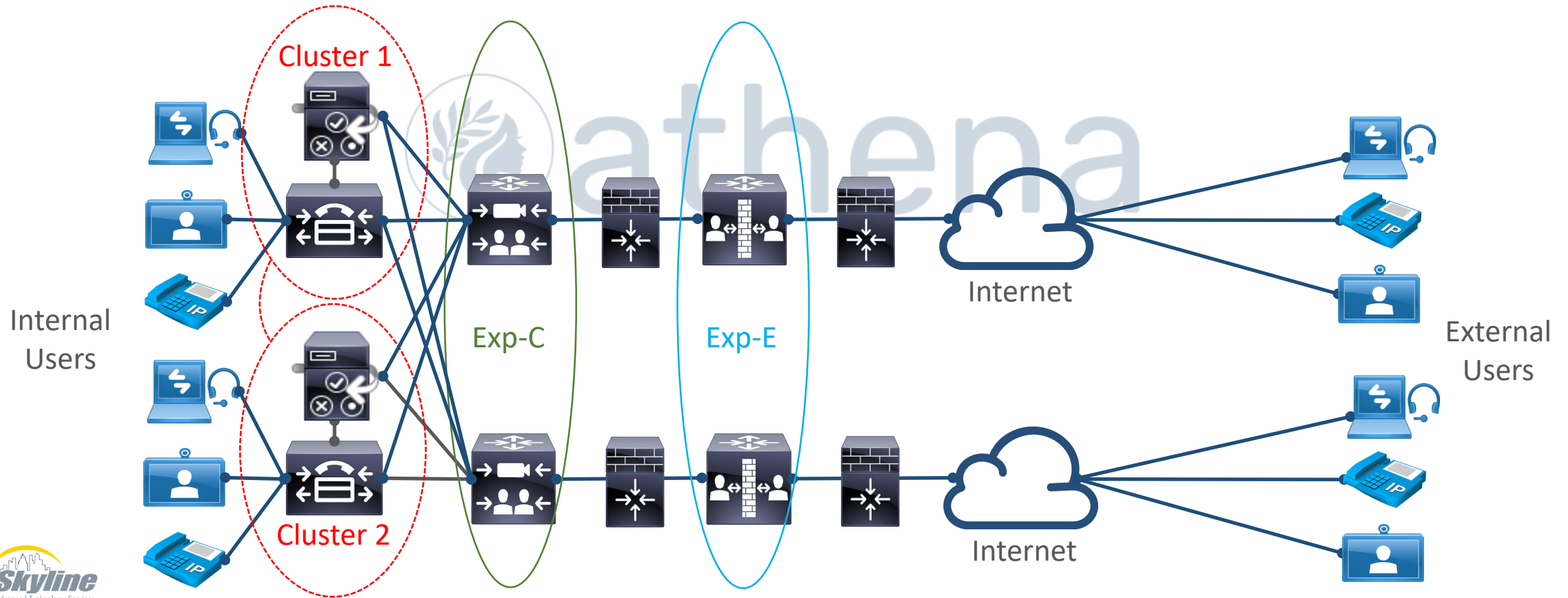
- Redundant Call Control
- Redundant networking devices for external users
- High Availability
- Suitable for large Jabber deployments



MRA Architecture – Multiple Clustered Call Control and Network Elements

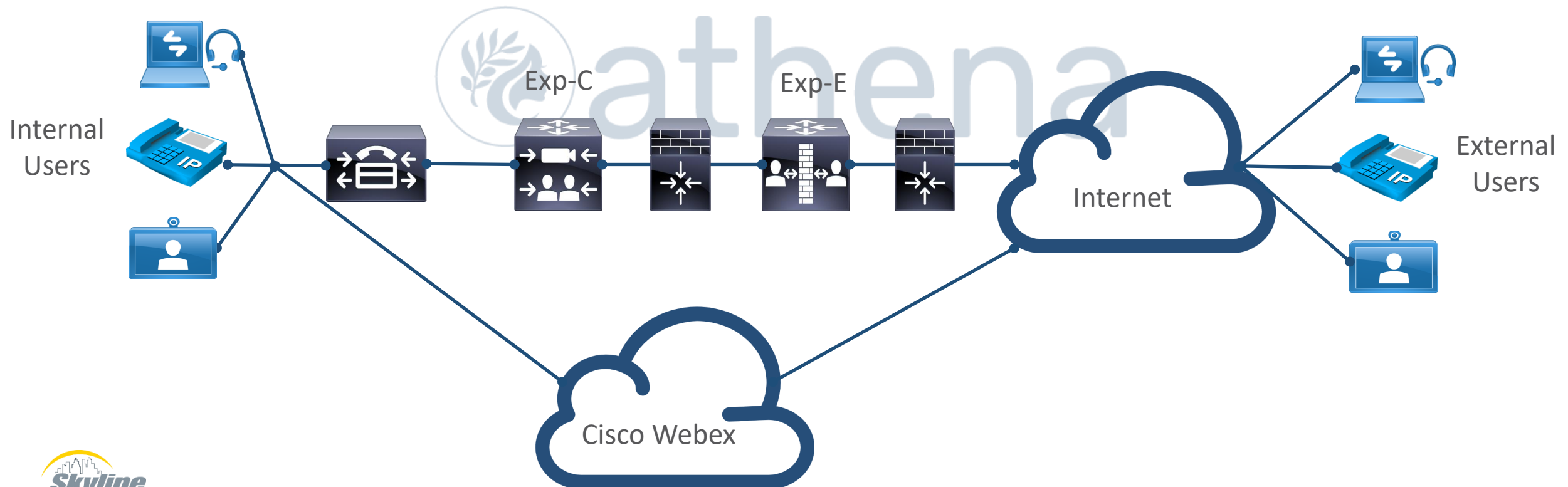
- Multiple Call Control Clusters
- Redundant networking devices for external users

- High Availability
- Suitable for large Jabber deployments



Hybrid Deployment

- Call control provided by Cisco Unified Communications Manager
- IM & Presence provided by Webex cloud

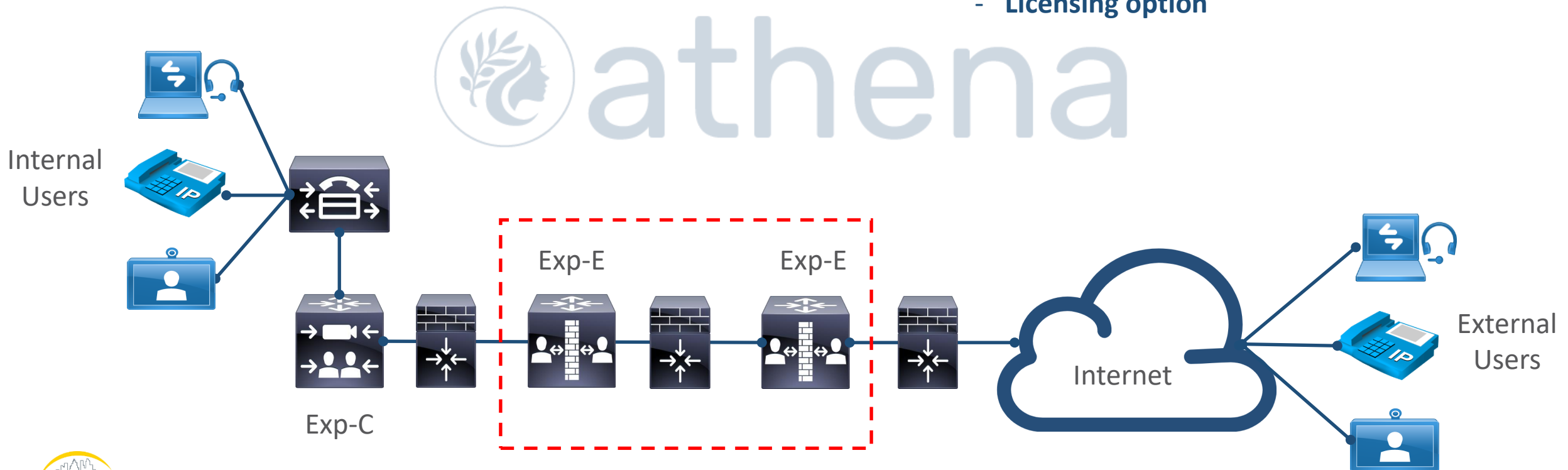


Multiple Expressway – E Servers



- Not supported with MRA
- Supported when using standard Expressways to support Business to Business calling

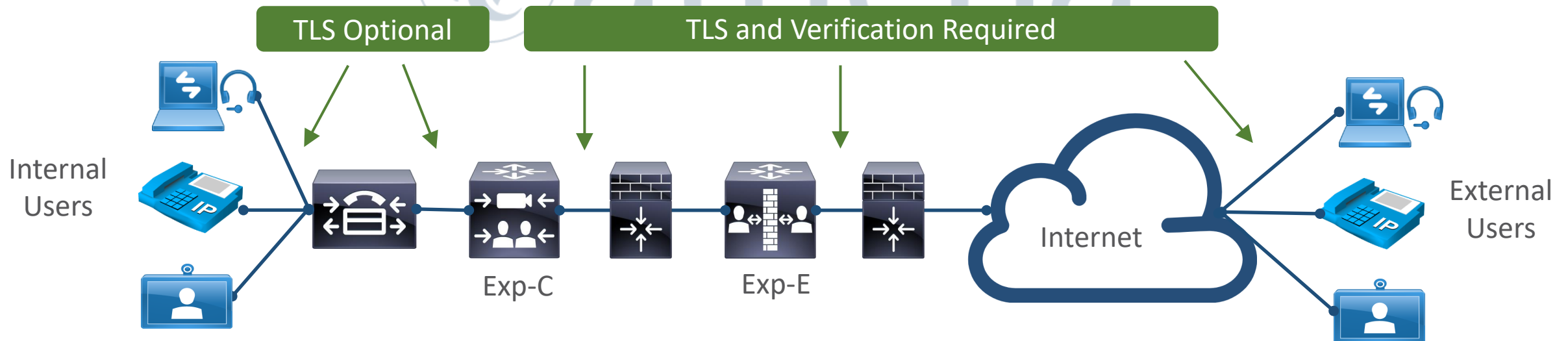
- Dual network ports supported
 - One internal
 - One external
 - Licensing option



MRA Authentication and Encryption



- Expressway-C to Expressway-E must be authenticated and encrypted
- Expressway-E to Endpoints must be authenticated and encrypted
- IP Phones require certificates from specific CAs
- Video Endpoints can use private certificates



Certificates in CM vs. Expressways



- Expressways only have one CA-signed certificate and one CA certificate for all functions



- Entire Server

- CUCM and other applications have a certificate and CA certificate per service



- Tomcat

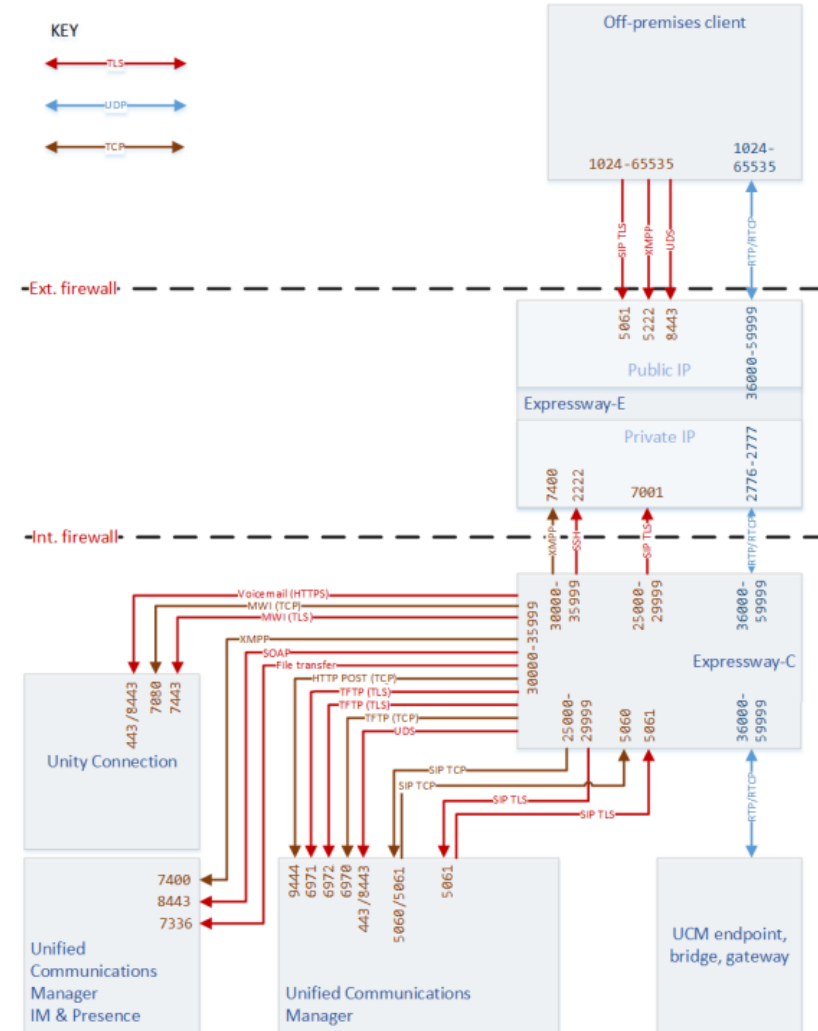
- Call Manager

- Tomcat-Trust

MRA Ports

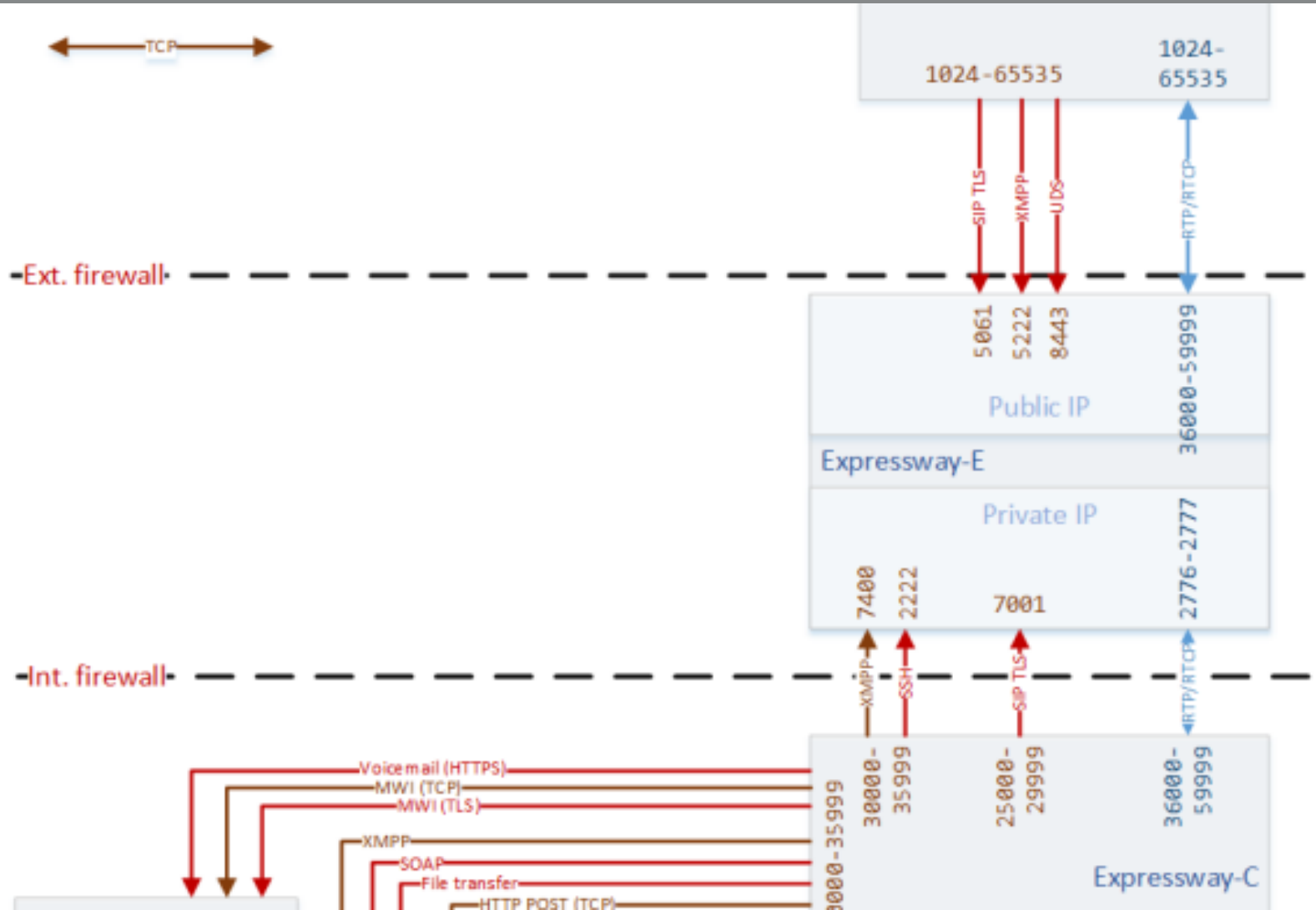
- Various components use different TCP and UDP port ranges to communicate with each other
- Source ports vary
- Destination ports depend on function
- Some port numbers can be configured in the application
- Search Cisco.com for: [Cisco-Expressway-IP-Port-Usage-for-Firewall-Traversal-Deployment-Guide-X12-5.pdf](#)

MRA Connections



MRA Ports (Cont.)

- All inbound signaling traffic targets single destination port number
- Small hole in firewall
- Media streams (RTP and RTcP) require larger port ranges



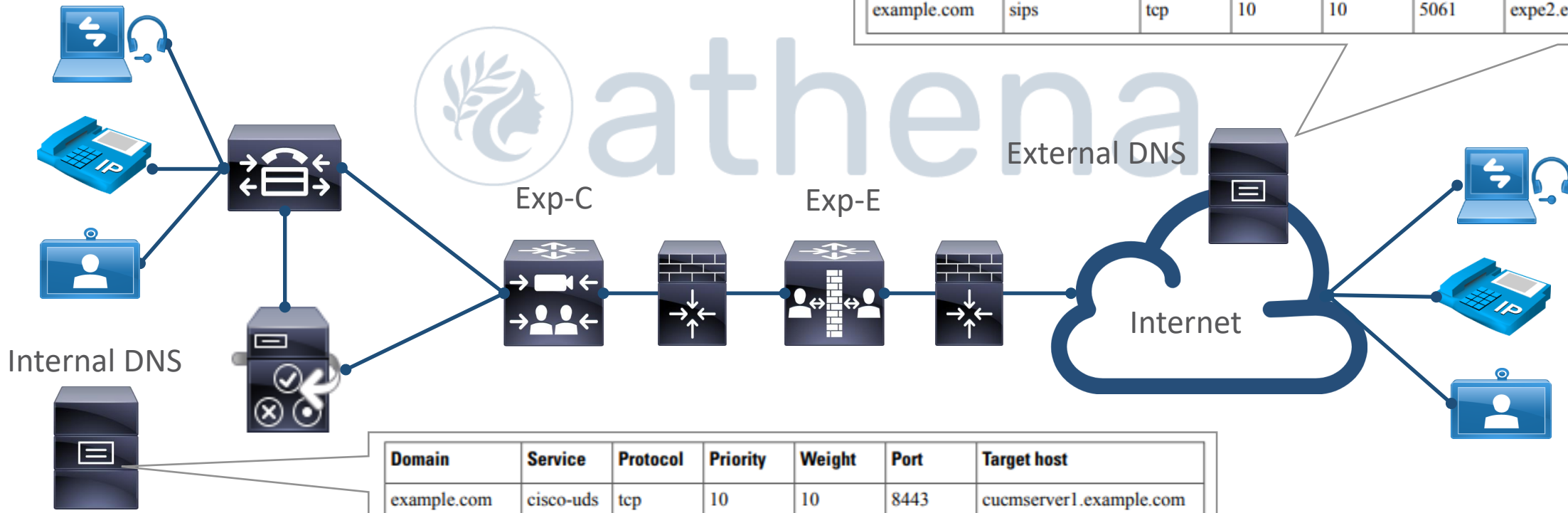
Service Discovery



Service Discovery

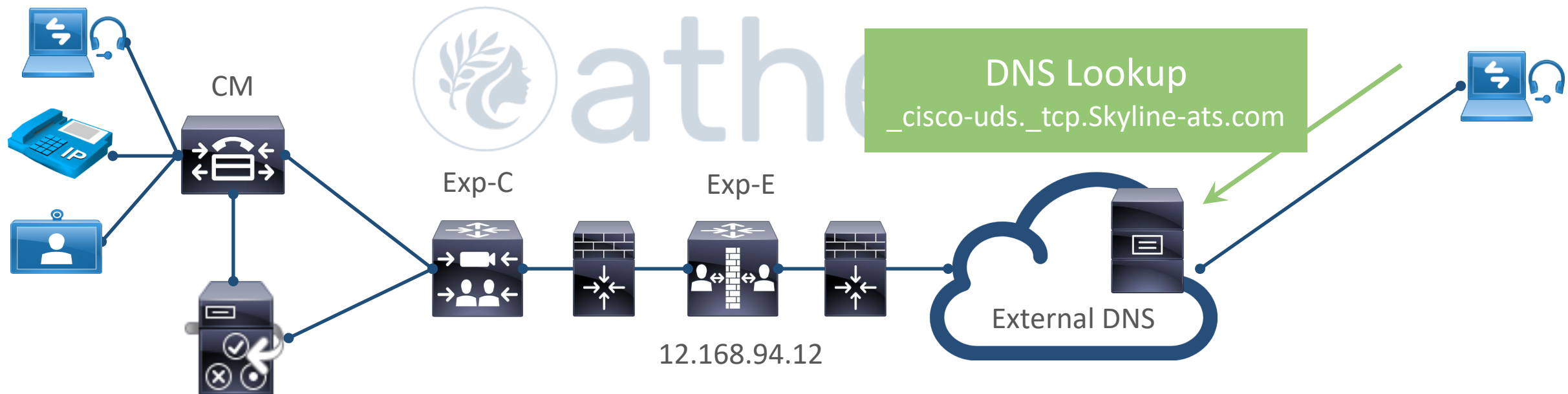
- Internal DNS entries to **_cisco-uds**
 - Recommended but optional after X12.5
- External DNS to **_sips**
 - Not required for MRA and may be used for B2B

Domain	Service	Protocol	Priority	Weight	Port	Target host
example.com	collab-edge	tls	10	10	8443	expe1.example.com
example.com	collab-edge	tls	10	10	8443	expe2.example.com
example.com	sips	tcp	10	10	5061	expe1.example.com
example.com	sips	tcp	10	10	5061	expe2.example.com

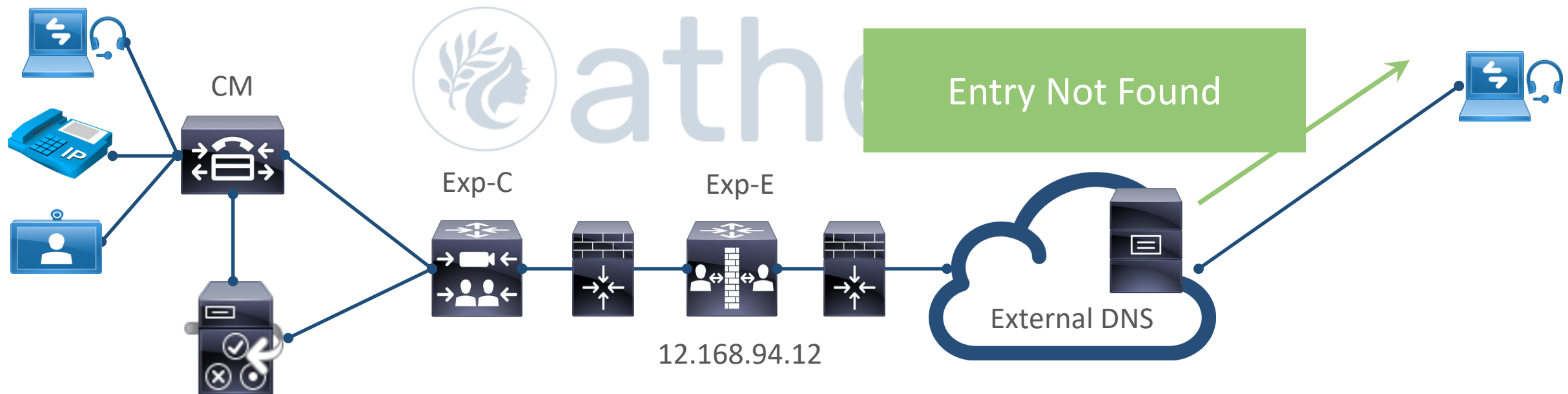


Domain	Service	Protocol	Priority	Weight	Port	Target host
example.com	cisco-uds	tcp	10	10	8443	cucmserver1.example.com
example.com	cisco-uds	tcp	10	10	8443	cucmserver2.example.com

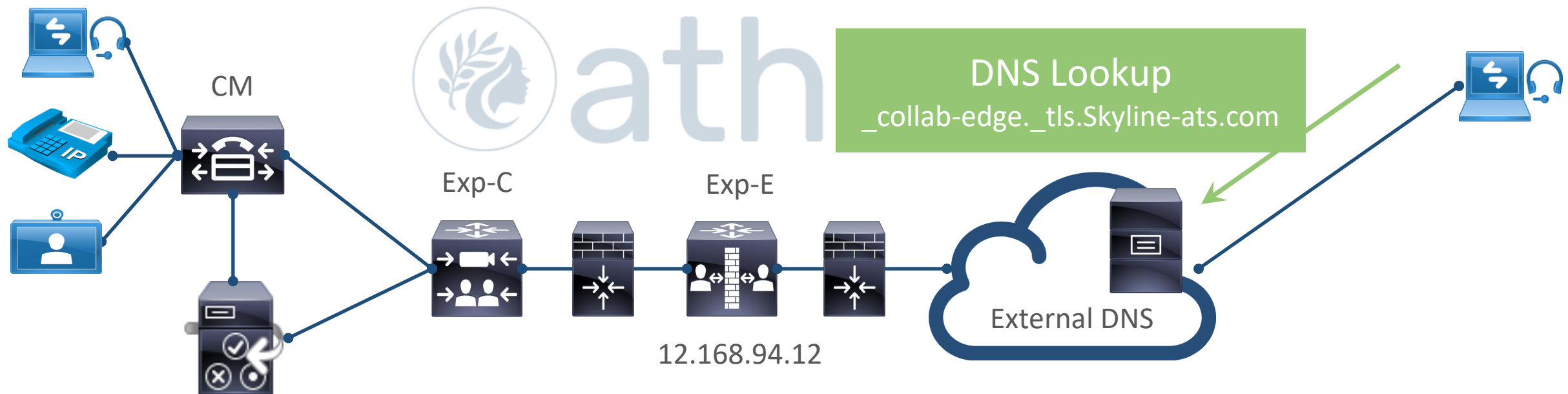
Service Discovery Flow



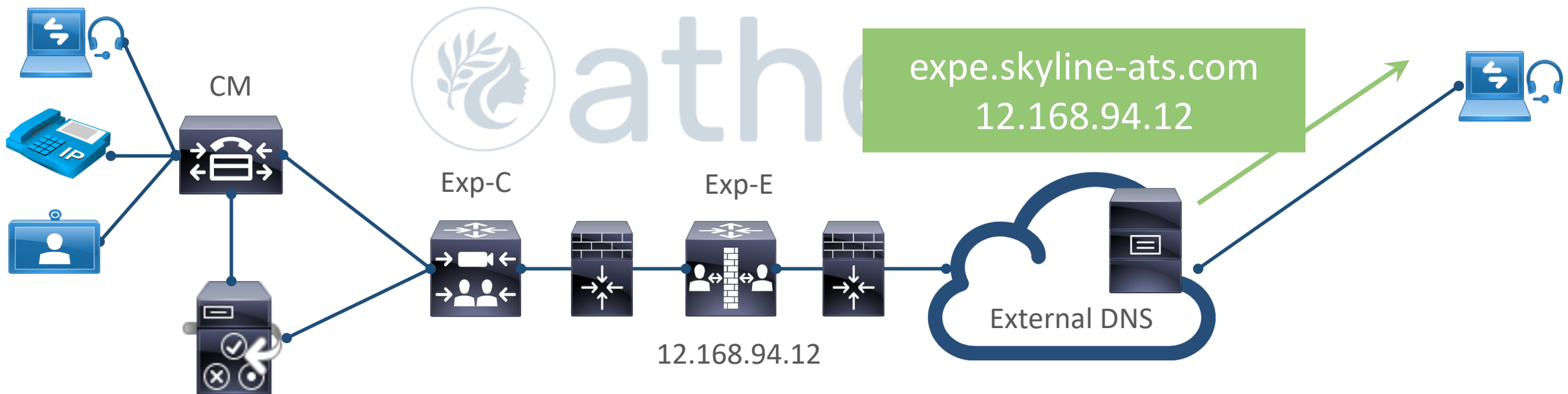
Service Discovery Flow (Cont.)



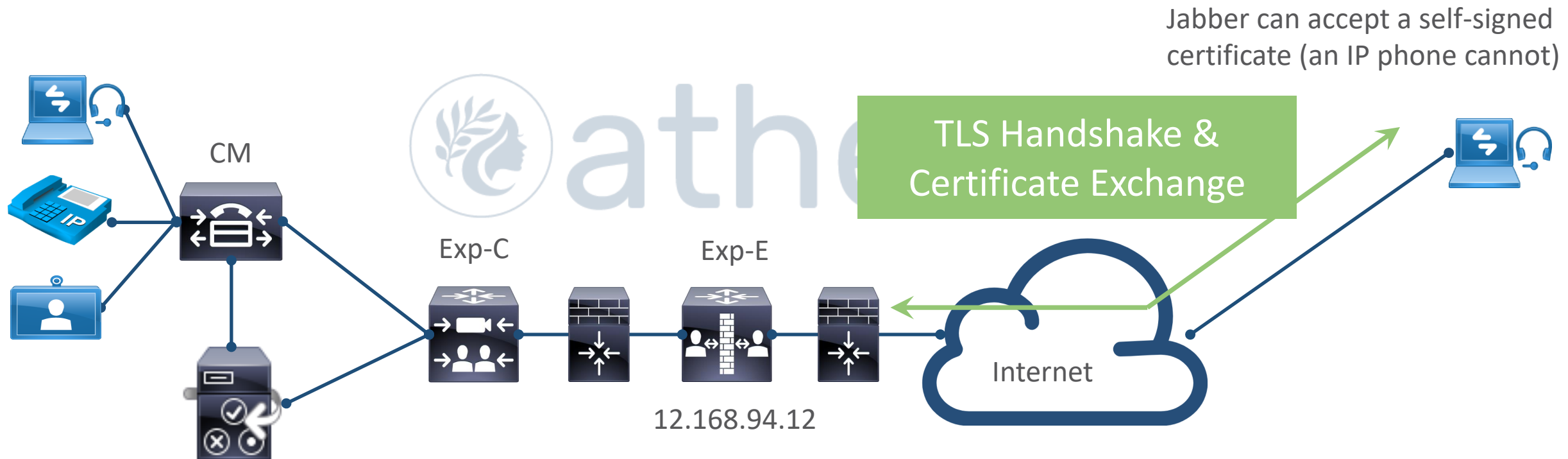
Service Discovery Flow (Cont.)



Service Discovery Flow (Cont.)

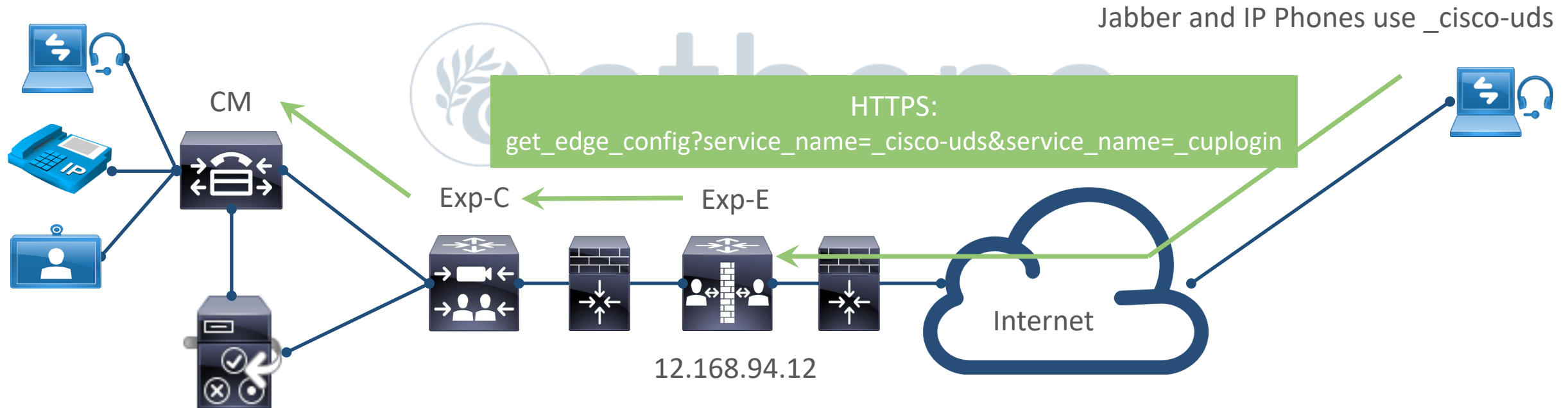


Service Discovery Flow (Cont.)

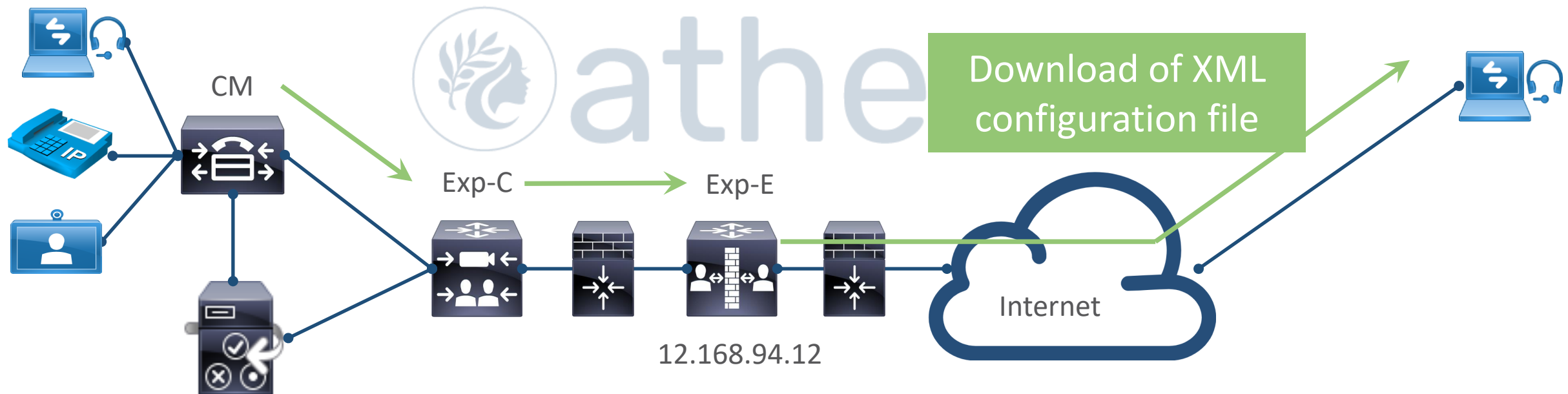


Jabber can accept a self-signed certificate (an IP phone cannot)

Service Discovery Flow (Cont.)



Service Discovery Flow (Cont.)



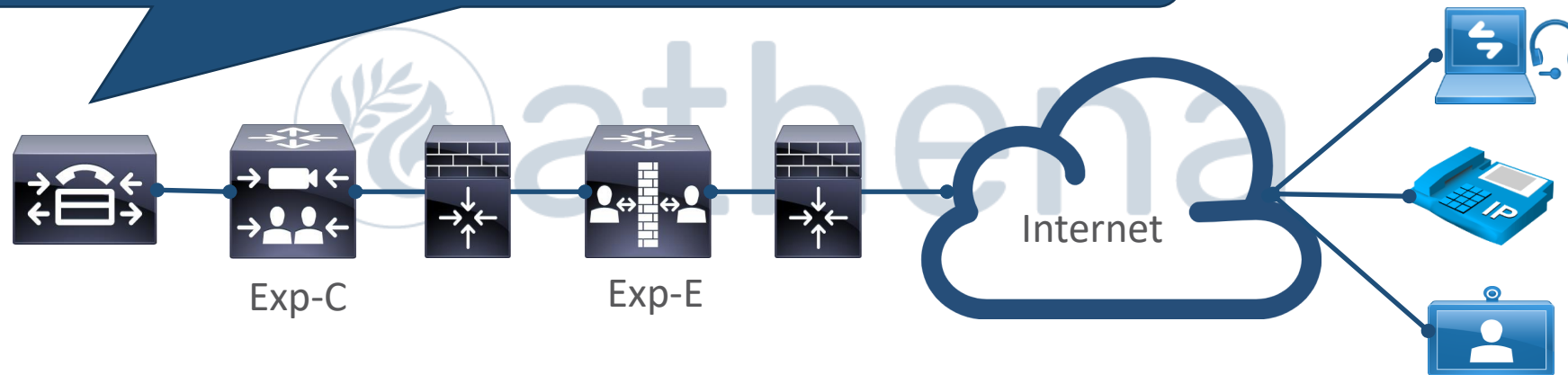
Deploying MRA



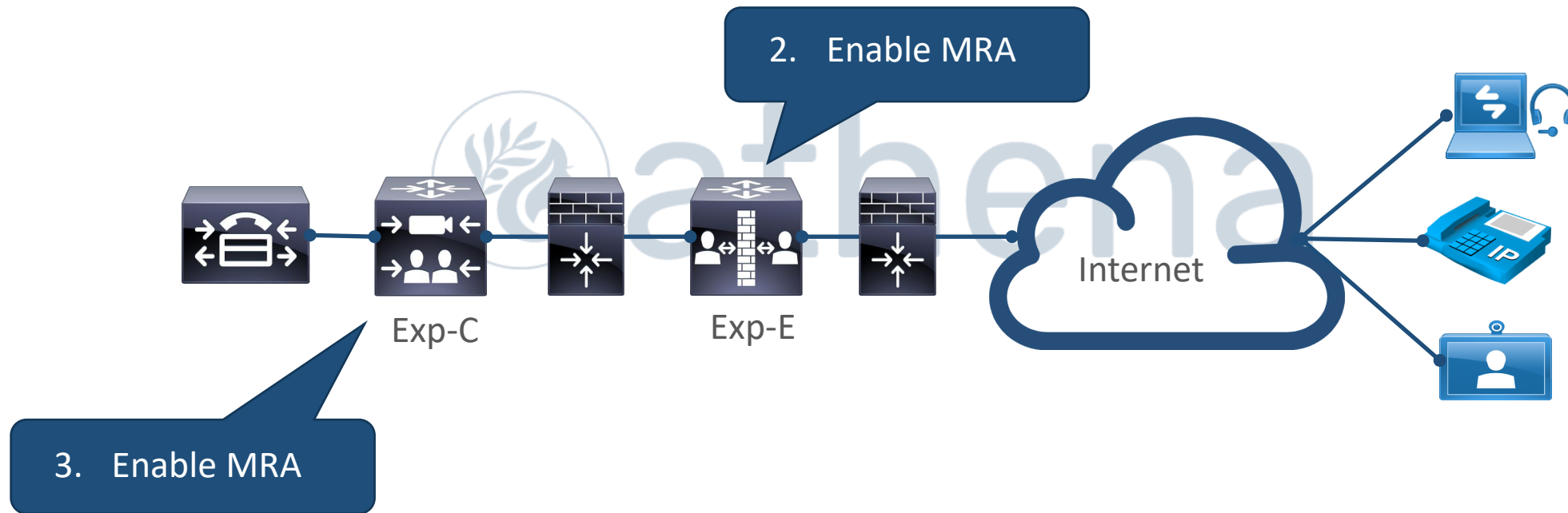
Steps to Deploy MRA



1. Configure IP Phones and Jabber.
No additional configuration for MRA vs. internal devices.



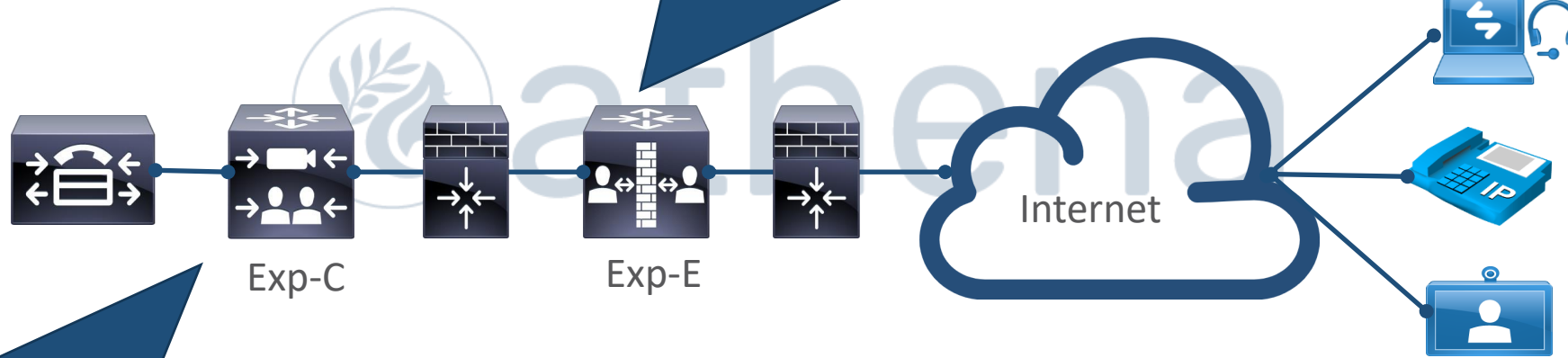
Steps to Deploy MRA (Cont.)



Steps to Deploy MRA (Cont.)



4. Create CSR
5. Submit to CA
6. Download signed Cert and CA Certs
7. Upload to Expressway

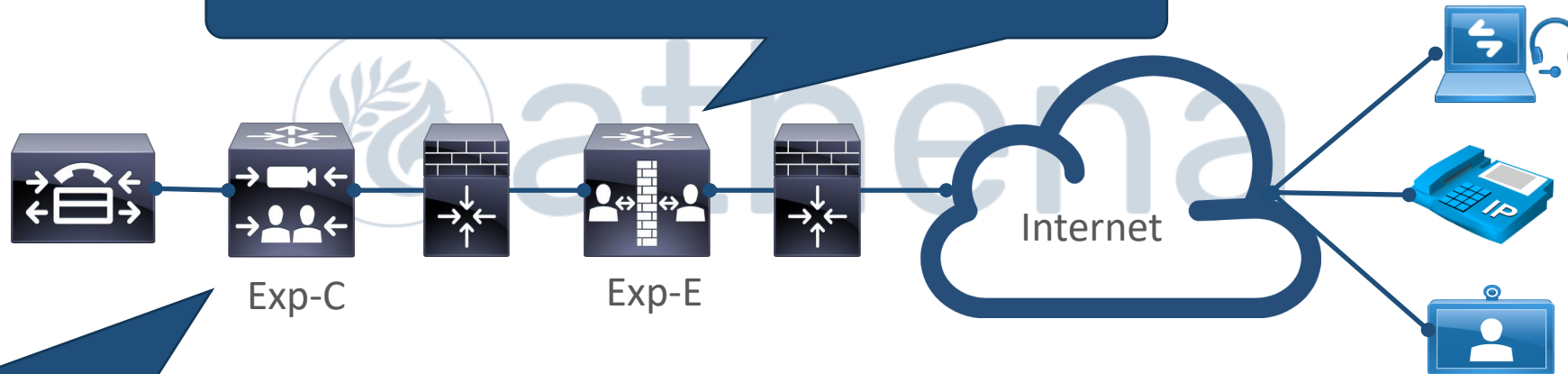


8. Create CSR
9. Submit to CA
10. Download signed Cert and CA Certs
11. Upload to Expressway

Steps to Deploy MRA (Cont.)

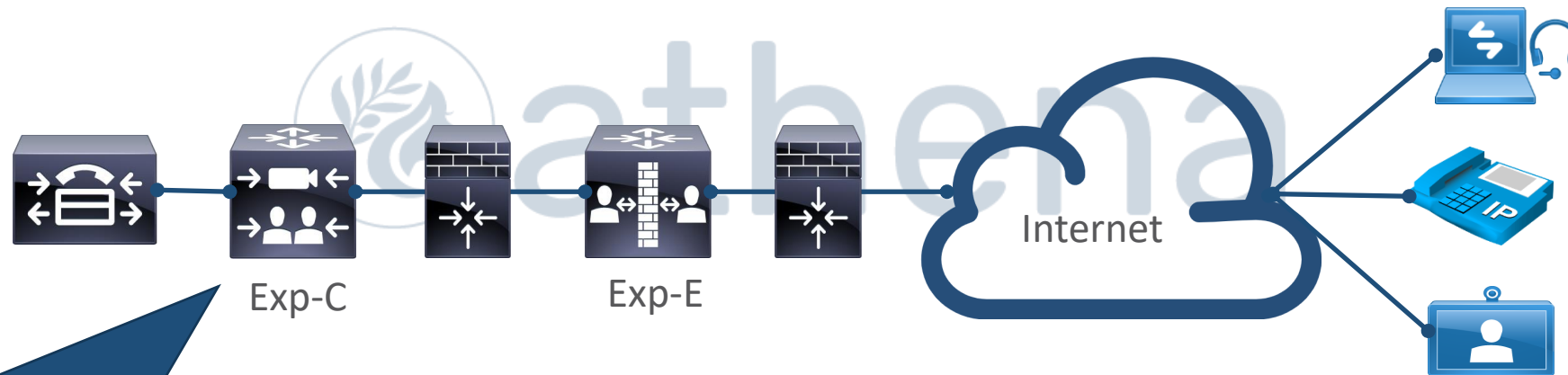


12. Create Unified Communications Traversal Zone



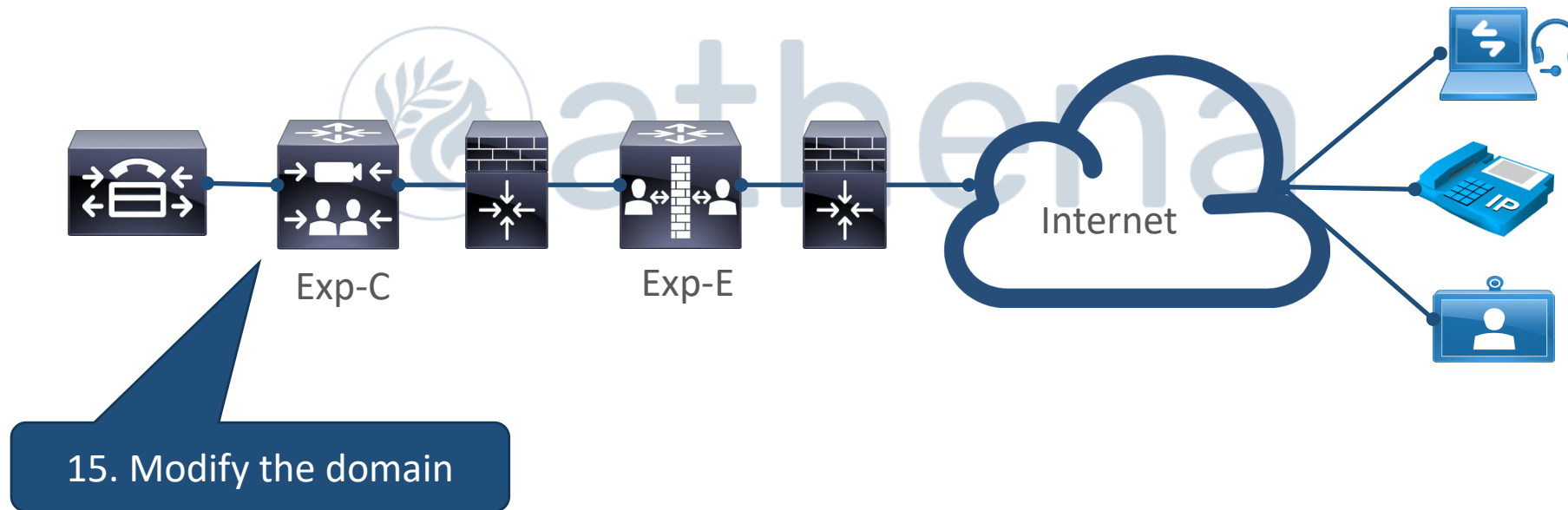
13. Create Unified Communications Traversal Zone

Steps to Deploy MRA (Cont.)

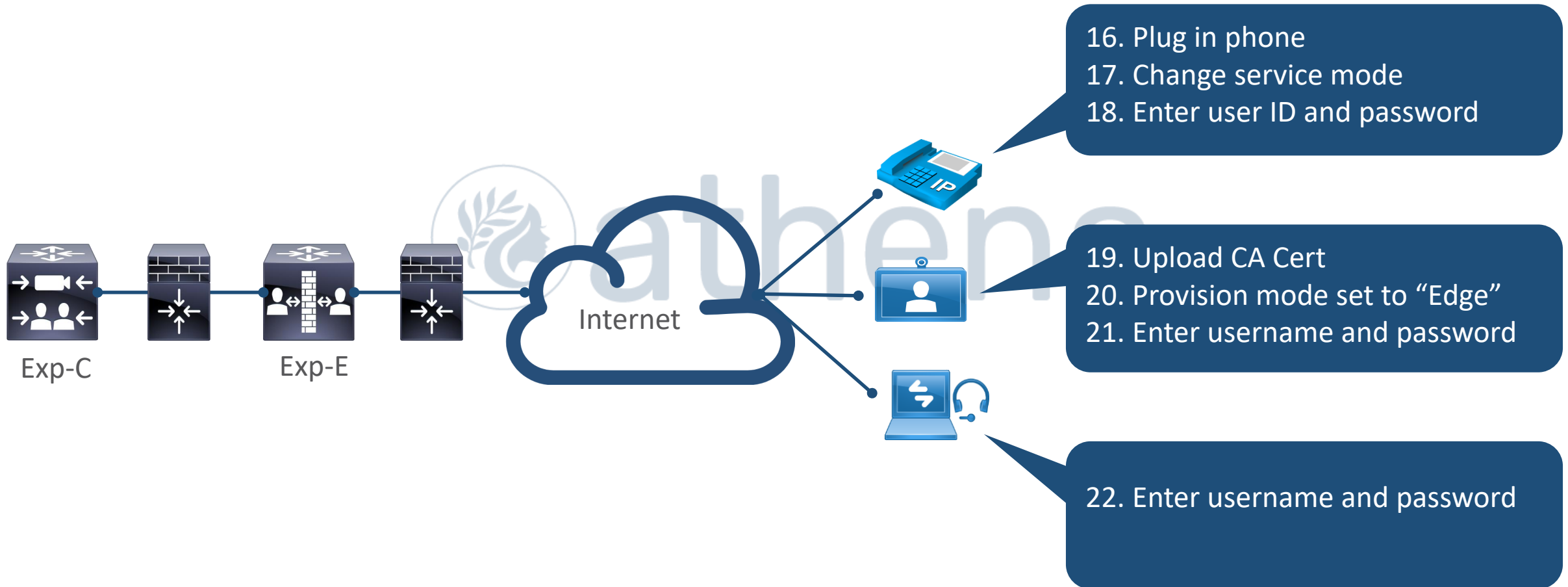


14. Add the Communications Managers and IM&P servers using discovery process

Steps to Deploy MRA (Cont.)



Steps to Deploy MRA (Cont.)



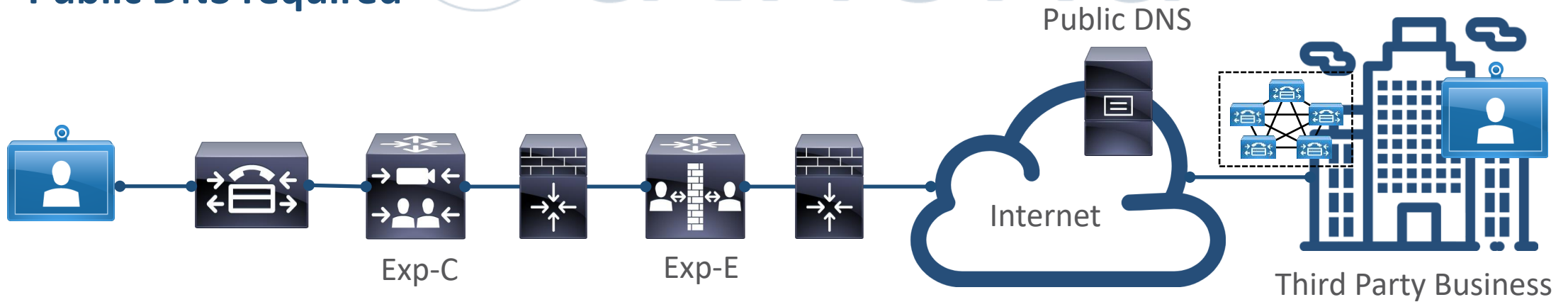
Business to Business (B2B) Communication



Business to Business (B2B) Calling



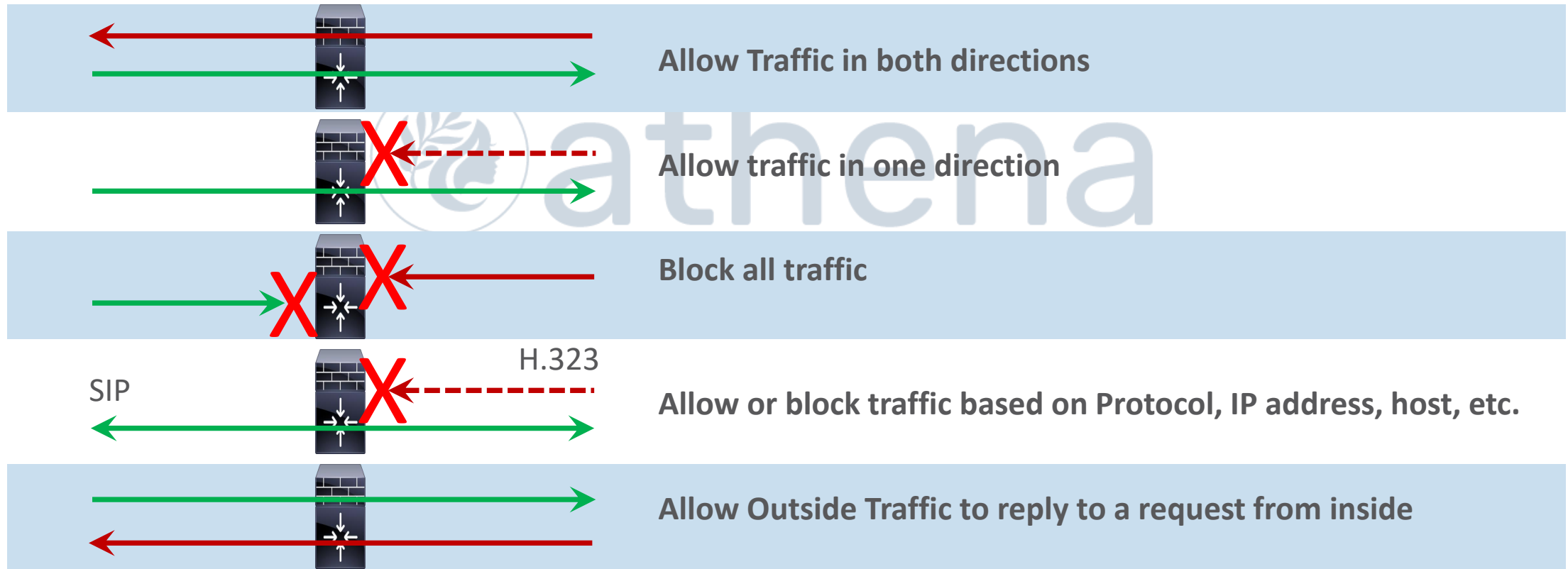
- Business to Business allows direct communication between two organizations
- Audio and video are supported
- Expressways allow single point of contact for all outside entities
- Only a small number of inbound ports need to be opened in the firewall
- Domain-based dial plan
- Public DNS required



Problems with B2B communications - Firewalls

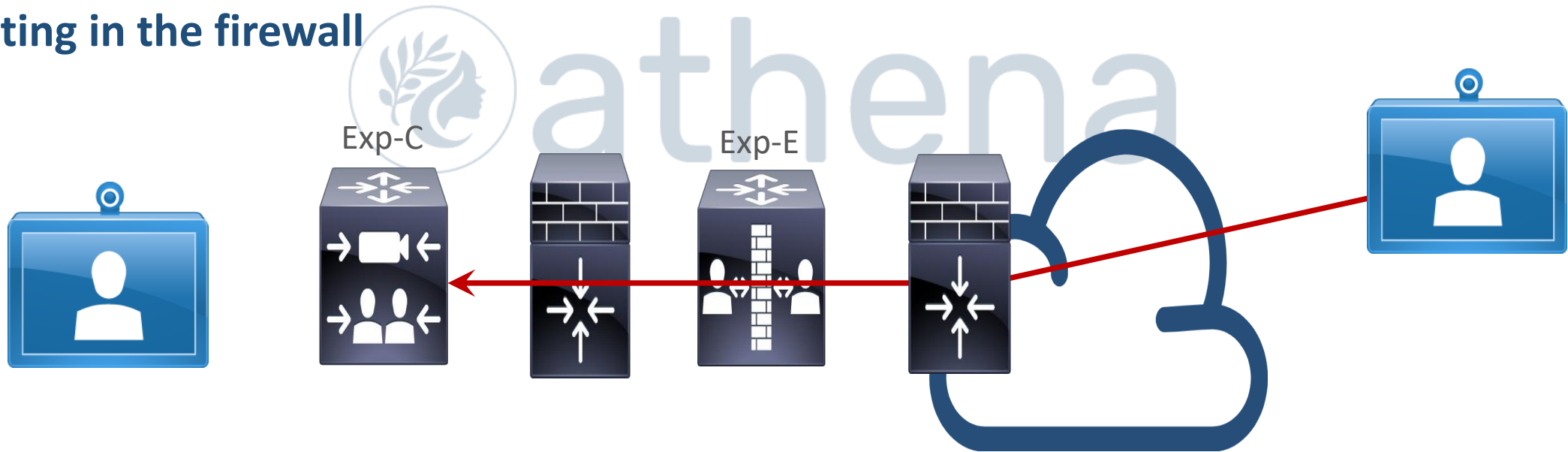


- Firewalls typically block all traffic not explicitly allowed

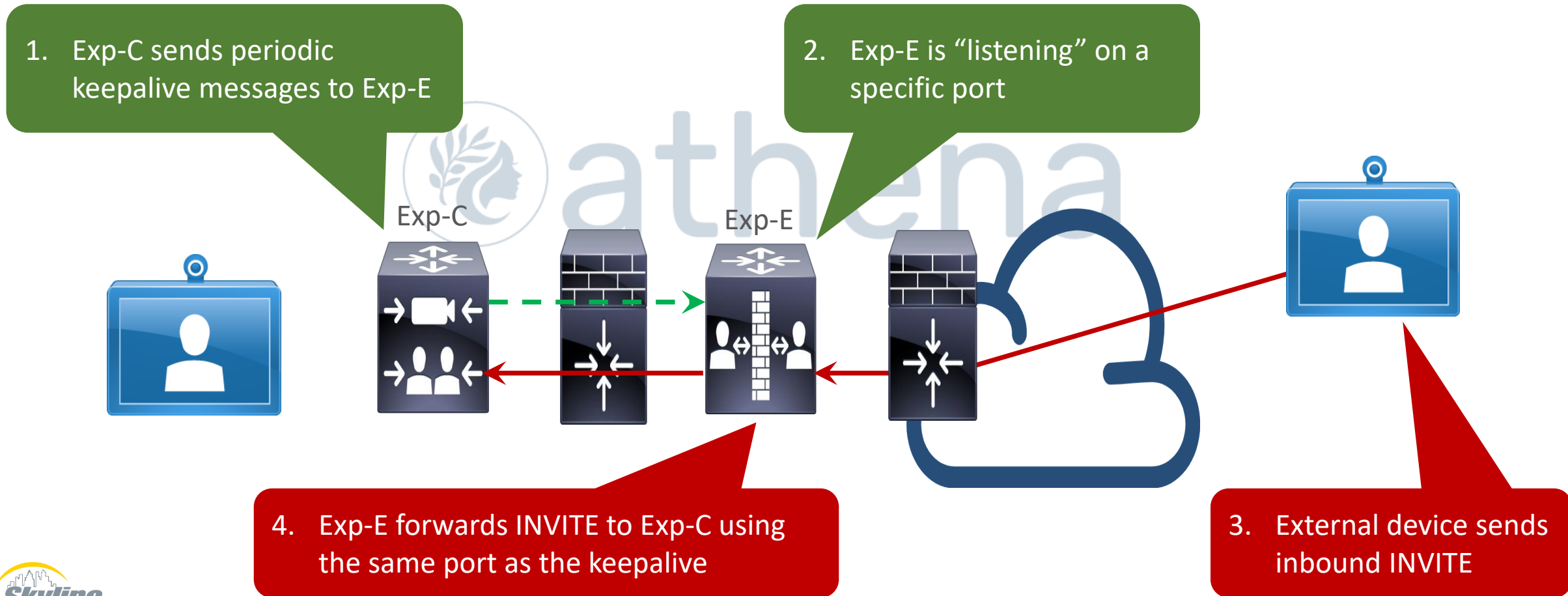


B2B Flow

- Expressways use protocols to open firewall ports
 - Assent for SIP
 - Assent or H.460 for H.323
- Uses the “Allow outside traffic to respond to a request from inside” setting in the firewall



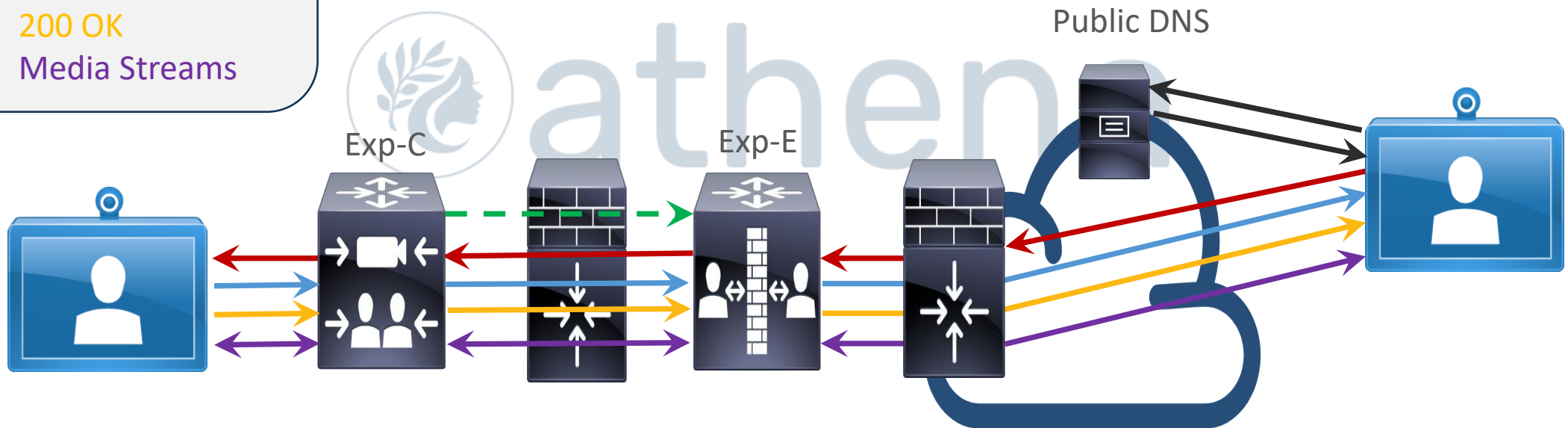
B2B Flow (Cont.)



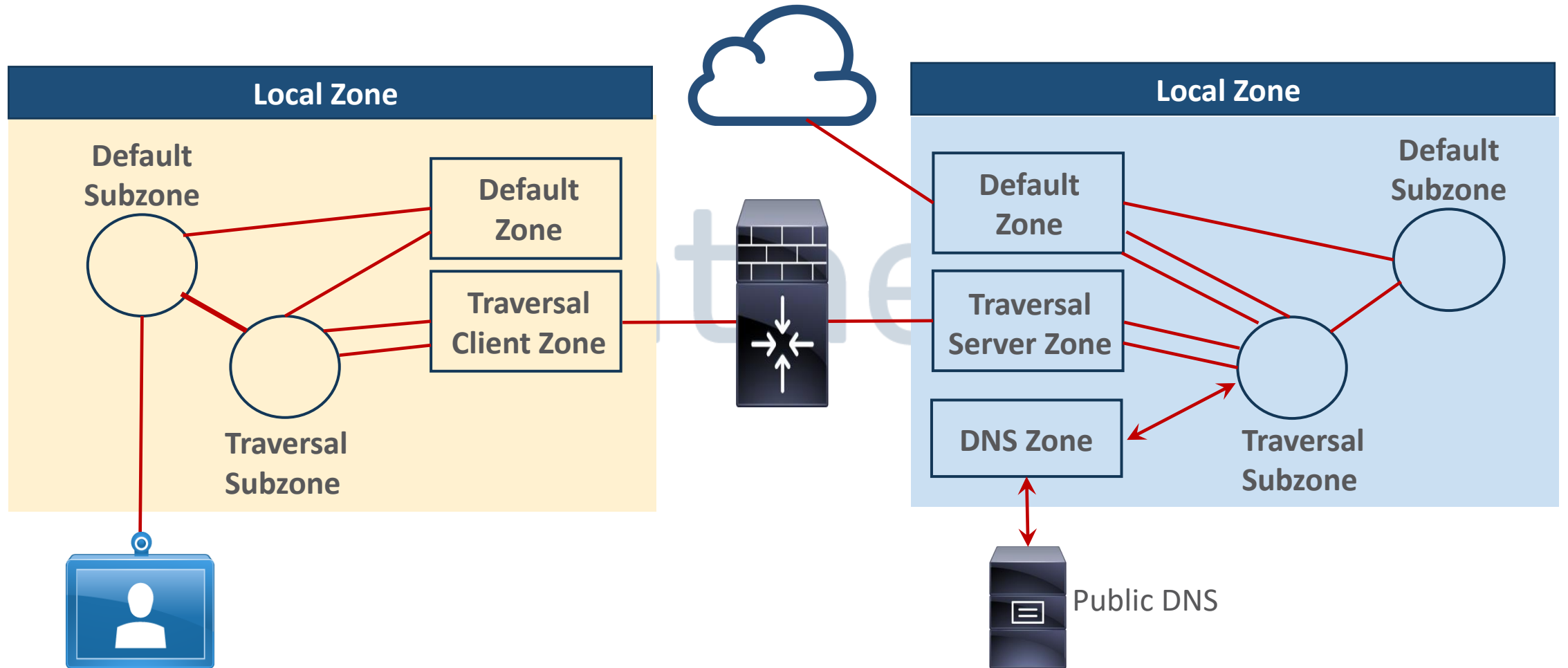
B2B Flow (Cont.)



1. Keepalive
2. DNS Lookup
3. Inbound INVITE
4. 180 Ringing
5. 200 OK
6. Media Streams



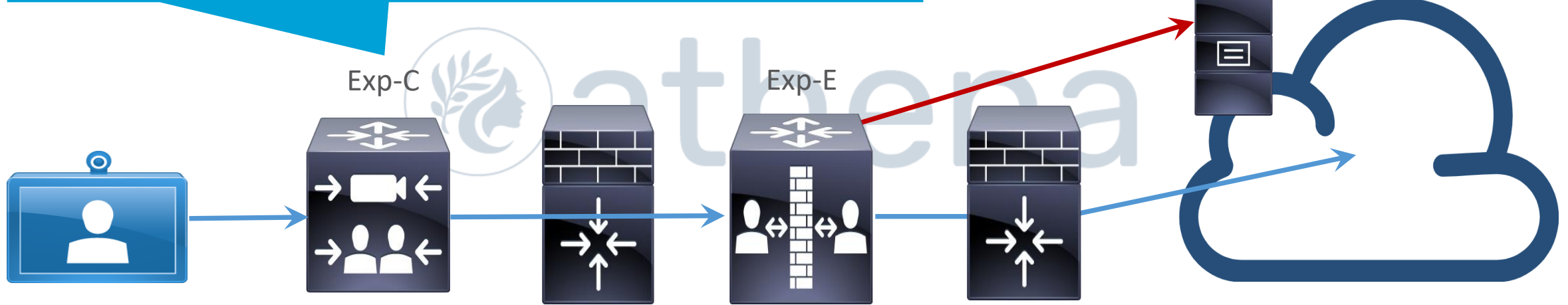
B2B Logic Flow



B2B Dial Plan - Outbound



Priority	Mode	Pattern Type	Pattern	Target
50	Any Alias	Any Alias	Any	Local Zone
100	Alias Pattern Match	Any Alias	Any	Traversal Client Zone

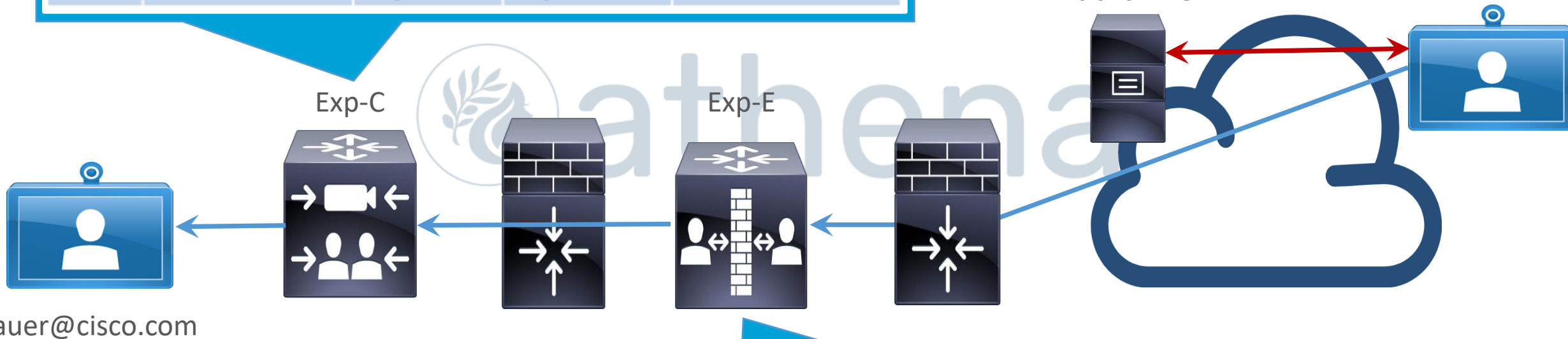


Priority	Mode	Pattern Type	Pattern	Target
100	Alias Pattern Match	Suffix	@cisco.com	Traversal Server Zone
200	Alias Pattern Match	Any Alias	Any	DNS Zone

B2B Dial Plan - Inbound



Priority	Mode	Pattern Type	Pattern	Target
50	Any Alias	Suffix	@cisco.com	Local Zone
100	Alias Pattern Match	Any Alias	Any	Traversal Client Zone



Priority	Mode	Pattern Type	Pattern	Target
100	Alias Pattern Match	Suffix	@cisco.com	Traversal Server Zone
200	Alias Pattern Match	Any Alias	Any	DNS Zone

Summary Points



- **Collaboration Edge includes Cisco Expressways and Cisco Unified Border Element**
- **Cisco UBE can provide multiple services**
 - Security
 - Address hiding
 - VoIP Gateway
- **Expressways support MRA and Business to Business calling**
- **MRA provides firewall traversal for CM and IMP**
- **B2B allows third-party access to your devices**
- **PKI certificates are critical for MRA and B2B functions**
- **B2B requires a dial plan in Exp-C and Exp-E**
- **MRA does not require a dial plan in the Expressways**
- **Jabber and Cisco IP Phones require Public DNS to connect**
- **Video devices can connect without DNS if manually configured (Not practical)**



athena



Questions



athenna





Thank You!



If you have any additional questions, or would like to learn more about our Athena program, please email...

pka@skyline-ats.com