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Hong Kong|2012



Presentation Title

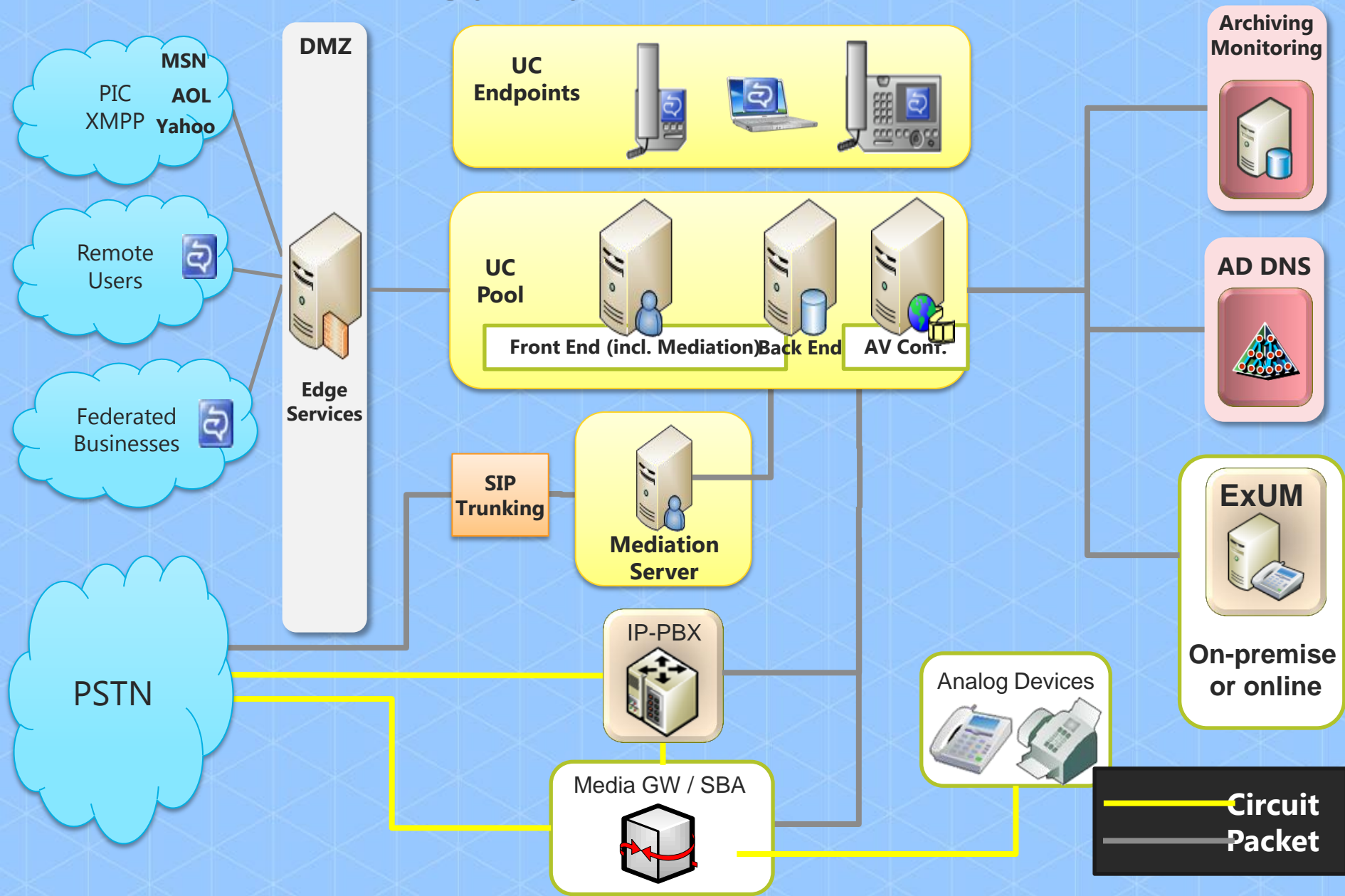
Speaker, Title
Microsoft Corporation



Agenda

- ▶ Review Lync 2010 voice topology
- ▶ Planning and overview of new voice features in Lync 2010
 - ▶ Call park
 - ▶ Unassigned number routing
 - ▶ E9-1-1
 - ▶ Private Line
 - ▶ Caller ID
 - ▶ Monitoring
 - ▶ Common Area Phones / Phone Infrastructure
 - ▶ Analog Devices / Phones
 - ▶ Trunk Translations
 - ▶ Mediation Server Consolidation / Multiple Gateways
 - ▶ Malicious Call Trace
 - ▶ Exchange UM
- ▶ Voice routing overview and planning considerations
- ▶ **Won't cover**
 - ▶ Resiliency
 - ▶ Call Admission Control
 - ▶ Media Bypass
 - ▶ Interop

Voice Topology: Lync 2010



Routing Overview and Planning

Voice Planning



Dial Plans

- Known as the *location profile* in OCS 2007 R2
- A set of normalization rules that translate dial strings to full, unique numbers (E.164) that are required by the routing and authorization applications of Lync
- Lync clients normalize dialed numbers before they are sent to the server
- Normalization rules are specified using regular expressions

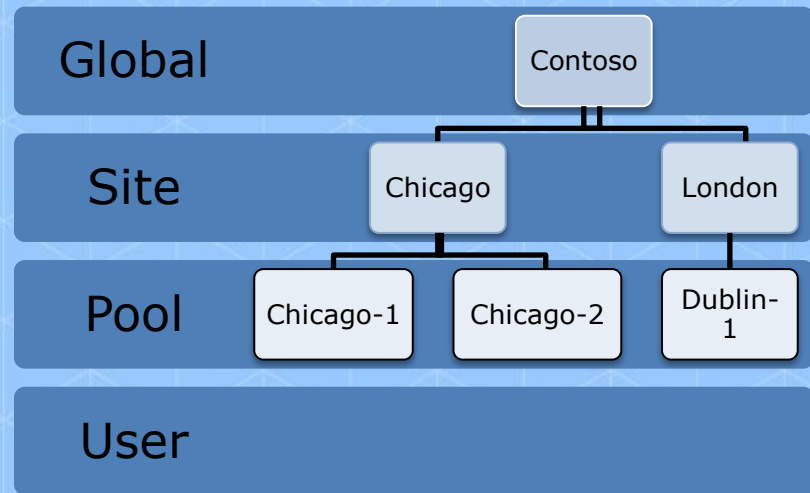
<code>^</code>	match the start	<code>\$</code>	match the end
<code>\d</code>	match any digit	<code>\d*</code>	0 or more digits
<code>\d{5}</code>	any 5 digits	<code>[135]</code>	1, 3, or 5
<code>(13) (17)</code>	13 or 17	<code>[1..5]</code>	1 through 5
<code>(...)</code>	"captures" the enclosed characters for referring to them in the result as \$1, \$2, \$3, etc.		

Planning for Dial Plans

- Identify all areas within the organization that have local dialing requirements
- Identify the valid number patterns for each
- Try to standardize on an organization wide scheme
- Determine the Dial Plan Scoping strategy
- Dial Plans are obtained by UC clients through the in-band provisioning process via the scope of the Dial Plan policy

Dial Plan Scope

- The most specific policy available will be applied
- User policy will be assigned or it will be set to <Automatic> to allow selection from Pool, Site, or Global policies
- Generally user based scopes are preferred even for survivable branches
 - Consistent operational practice
 - Users won't pick up different Dial Plans when roaming or the SBA goes offline
- Pool scopes are for PSTN gateways and Registrar's of a Pool
 - Mediation Server appends on INVITE of incoming calls from gateway for example



Voice Policies

- Control of user voice features
 - Call Forwarding
 - Delegation
 - Call Transfer
 - Call Park
 - Simul Ringing
 - Team Call
 - PSTN Rerouting
 - BW Policy Override
 - Malicious Call Tracing
- Associated to PSTN Usages – what calls are authorized

Edit Voice Policy - Global

OK Cancel

Scope: Global

Name:*

Global

Description:

Calling Features

- Enable call forwarding
- Enable delegation
- Enable call transfer
- Enable call park
- Enable simultaneous ringing of phones
- Enable team call
- Enable PSTN reroute
- Enable bandwidth policy override
- Enable malicious call tracing

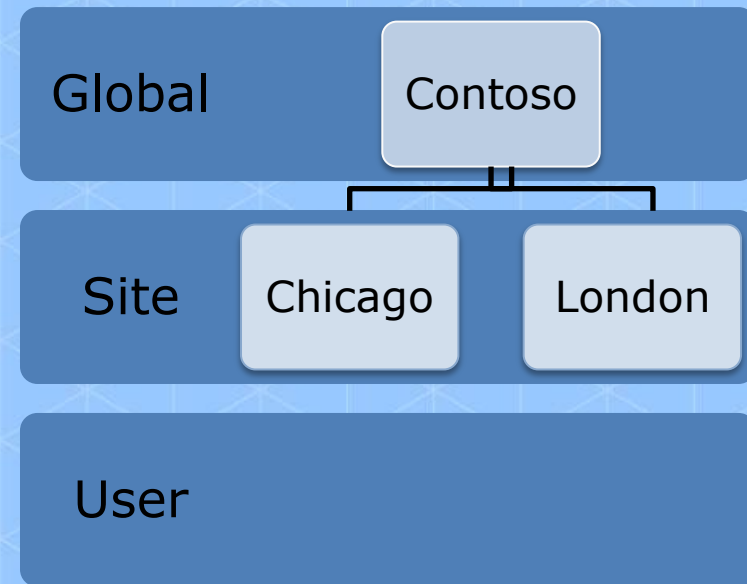
Associated PSTN Usages

New Select... Show details... Remove ↑ ↓

PSTN usage record	Associated routes
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Voice Policy Scope

- The most specific policy available will be applied
- Generally user based scopes are preferred even for survivable branches
 - Consistent operational practice
 - Users won't pick up different Voice Policies when roaming or the SBA goes offline
- The PSTN Usages provide the link between the user and outbound routes – at least one is required.
- The ordering of PSTN usages is important because outbound routing does usage matching from the top down.



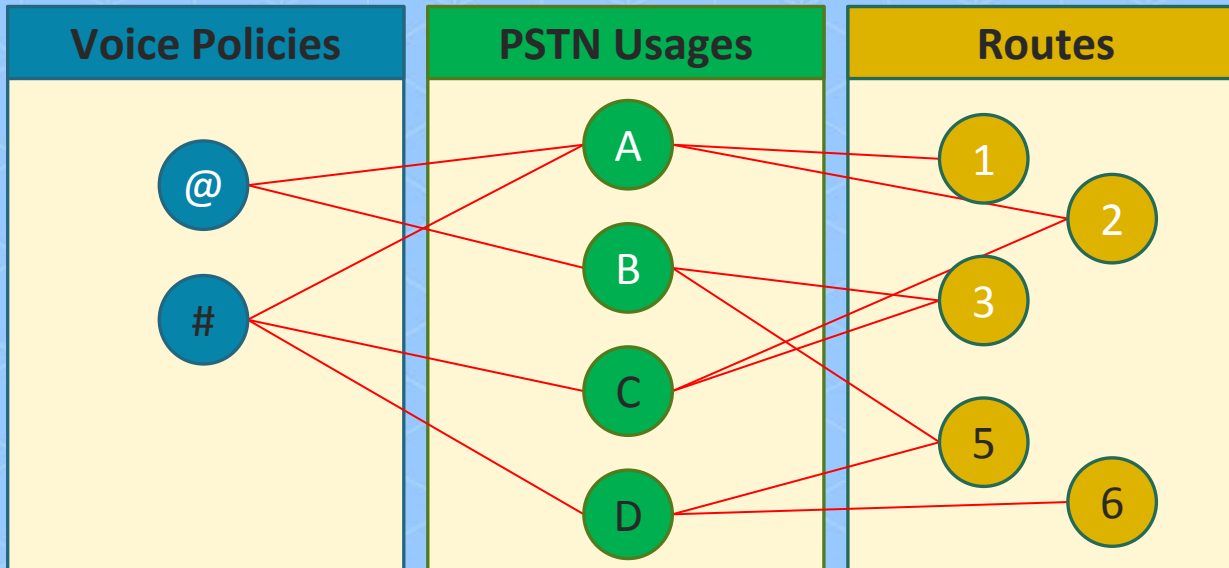
Planning for PSTN Usages

- PSTN Usages are just call permission descriptive labels
 - These are generally based on the PSTN cost
- Identify all call permissions that are required in the organization – create a PSTN Usage for each
- Should be contextual
 - Local in context such as Atlanta Local
 - Regional in context like US Long Distance
- The result should be that there are PSTN Usages defined that meet the dialing authorization needs of the organization
- Can establish priority of routes by ordering usages that can route the same called number

Planning Voice Routes

- Routes are needed to route the destination numbers listed in the Dial Plans
 - There should be no Dial Plan numbers that don't match users, orbits, unassigned numbers, or routes
 - Regular expressions are also used in Routes to specify the dialed number to match
- Each Route is required to have the FQDN of one or more gateways which support the route
 - Calls will be evenly distributed between multiple gateways in a given route
- Each Route gets assigned the PSTN Usage records that users must have in order to call the numbers served by the Route
 - US Long Distance
 - Route resiliency can be done with multiple Usage's
 - User's first Usage grants "Local Calling"
 - User's second Usage grants "Long Distance Calling" – can also reach local numbers
- Least Cost Routing is supported by associating numbers to specific gateways
 - Europe countries codes could egress from a single gateway for example

Call Authorization and Routing

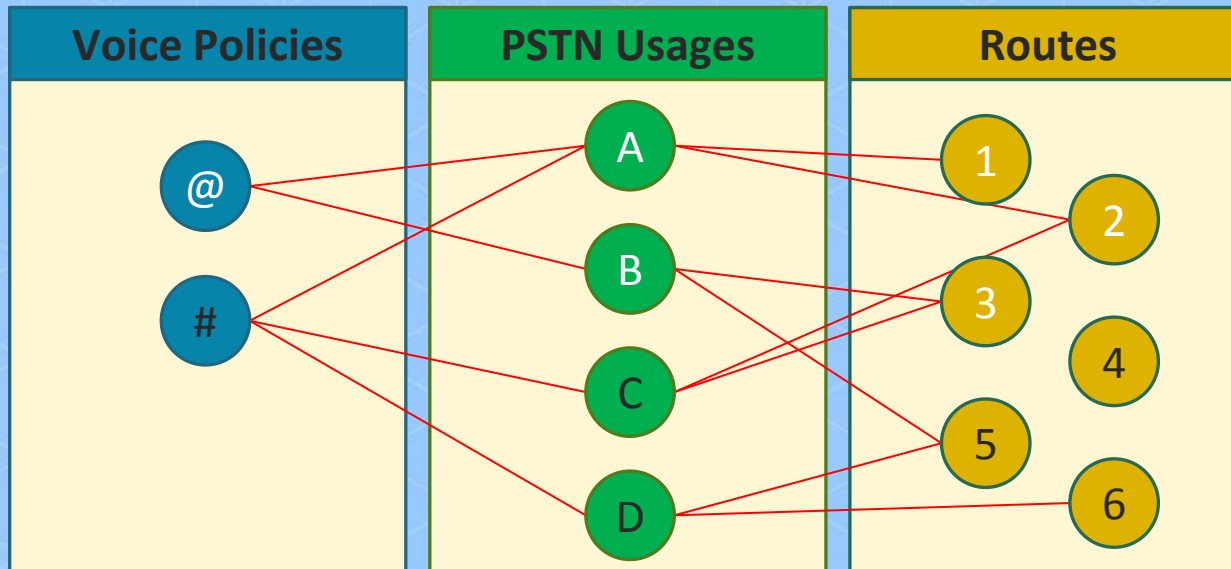


- Call authorization
- Voice feature set

- Purpose (usage, caller's intent)
- Priority

- Called number
- Cost of call

Call Authorization and Routing

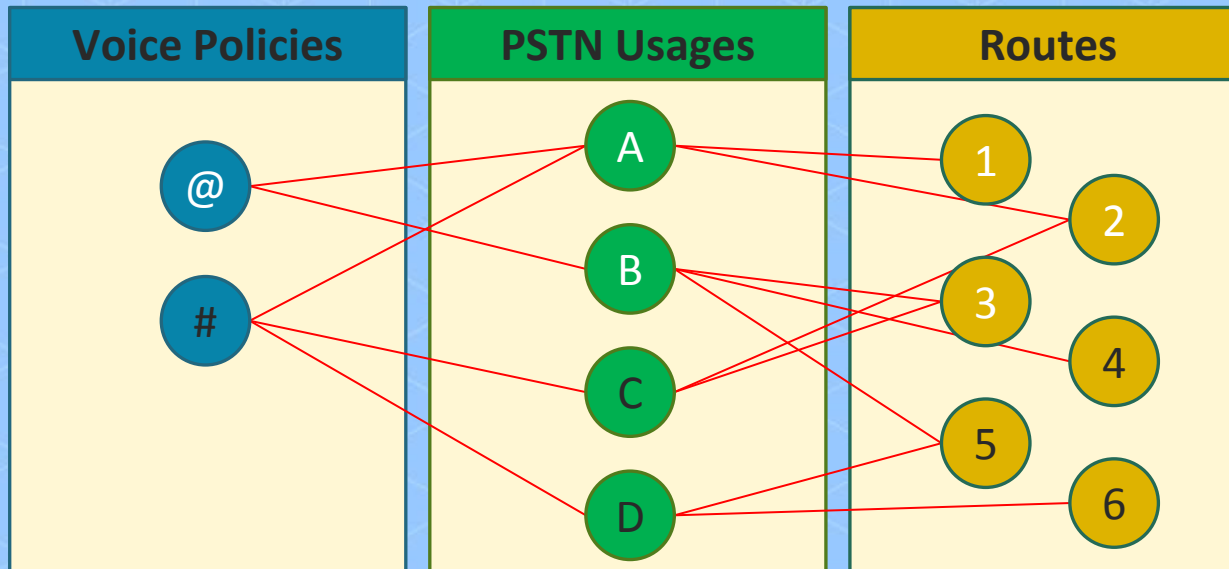


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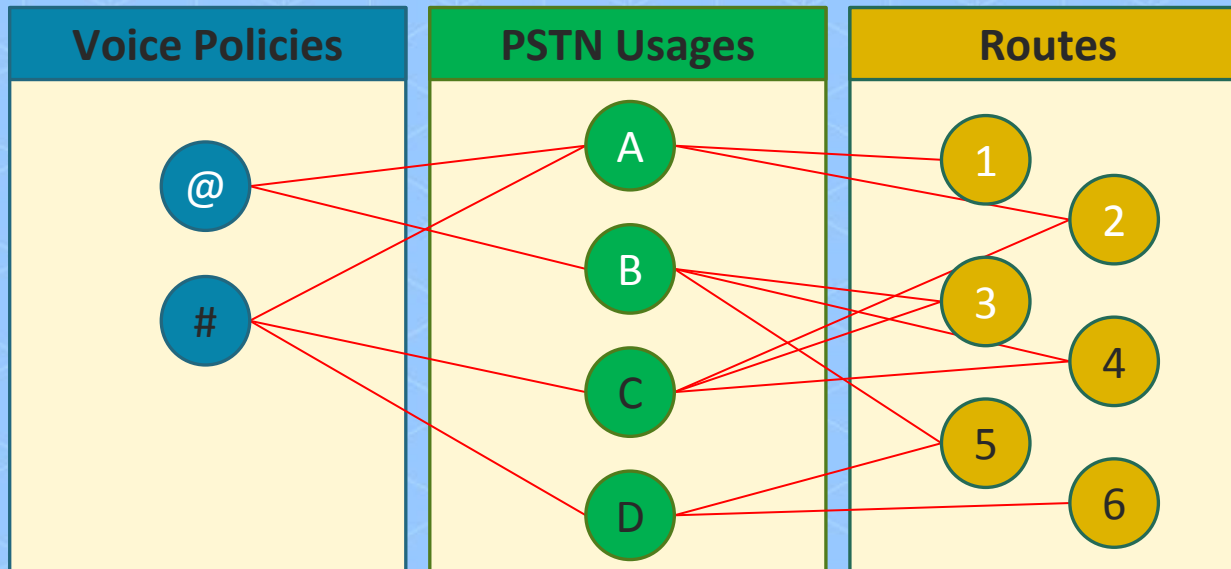


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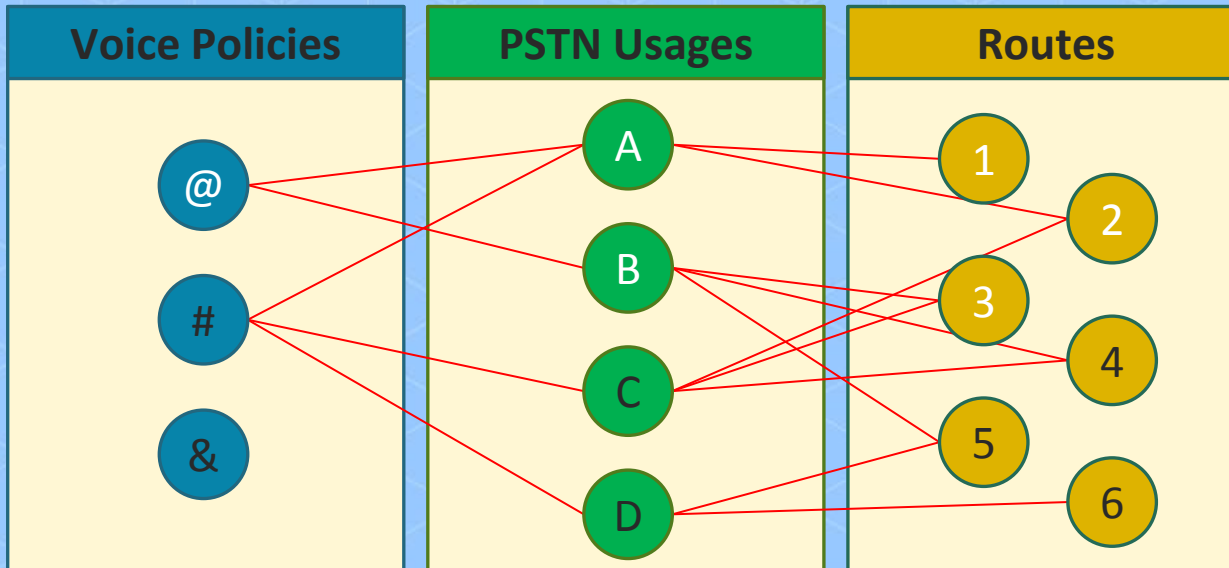


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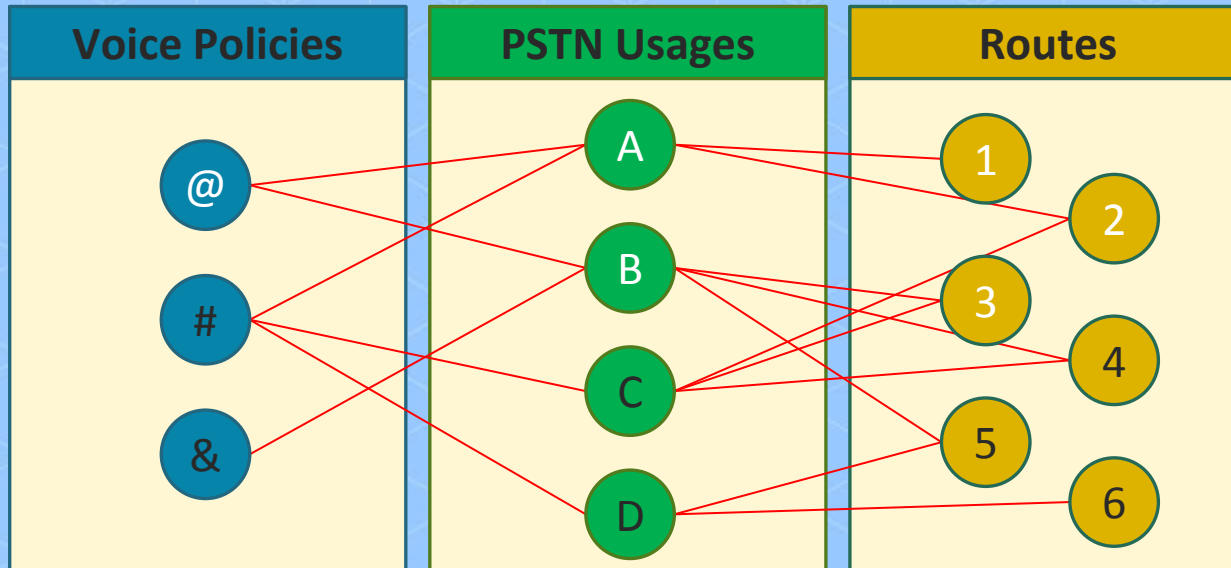


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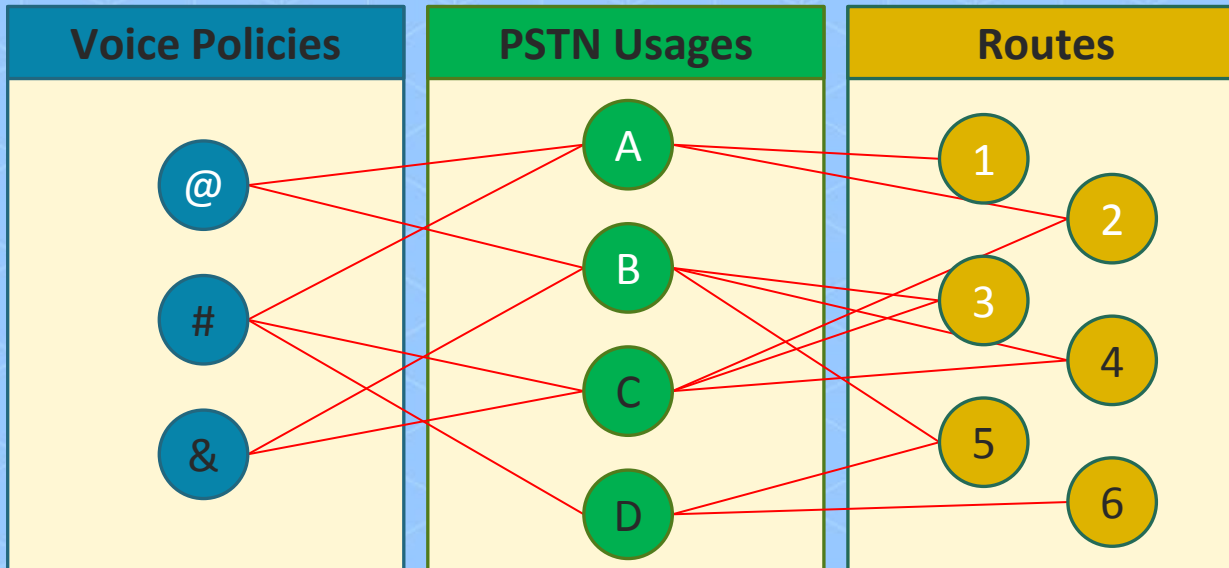


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Call Authorization and Routing



- Call authorization
- Voice feature set

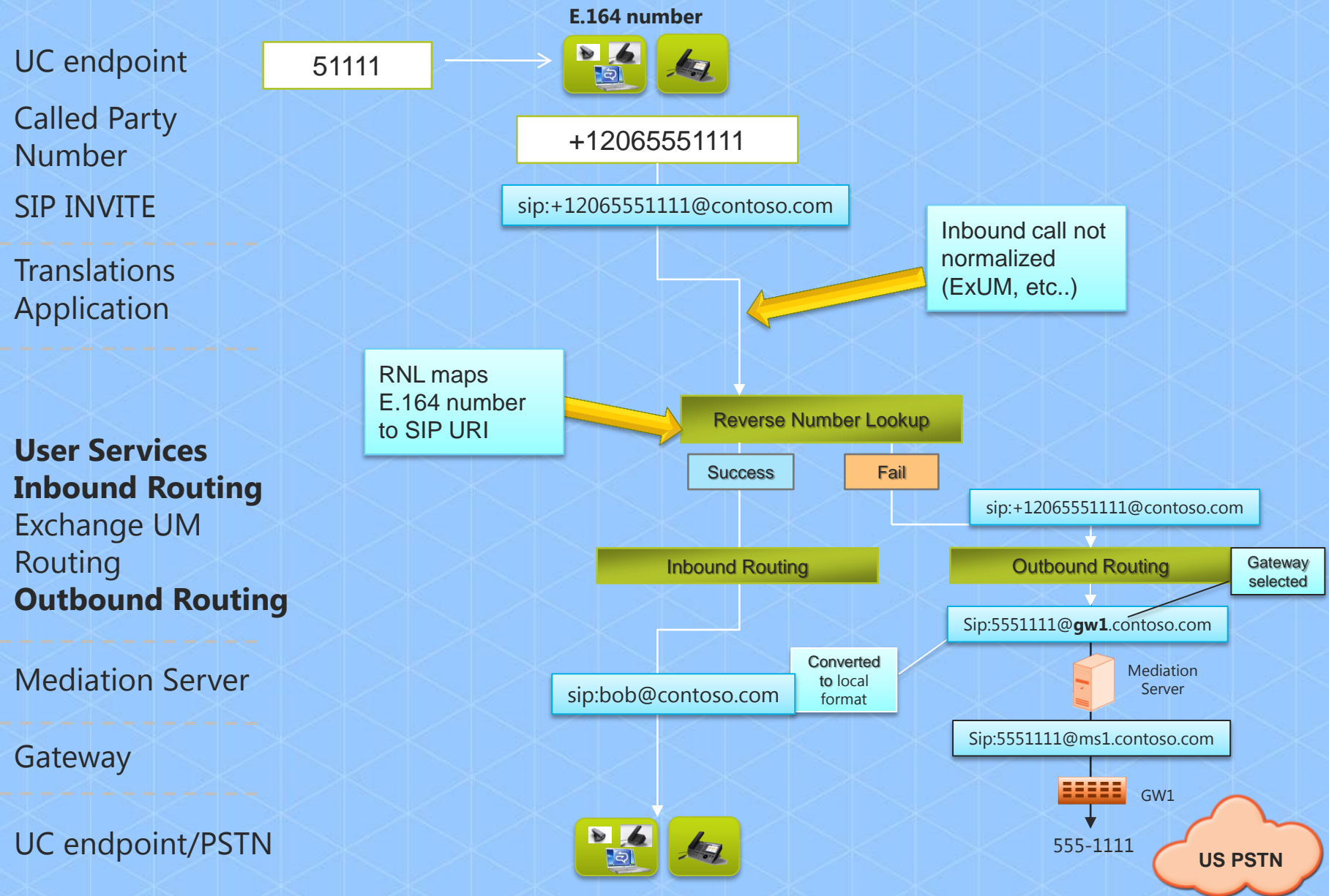
- Purpose (usage, caller's intent)
- Priority

- Called number
- Cost of call

High Level Outbound Routing Logic

1. Dialed number is normalized to an E.164 number
2. Reverse number / user lookup is done
 - If matched then route to the user's SIP URI
3. Check Call Park orbit and Unassigned Number ranges
 - If matched then route to appropriate service
4. Check user's first PSTN Usage and check each route that contains this Usage and matching destination number
 - If matched that route to Mediation server for the gateway
 - Perform appropriate trunk translations for the gateway
5. Iterate through user's additional Usage's
 - If no route match return a 403 (bad config)

Outbound UC Call – E.164 number



Advanced Voice Features

Lync Voice Updates



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Call Park

- Call Park allows an Enterprise Voice user to put a call on hold from one endpoint and then retrieve the call later by dialing an internal number
- Clients Supported
 - Clients that can Park Calls - Lync 2010, Lync 2010 Attendant, Lync 2010 Phone Edition
 - Clients that can retrieve calls – Above plus OCS 2007 R2 Clients, IP Common Area Phones, Non Lync endpoints (E.g. PBX Phones)
- Orbit Range
 - Call Park uses orbits (internal numbers not assigned to users) for parking calls
 - Orbits are scoped at the pool level by assigning the range to the Call Park Service running on the front ends
 - Have enough orbits so that any one orbit is not reused too quickly
 - Assigning DID numbers as orbit numbers is not supported
 - No need to define an orbit range for every pool but must disable call park service on pools that do not have ranges defined
- Comparison/Caveats
 - No parking in a known destination or at another extension
 - No pickup from any ringing extension

Unassigned Numbers - Announcements

- Handles numbers that are valid for your organization but not assigned to a user or phone
- Transfer these calls to a predetermined destination (phone number, SIP URI, or voice mail) or play an audio announcement or both
- Create and Manage an Unassigned Numbers List
 - For Example :
 - Unprovisioned Numbers
 - Decommissioned Numbers
 - Blocked Numbers

Location and Enhanced 911

- Lync now includes a Location Information Server (LIS) for clients to acquire locations
- Location used for Presence, Emergency Routing, or both
- Populating LIS database with (in order of preference):
 - Wireless Access Point (BSSID)
 - LLDP Port
 - LLDP Switch
 - Subnet
 - MAC
- Powershell manual or CSV (no Lync Control Panel Support) for configuring LIS
- Location Policy is needed for enabling E911 and routing
 - User
 - Subnet
- Emergency Calls are routed via SIP to Emergency Service Provider – includes the location
- Include Security Desk IM alter and conference
- Requires obtaining routing service from a provider
- Can be used for location based emergency routing outside of United States

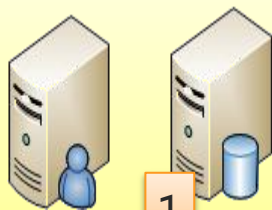
Enhanced 911

Location Determination

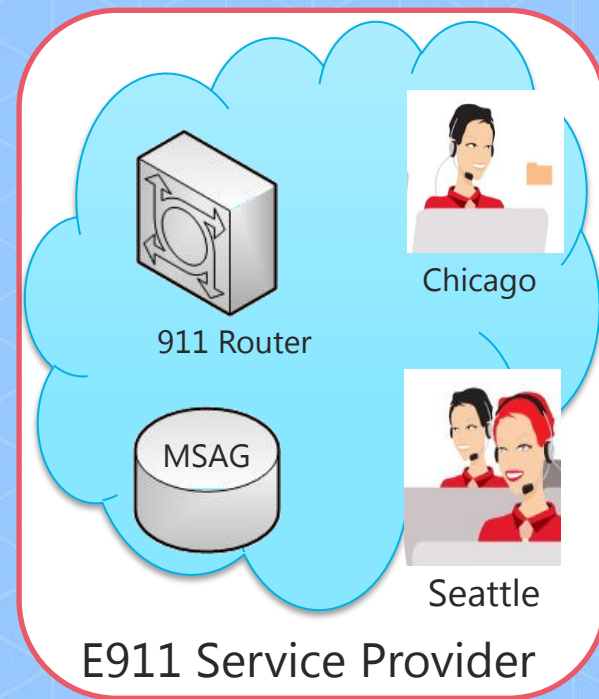
Customer Site

Switch:
157.56.64.2
Port: 6/29
3910 163rd Ave
NE #3222
Redmond WA
98052

425-706-1442
0016E3A558CA
172.24.33.132

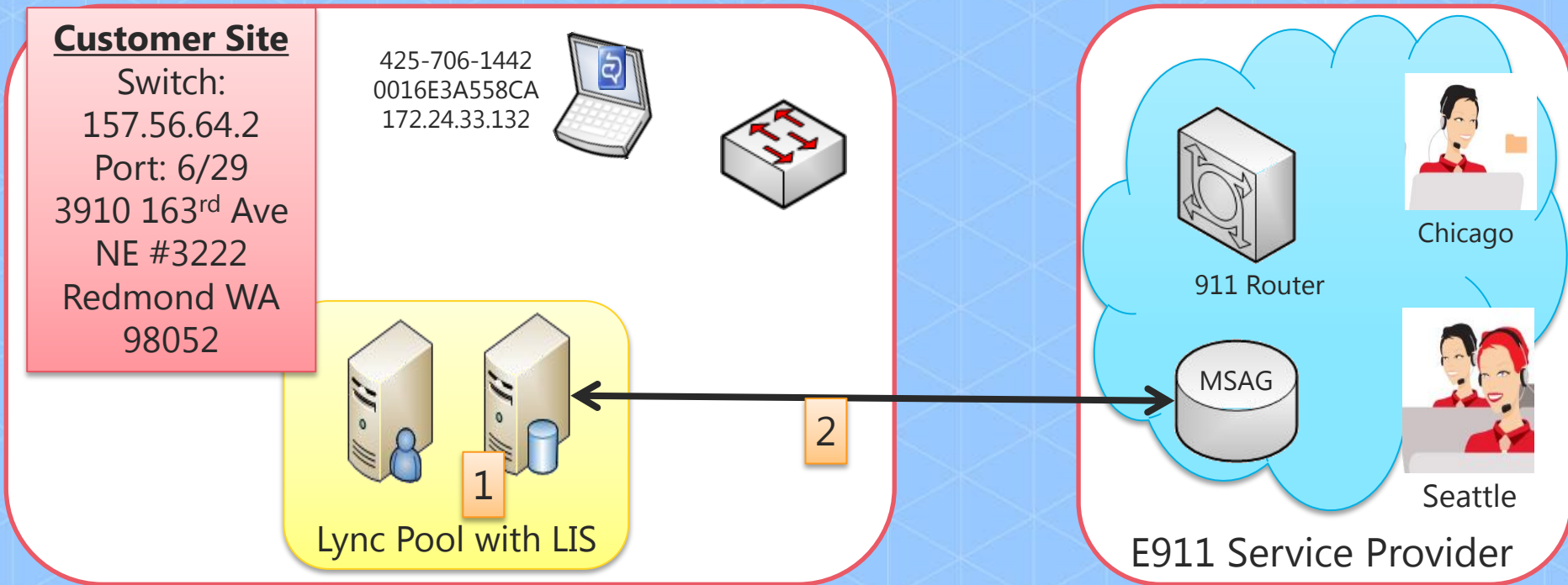


1
Lync Pool with LIS



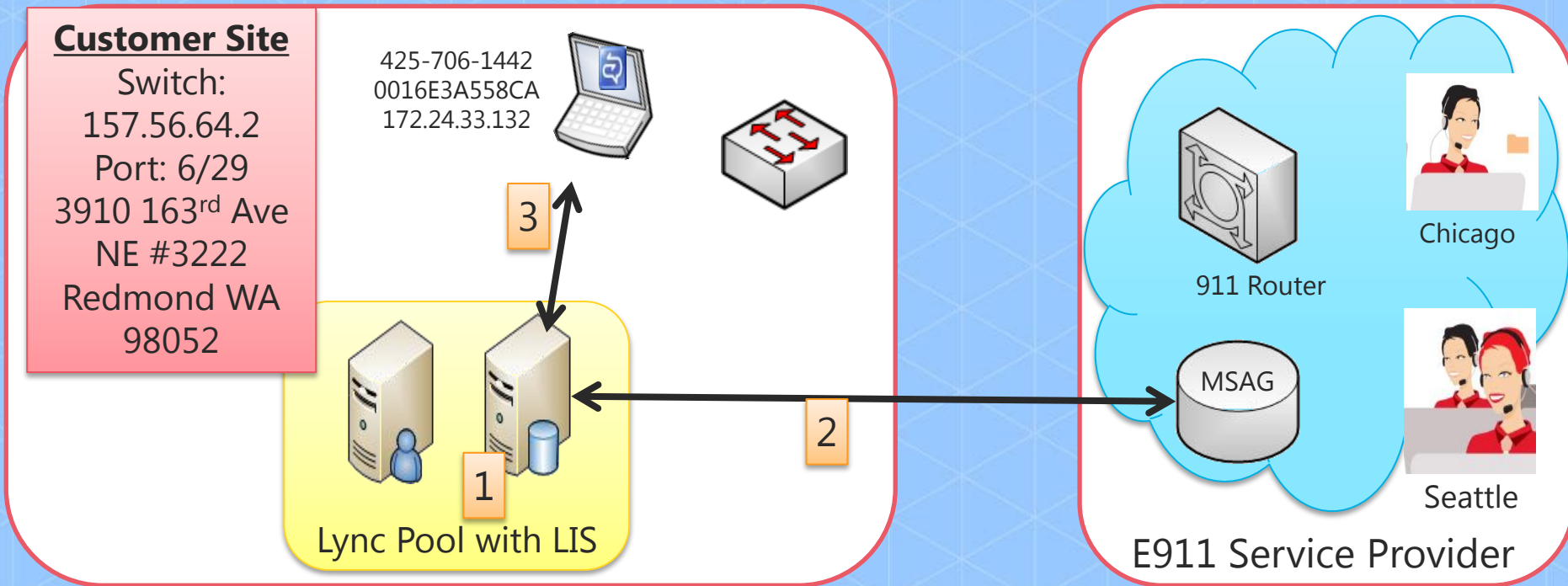
1 – Map of network elements and locations created in Location Information Server (LIS)

Enhanced 911 Location Determination



- 1 – Map of network elements and locations created in Location Information Server (LIS)
- 2 – LIS addresses validated with Master Street Address Guide

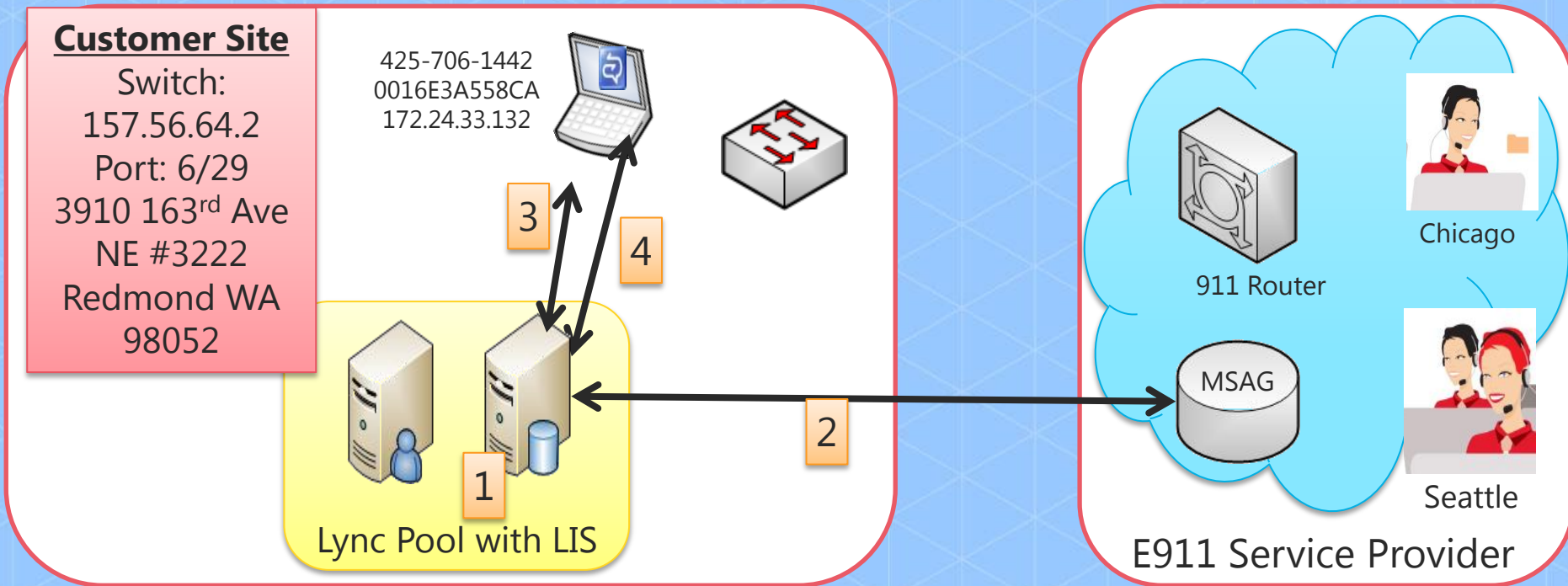
Enhanced 911 Location Determination



- 1 – Map of network elements and locations created in Location Information Server (LIS)
- 2 – LIS addresses validated with Master Street Address Guide
- 3 – Premise connected client acquires LIS URI, emergency dial strings, and configuration setting, and sends Location Request with IP / MAC / BSSID address to LIS upon registrations or network change

Enhanced 911

Location Determination



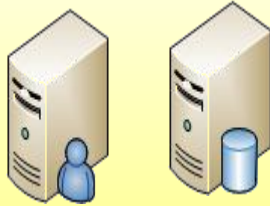
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- 4 – LIS returns civic address to client based on network address lookup in database

Enhanced 911 Call Routing

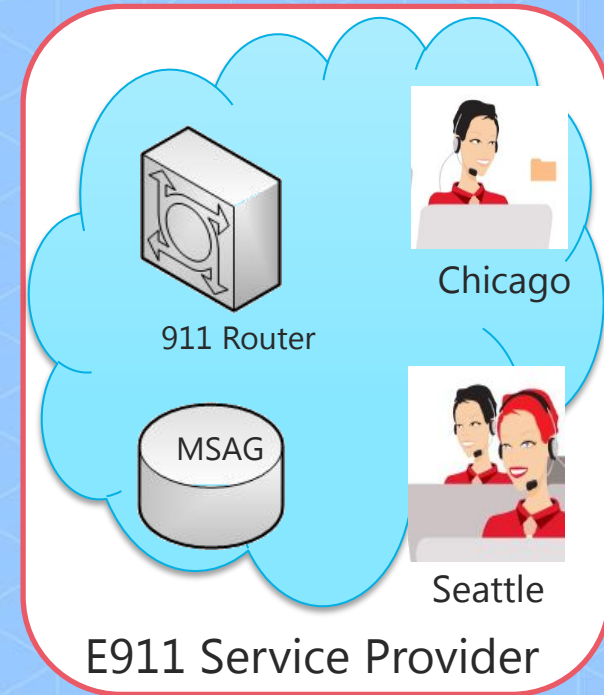
Customer Site

Switch:
157.56.64.2
Port: 6/29
3910 163rd Ave
NE #3222
Redmond WA
98052

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Lync Pool with LIS

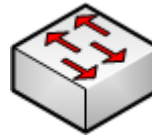


Enhanced 911 Call Routing

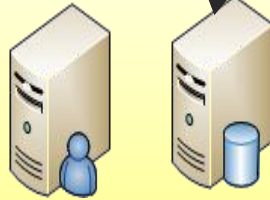
Customer Site

Switch:
157.56.64.2
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3910 163rd Ave
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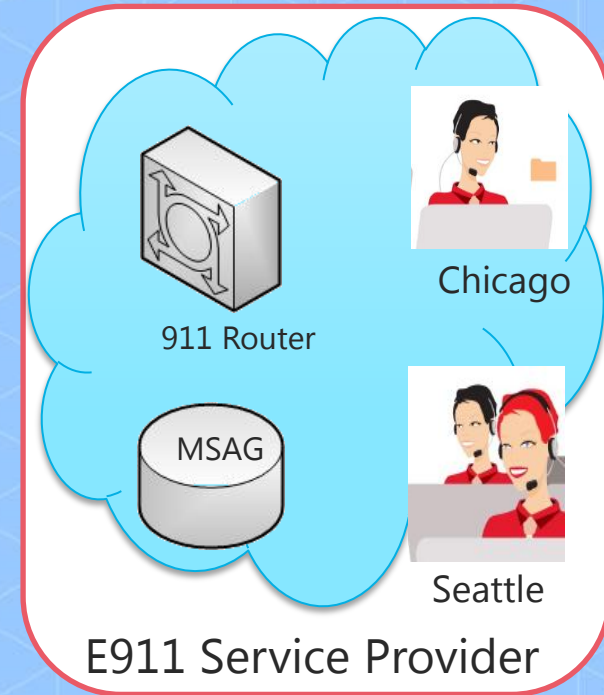
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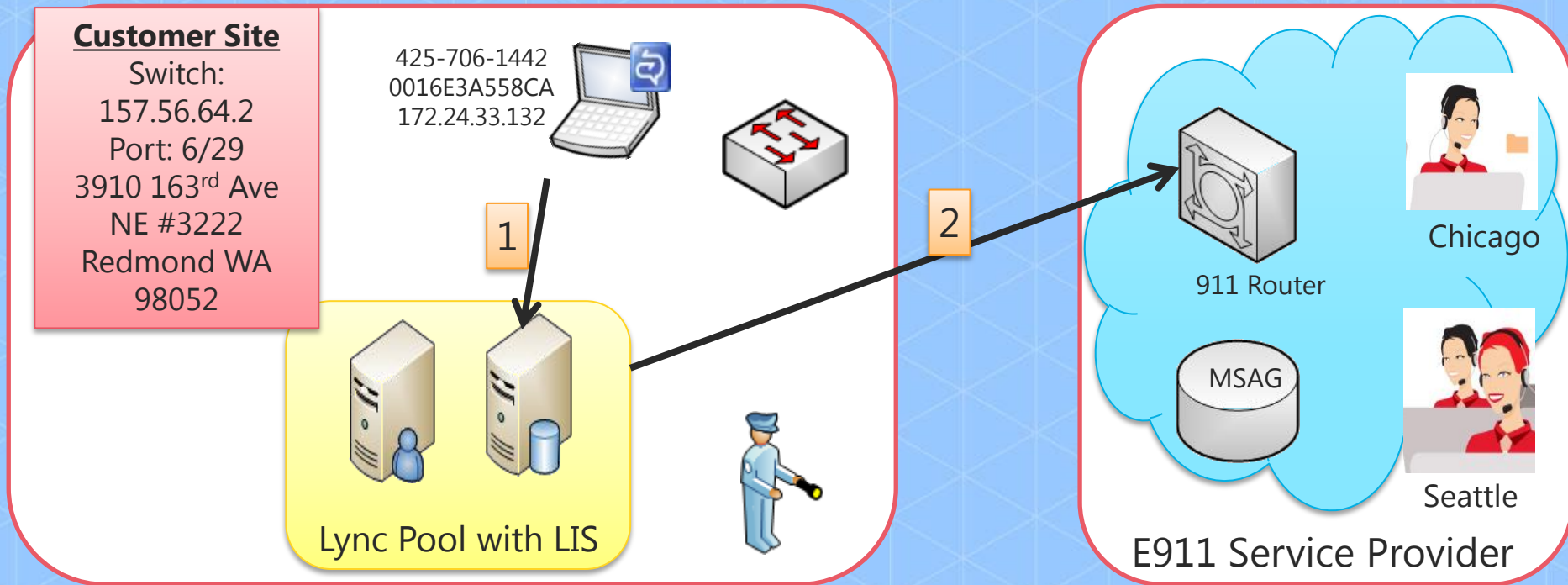


Lync Pool with LIS



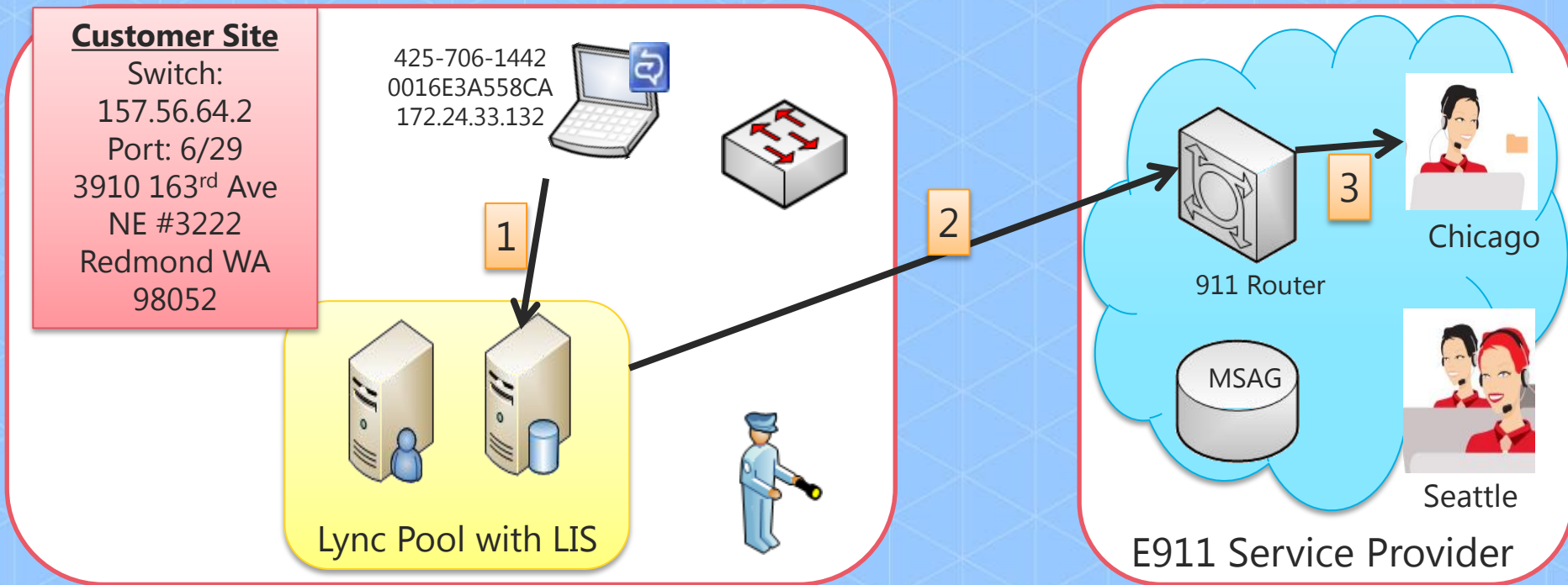
1 – Client initiates 911 call and includes location and E.164 number in SIP Invite

Enhanced 911 Call Routing



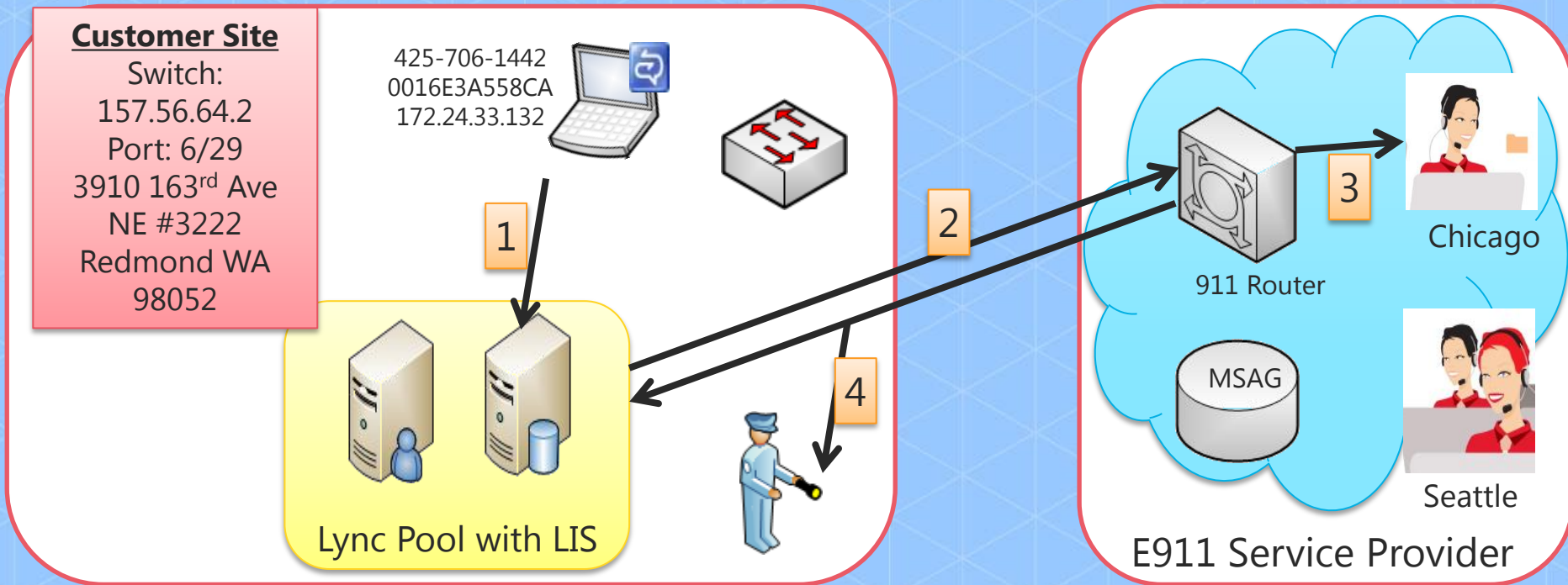
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- 2 – Lync matches 911 number pattern and routes to SIP trunk connecting to E-911 Service Provider

Enhanced 911 Call Routing



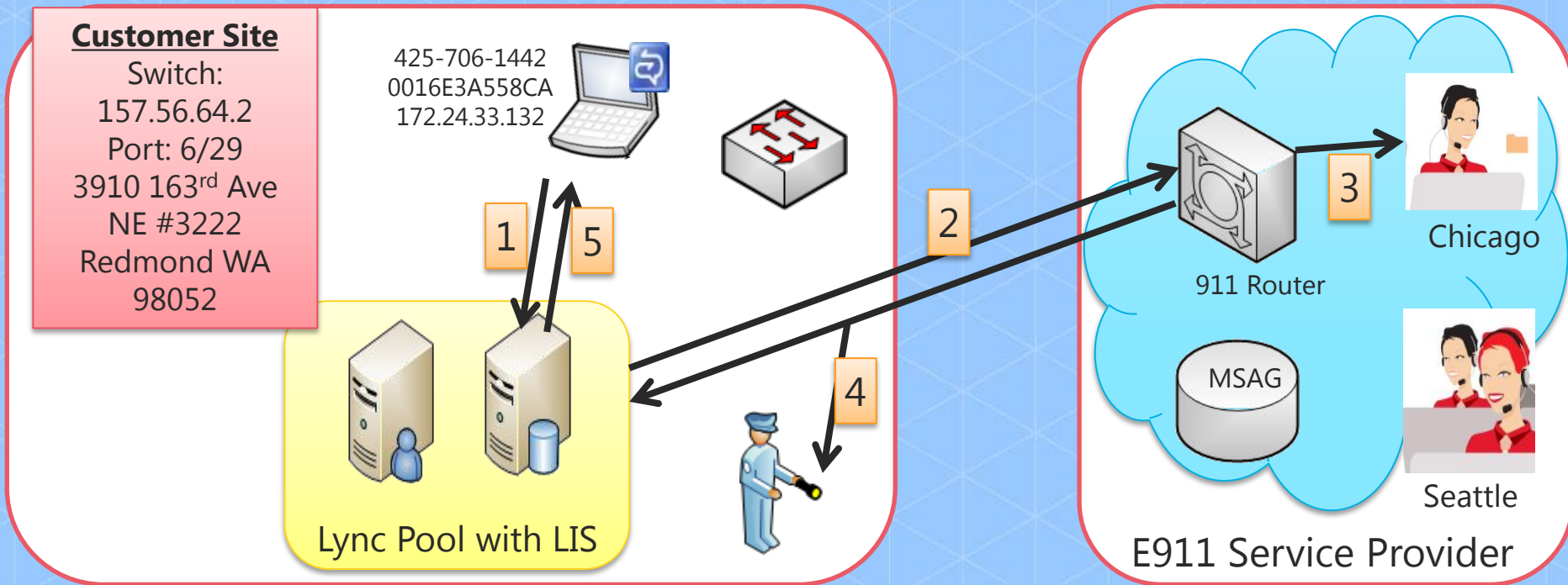
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Enhanced 911 Call Routing



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- 4 – Service provider optionally conferences in on-premises security to call

Enhanced 911 Call Routing



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- 2 – Lync matches 911 number pattern and routes to SIP trunk connecting to E-911 Service Provider
- 3 – E-911 Router references civic address to route call to correct PSAP
- 4 – Service provider optionally conferences in on-premises security to call
- 5 – PSAP able to call back using E.164 number

Private Line

- A private line is a phone number that is not published in Active Directory Domain Services (AD DS) and, as a result, is not readily available to other people.
- Private lines do **not** include assigning the user a second Line URI or SIP address but merely a specific value for the PrivateLine property.
- Private lines bypass most in-bound call routing rules; for example, call forwarding, team call, delegation, team ring, do not disturb, and Response Groups. However, when simultaneous ringing is enabled on a user's primary line, it is also enabled on the private line.
- Private lines do not work if a user on OCS 2007 R2 calls the private line of a user on Lync Server 2010. OCS 2007 R2 cannot perform a reverse phone number lookup on the private number resulting in the call failing.
- Private lines work only on inbound calls. Users cannot use the private line to make an outbound call.
- Private lines will send voicemail to the same Exchange mailbox as the primary phone number.

Caller ID Presentation Controls

- Admins can natively control what Caller ID is presented to the receiving party (PSTN/PBX):
 - Per user/group controls to suppress/alter calling party number by a route setting
 - Granular controls based on callers and destination number:
 - Alice calls an external PSTN number, caller ID is presented as +1 425 555 0100
 - Alice calls an internal PBX number, caller ID is presented as +1 425 555 2302
 - Override for "simultaneous ringing": Bob calls Alice, who has caller id masked for external calls and also has simultaneous ringing configured; Bob's caller-id is presented to Alice's mobile device

Caller ID Presentation Controls

Voice Routes > Edit Voice Route

OK Cancel

▶ +971.....\$ (match, except below) Edit
▶ +971.....\$ (match, except below) Remove
▶ +800 (match, except below)

Suppress caller ID
Alternate caller ID: *
+14259828090

Gateway:
Radmond-PstnGateway-1

Associated phone usages:
+ New Select... Modify Remove

Phone usage record	Associated voice polici...
AD.Local_LD	AD-U AD-R

Suppress caller ID
Alternate caller ID: *
+14259828090

Monitoring

- Deployment not complete until you deploy monitoring
- Monitoring provides QoE reports and Call Accounting (CDR)
- You can collocate Monitoring Server with Archiving Server
- Scalability :
 - 250,000 Users per Monitoring Server
 - CDR database grows 31.5 KB per user per day
 - QoE database grows 28 KB per user per day
- Run the Monitoring Server databases in a separate instance from other databases

Common Area Phone Support

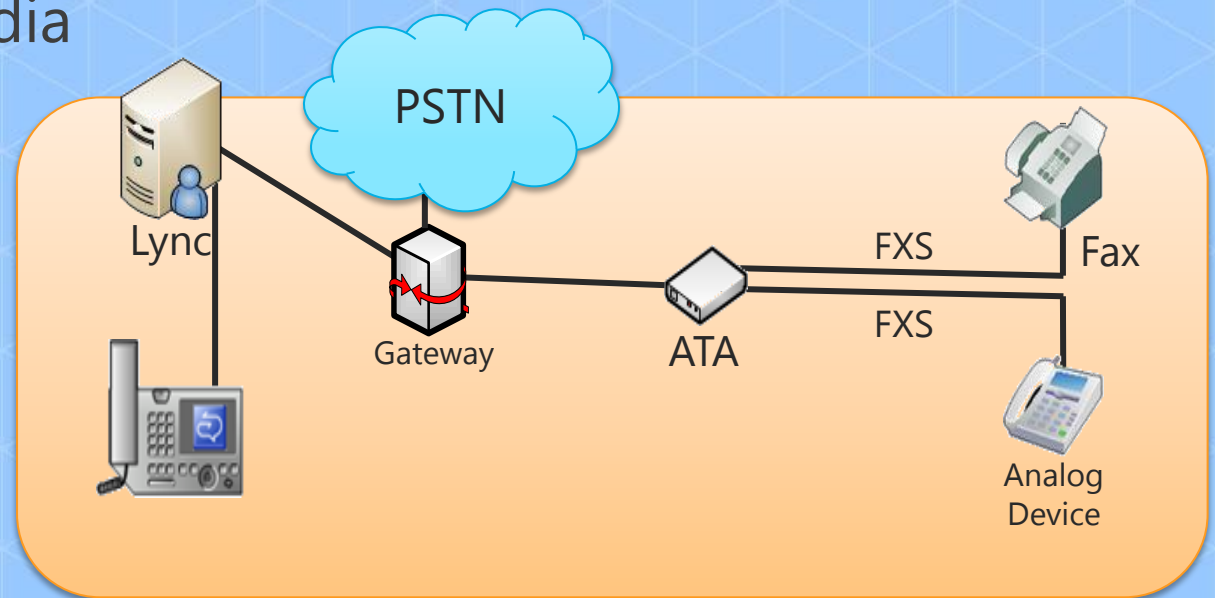
- Enables low-cost IP phones to be placed in common (shared) areas.
- **Base Functionality**
 - Ability for admin to pre-provision phones for installation by Move-Add-Change (MAC) tech
 - Ability to configure call control behavior
 - Ability to block external usage, compromised accounts
 - Low user intervention e.g. 100% recovery from power outages
- **Support for hot-desking scenario**
 - Temporary use by an enterprise voice user
 - Can toggle from a common area to hot desk user

IP Phone Infrastructure Requirements

- LLDP-MED supported (but not required) for VLAN and location discovery (not supported on Lync soft clients)
 - Will pass switch/port ID to the LIS
- Power-over-Ethernet (PoE) supported
 - Not required but make sure to order adapters
- DNS requirements are roughly the same as R2
 - Used to discover the Lync pool
- DHCP requirements are new - when using PIN auth since DNS lookups can't be done
 - Enterprise DHCP servers must support option 43 with MSUCClient vendor class and option 120
 - Registrar can be enabled to provide these options

Analog Device Management

- Physical connectivity of Analog devices (FXS) provided by GW partners
- All routing and policy enforcement for Analog devices are centralized in Lync Server – eliminates the need to manage GWs as “mini-PBX”
- Lync Server Call Detail Record (CDR) infrastructure used to track usage
- Optimized routing allows Fax call routing through without terminating Media



Voice Routing – Trunk Translations

- Centrally manage number formatting prior to routing to PBX/PSTN
- Alice calls +44221234567; based on route translation pattern, called number formatted to 01144221234567 when using GW in Redmond
- Bob calls +44221234567; based on route translation pattern, called number formatted to 0221234567 when using GW in London

Trunk Configurations > Edit Trunk Configuration > New Translation rule

OK Cancel

Name:*

Replace-plus-with-9011

Description:

Update automatically

Match this pattern:*

^\+([d]*)\$

Starting digits:

+

Length:

At least 1

Digits to remove:

1

Translate to:*

9011\$1

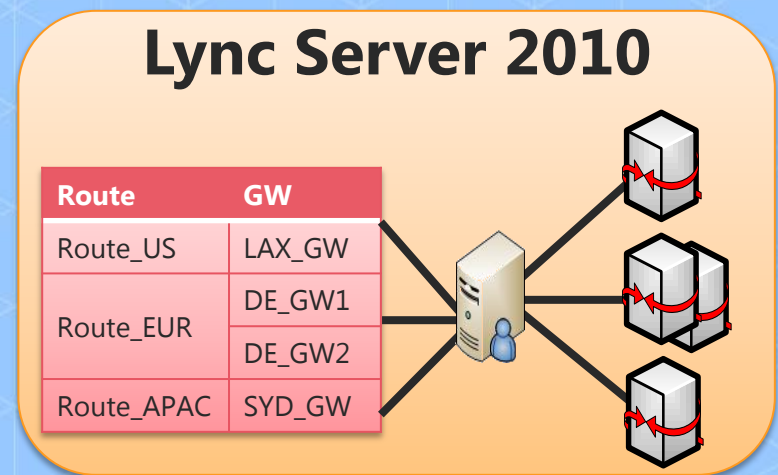
Prefix:

9011

Mediation Service Colocation

Lower TCO and better quality with two enhancements

- **Multiple Gateways per Mediation Service**
 - Routes point to a Gateway
 - Outbound Routing uses topology document used to find an appropriate Mediation Service
 - Mediation Service uses the GW-FQDN in the Request-URI to route to appropriate Gateway
- With Media Bypass allows consolidation of most Mediation resources at the Data Center



Malicious Call Trace

- Lync provides the end-user the capability of tagging the prior call as a malicious call.
- Supported in Lync, Lync Phone Edition & Attendant Console.
- Tagging is reflected in the backend CDR database, enabling the Lync Server administrator to take action on the call.
- Excellent blog written on this –
- <http://blogs.technet.com/b/nexthop/archive/2011/05/16/how-to-trace-a-malicious-call-using-lync-server-2010.aspx>



Exchange Unified Messaging (UM)

- Only supported voice mail solution for Lync users
- Lync supports Exchange UM 2007 SP1 and beyond
- Do not separate UM and Mailbox servers over the WAN
 - MAPI traffic is less tolerant of latency than VoIP in this scenario
- UM servers in separate forests from the Lync forest is a supported topology
 - Need to ensure the EUM settings in the proxyaddress of the user objects are synched to the Lync forest
- Hosted EUM as part of O365 is also now supported
 - Can integrate with both simultaneously
 - EUM enablement setting on the user object is needed
 - User Move
 - Lync Powershell
 - Need to configure Edge Server for a shared domain

Advanced Voice Features

Lync Voice Updates



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