

Overview



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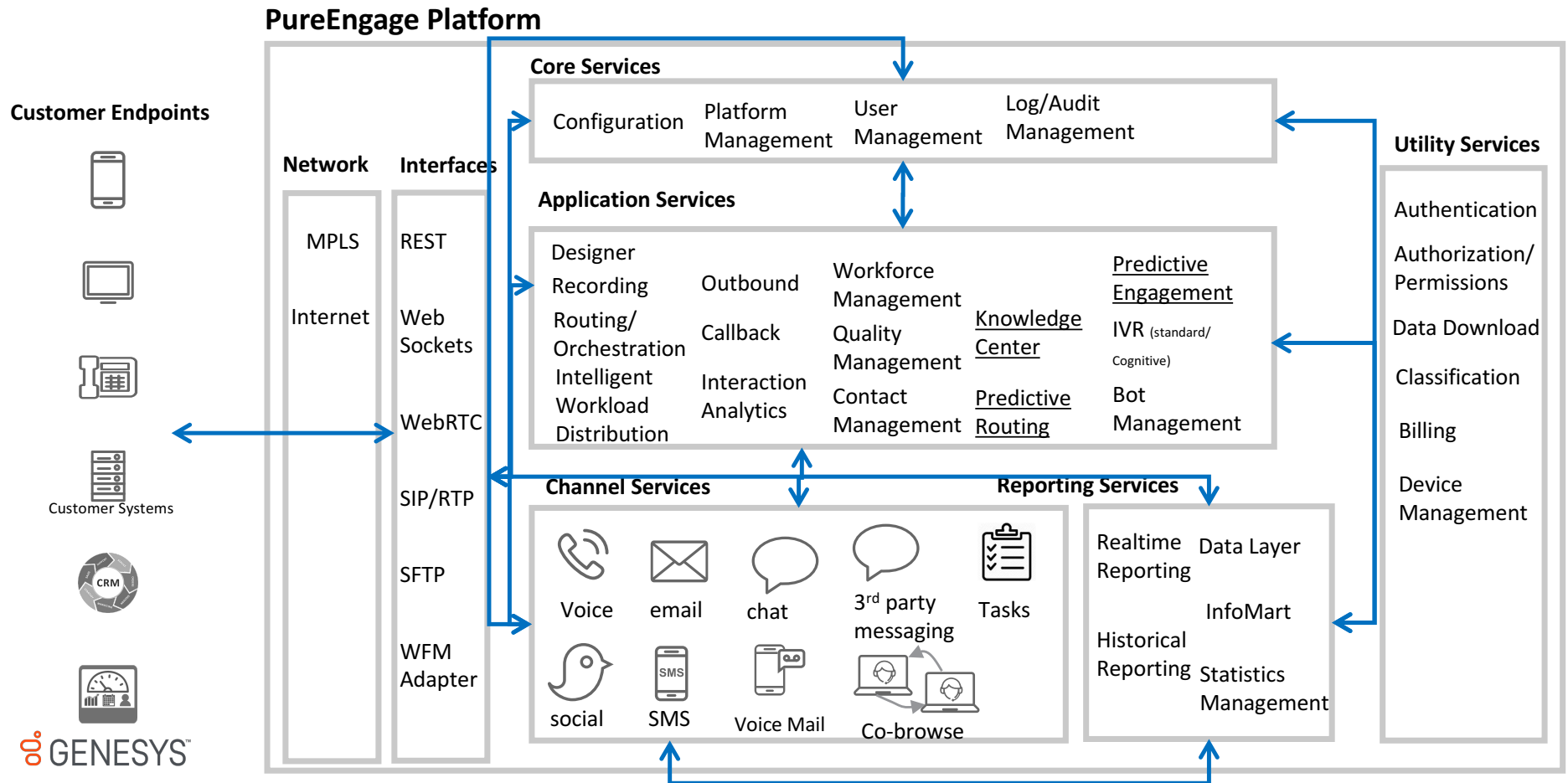
Terminology

- AWS:
 - Region
 - A Region is a Group of Amazon Availability Zones (i.e. data centers) in a geographic area.
 - There are multiple Amazon Regions in some Countries
 - ▲ Examples: US East, US West, EU West1, EU West2, EU East, APAC Singapore, APAC Sydney,...
 - Availability Zone
 - Each availability zone runs on its own physically distinct, independent infrastructure, and is engineered to be highly reliable. Common points of failures like generators and cooling equipment are not shared across Availability Zones. Additionally, they are geographical separation, such that even extremely uncommon disasters such as fires, tornados or flooding would only affect a single Availability Zone.
- Network Access Data Center (Genesys Transit Network (GTN)):
 - A data center which provides the connectivity point for customer network carriers and customer MPLS networks.
 - Geographic Areas defined around the serving area for Genesys GTN pairs. Genesys Geographies Include : US, Canada, EMEA, APAC, and India
- Infrastructure Unit (IU)
 - An instance of the PureEngage Cloud platform which containers all the CX services. It supports multiple tenants. It is deployed in a given AWS region.
- Infrastructure Unit Group (IU Group)
 - This set of inter-connected Infrastructure Units which provides an advanced contact center DR solution across a pair of AWS regions and also a global logical contact center across geo-regions.

Overview

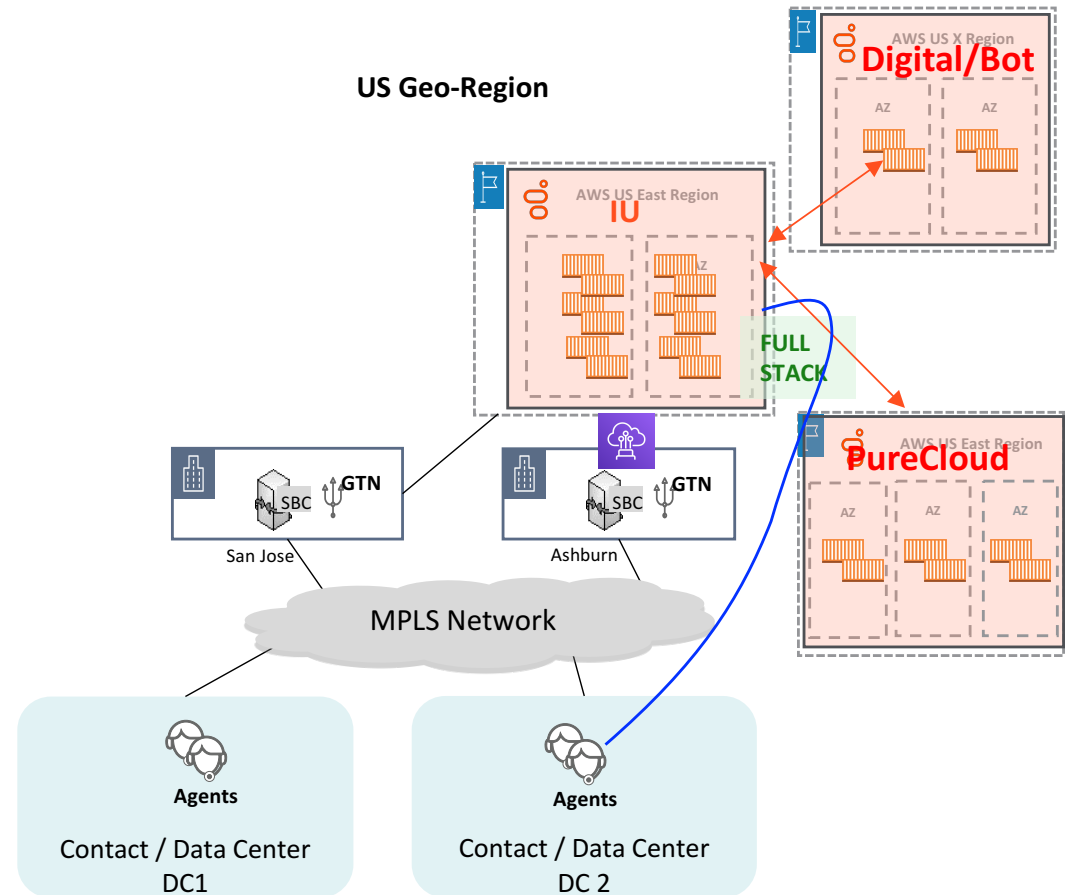
- PureEngage services are
 - Multi-Tenant
 - Fully redundant – No single point of failure
 - Service instances are spread across 2 data centers (AWS Availability Zones)
 - Have fully automated in-service upgrades (blue-green, rolling)
 - Service instance images are immutable
 - Services communicate with interfaces/protocols that have well defined contracts
 - Services also perform self-resiliency by throttling traffic, downgrading level of service, auto-restart, etc.
- PureEngage supports in-region redundancy and also supports redundancy across 2 regions for critical services. This provides a second tier of resiliency for major disaster
- PureEngage uses MPLS connectivity to customer's locations to provide the most resiliency and highest quality solution plus also support internet connectivity
- PureEngage is designed to scale to individual contact center sizes of 60,000 agents
- PureEngage is globally availability (North America, EMEA, APAC and India). This enables customers to create a contact center anywhere in the world or a single virtual global contact center around the world.

Functional Architecture



Advanced Redundancy (Standard +)

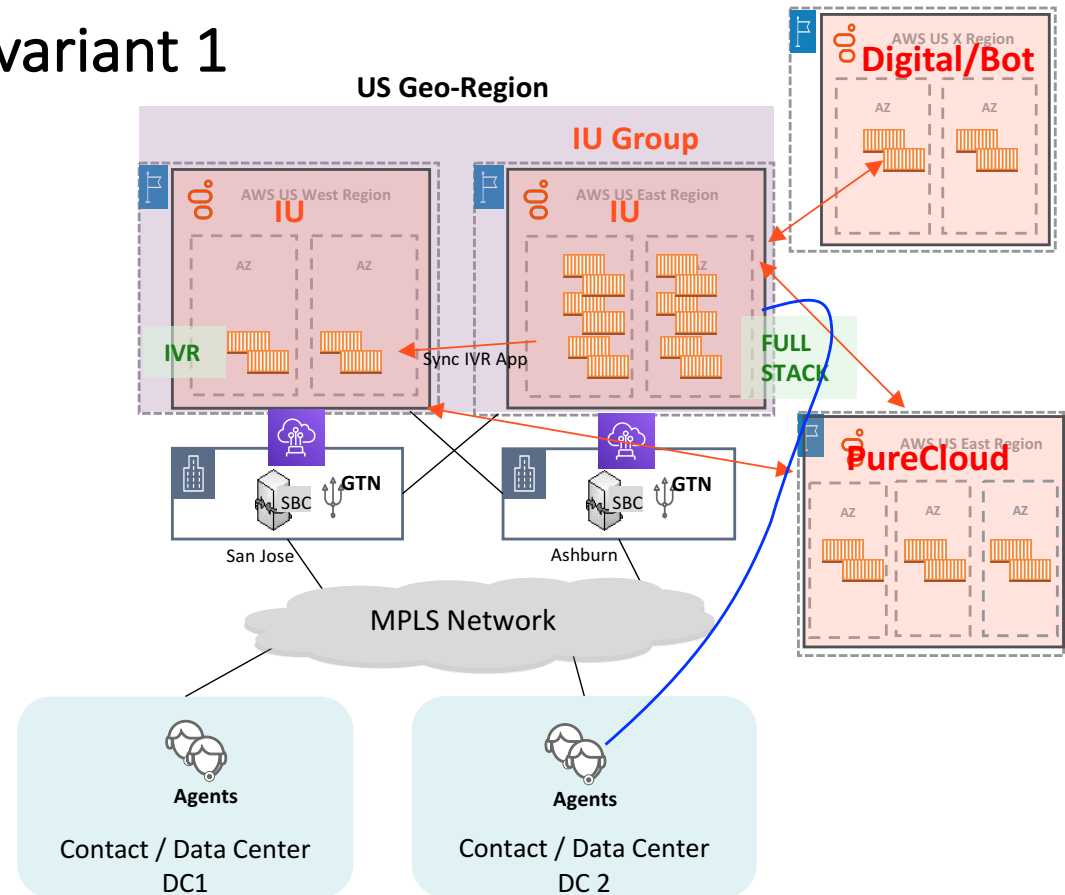
- **Primary Region** – has the full Genesys set of services (Full Stack).
- SIP Cluster and Base SIP Models
- Service Level Agreement (SLA):
99.99% Genesys Platform Availability
- Supports load balancing voice traffic across GTNs.
- A customer can select which region is primary
- This is used for countries with data sovereign and Telco requirements – Canada, India, Australia



Advanced Redundancy (Standard +) variant 1

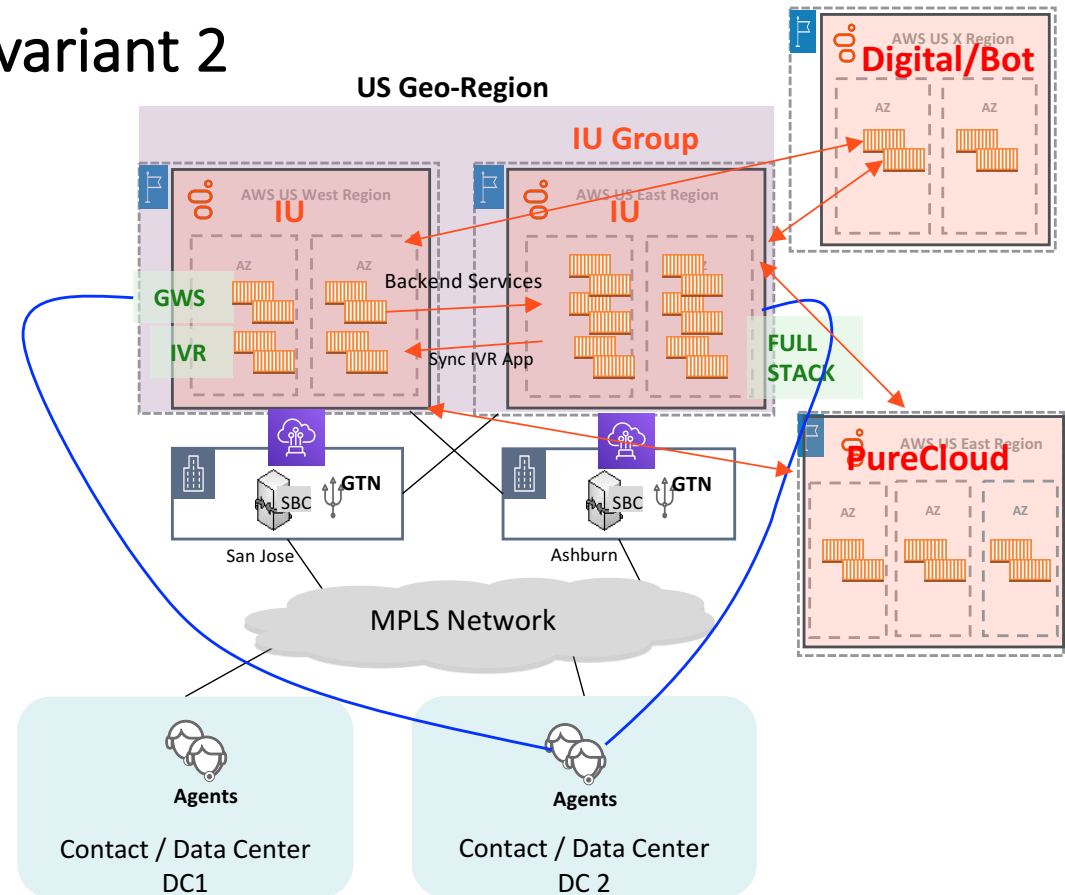
– Deprecated

- **Primary Region** – has the full Genesys set of services (Full Stack).
- **Secondary Region** – has just the IVR Services
- SIP Cluster and Base SIP Models
- Service Level Agreement (SLA):
99.99% Genesys Platform Availability
- Supports load balancing voice traffic across GTNs.
- A customer can select which region is primary



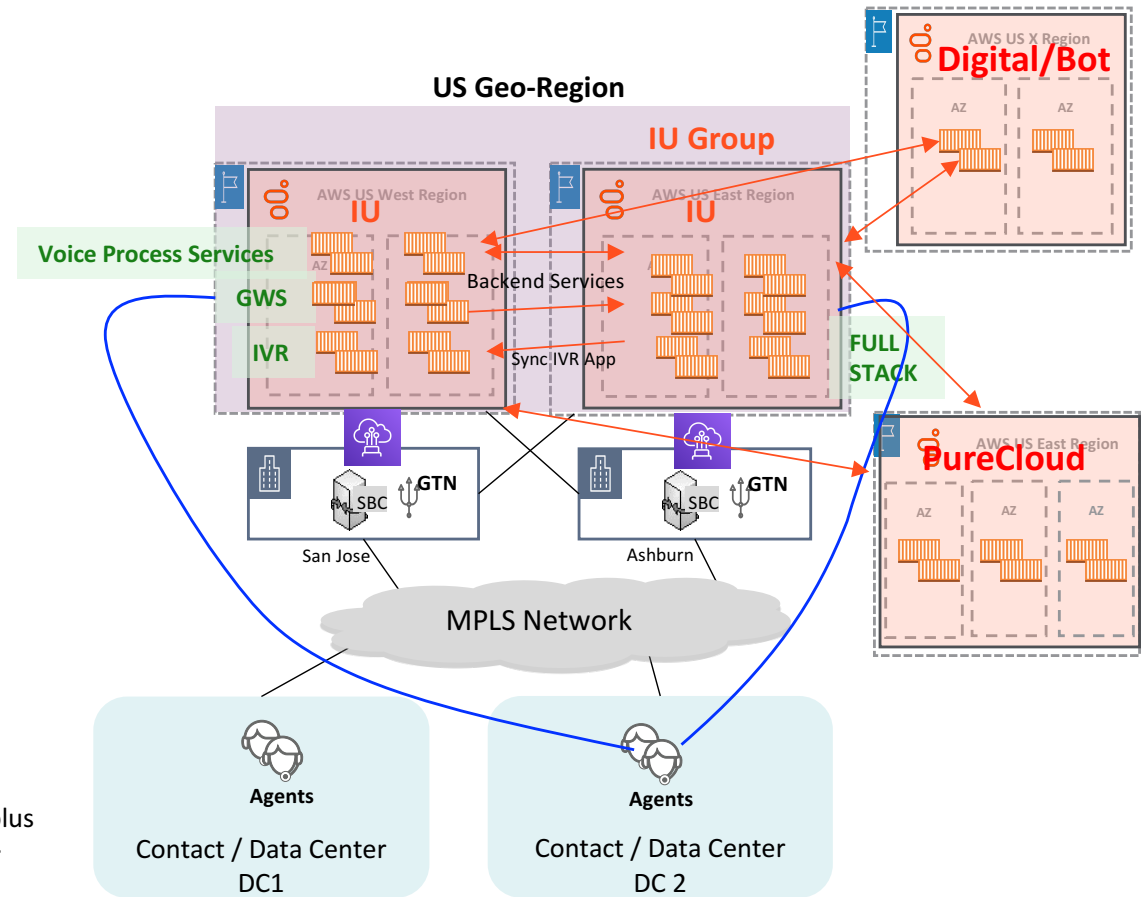
Advanced Redundancy (Standard +) variant 2

- **Primary Region** – has the full Genesys set of services (Full Stack).
- **Secondary Region** – has just
 - IVR Services
 - GWS/WWE Services
- SIP Cluster and Base SIP Models
- Service Level Agreement (SLA):
99.99% Genesys Platform Availability
- Supports load balancing voice traffic and agents across regions.
- A customer can select which region is primary



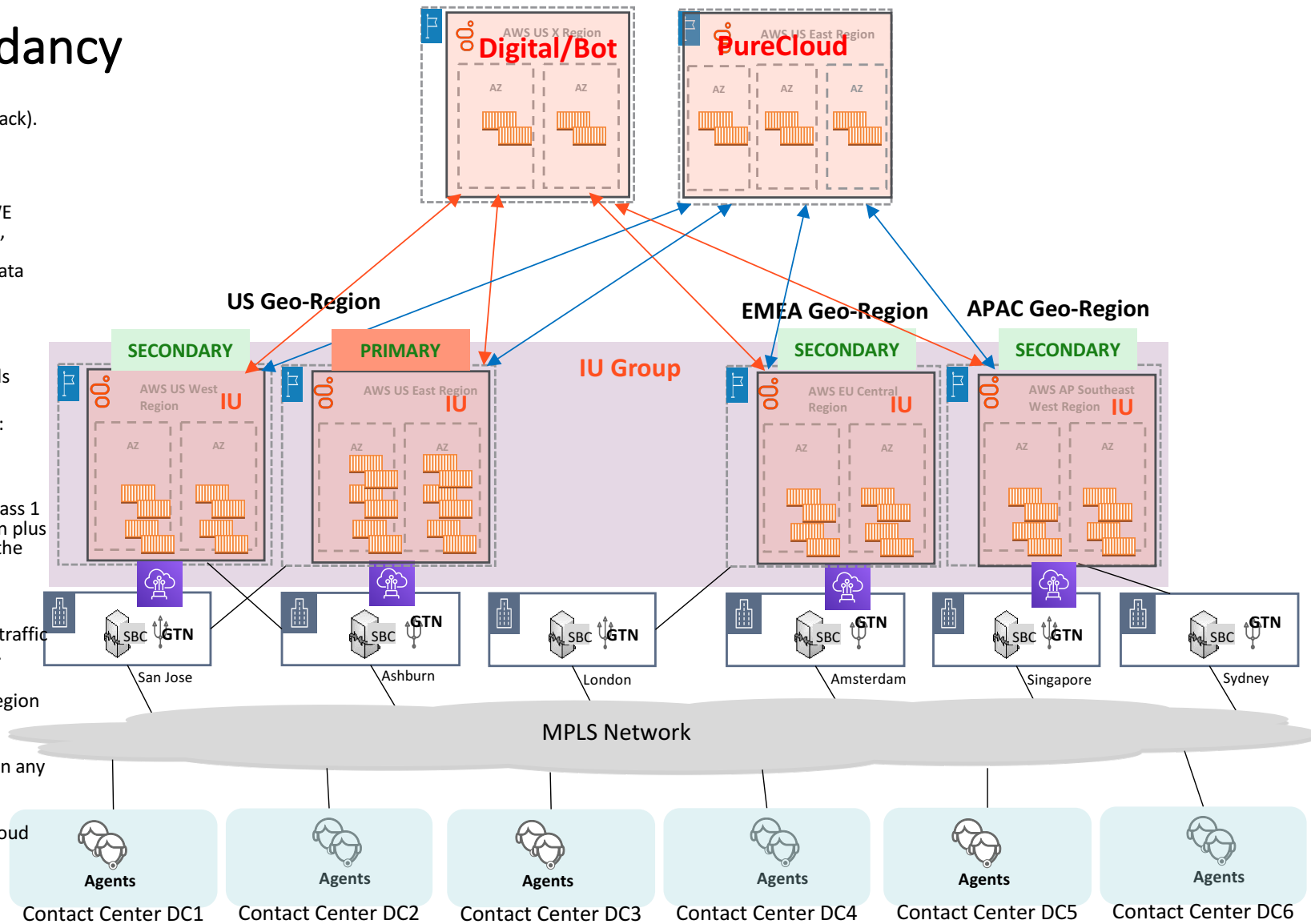
Super Advanced Redundancy

- **Primary Region** – has the full Genesys set of services (Full Stack).
- **Secondary Region** – has just
 - IVR Services
 - GWS/WWE Services
 - Voice Routing
 - VoiceMail
 - Recording Collection
 - Reporting data capture
 - WFM adapter (requires to manual provisioning to switch)
- SIP Cluster and Base SIP Models
- Service Level Agreement (SLA): **99.99%** Genesys Platform Availability
- This solution's SLA covers all class 1 services within one AWS region plus additional coverage across the two AWS regions for voice processing.
- Supports load balancing voice traffic and agents across regions.
- A customer can select which region is primary



Global Redundancy

- **Primary Region** – has the full Genesys set of services (Full Stack).
- **Secondary Regions** – has just
 - IVR Services, GWS/WWE Services, Voice Routing, VoiceMail, Recording Collection, Reporting data capture, WFM adapter (requires to manual provisioning to switch)
- SIP Cluster and Base SIP Models
- Service Level Agreement (SLA): **99.99%** Genesys Platform Availability
- This solution's SLA covers all class 1 services within one AWS region plus additional coverage across all the secondary regions for voice processing.
- Supports load balancing voice traffic and agents within geo-regions.
- A customer can select which region is primary
- Secondary regions can be put in any support AWS region.
- Only one Digital/Bot or PureCloud region can be used across the deployment

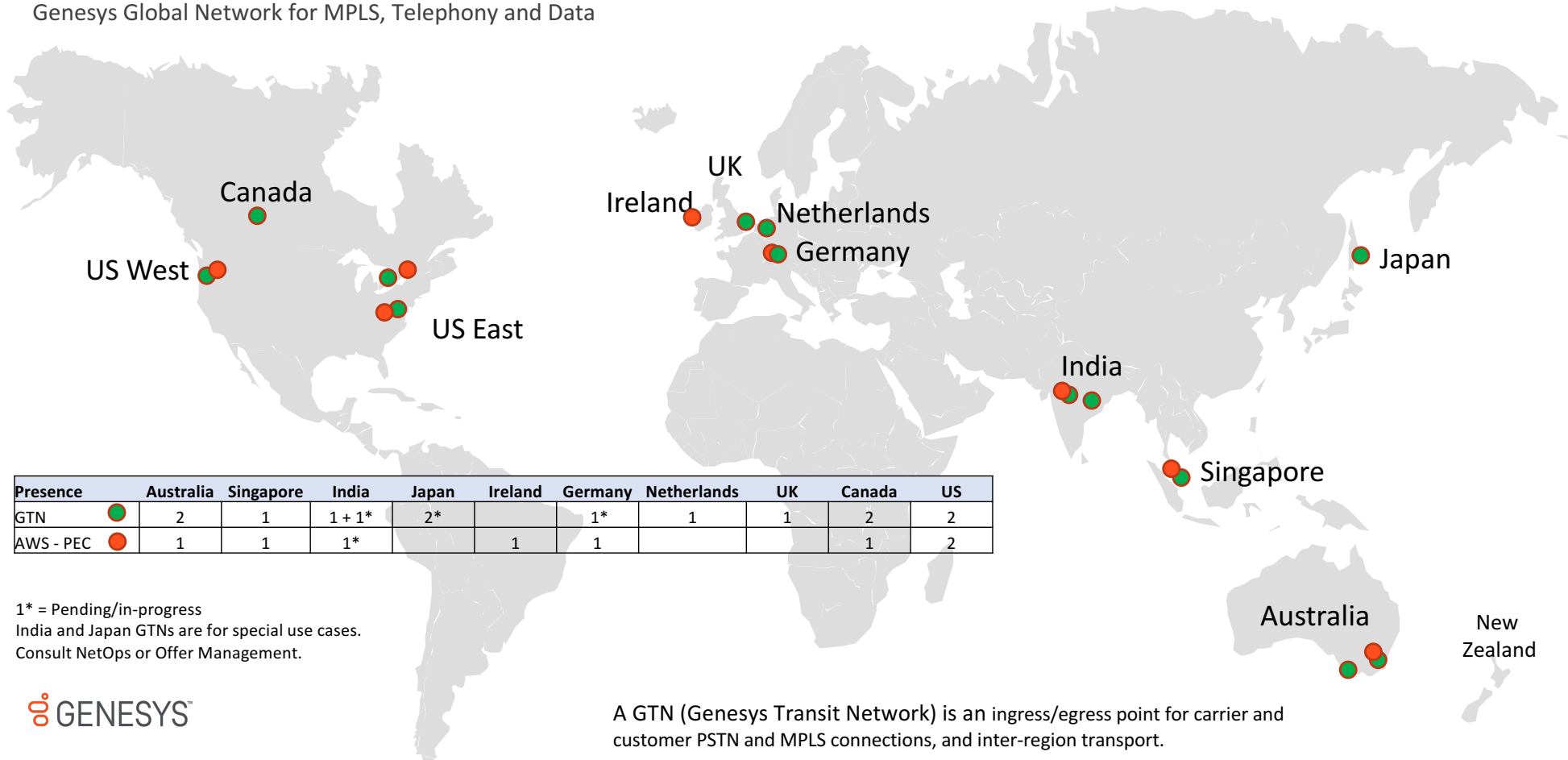


PEC Infrastructure

Technology	PureEngage
Pipeline Deployment tooling	CloudFormation – directly
CI and CD automation tool	Jenkins - different system
A centralized tool managing deployment information	GCMC
A centralized tool for managing a deployment of the platform	GCMC
GIT-based repository	Gitlab
Secret Management	AWS SSM based service. Premise is TBD.
VPN Access	Cisco Anyconnect
Access services	Active Directory / LDAP
Package Vulnerability Scanning	Artifactory Xray
cost control / cleaning of unused resources / chaos / tagging tool	Custom tools based on tagging
APM - Monitoring tool	Zabbix, Prometheus, CloudWatch
Incident response platform	PagerDuty
Message Bus	Kafka (new)
Log management platform	Custom with ElasticSearch
Centralize naming data service	None / Convention
Key management	AWS KMS
Relational DB	Postgres, MS SQL, Oracle RDS
ElasticSearch	PureEngage Ops version
In-Memory Cache	Redis/ElasticCache
File Storage	S3, Glacier, EFS
Key-Value Pair DB	None
Scaling	ASG
Container Management	ECS
Compute	Docker Container
Serverless Compute	Lambda
Load balancing	ELB/ALB/NLB
Notification Service	SNS
Access customer premise	DirectConnect and GTNs
Global DNS	Route53
Microservice Identity & Access Management	IAM - limited also Security Groups

PureEngage Cloud Global Footprint

Genesys Global Network for MPLS, Telephony and Data



		Secondary Region		Regions	Primary Region		
		AZ	AZ		AZ	AZ	
	●						Voice IVR and Routing
★	●						Screen and Voice Recording UI and managemnt
	●						Screen and Voice Recording Collection
	●						Voicemail – Device Mgt
	●						Desktop(WWE)/Consumable API(GWS)
	●						Callback
	●						IWD
	●						Digital (Chat, Email, etc.)/Bot mgt
★	●						Interaction Analytics
	●						Realtime Reporting
	●						Designer/Designer Analytics
	●						Co-Browse
	●						Provisioning
★	●						WFM
	●						Historical Reporting
	●						Outbound
	●						WebRTC
	●						WFM 3 rd party

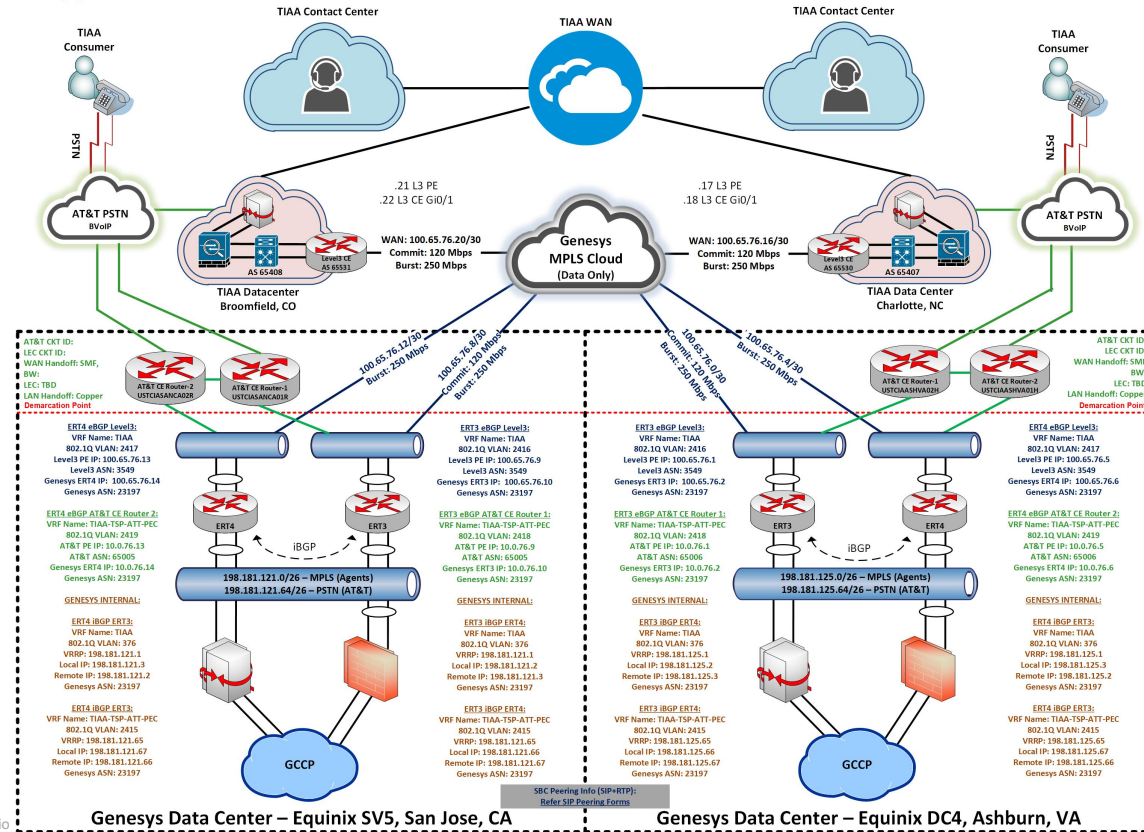
Services in PEC

- Workforce Management
- Voice Routing
- Voice Mail
- Inbound Voice IVR
- Interaction Recording (Voice/ Screen)
- Telephone Network
- Real-time Reporting
- Digital (chat, email, etc.)/Task Routing
- IWD
- Outbound
- Voice and Digital Bots
- Interaction Analytics
- Historical Reporting - GCXI
- Designer Analytics/Designer/Post Call Survey
- Download Services
- Consumable API
- Co-Browse
- Callback – Web/In Queue
- Platform Administration/Agent Setup
- Agent Desktop (WWE)
- WebRTC
- 3rd party WFM

Network Architecture Details - Example

TIAA – Genesys MPLS Network Architecture - **FINAL**
PureEngage Cloud – Ver 2.5 – December 22nd, 2017

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High Level Service Architectures



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Others to add

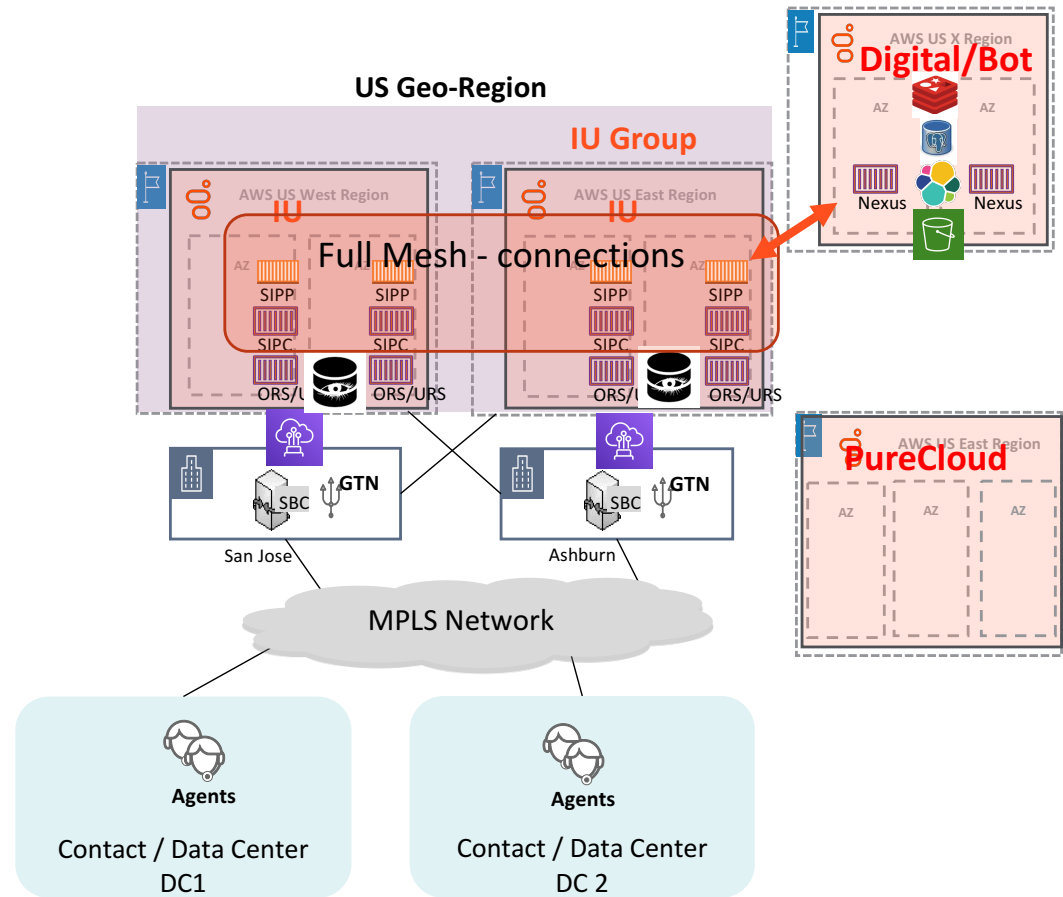
- GVP – add to voice stuff
- Co-Browse
- Voicemail
- Outbound
- IWD
- WebRTC
- 3rd party WFM
- Bots
- Task
- Interaction Analytics
- Download

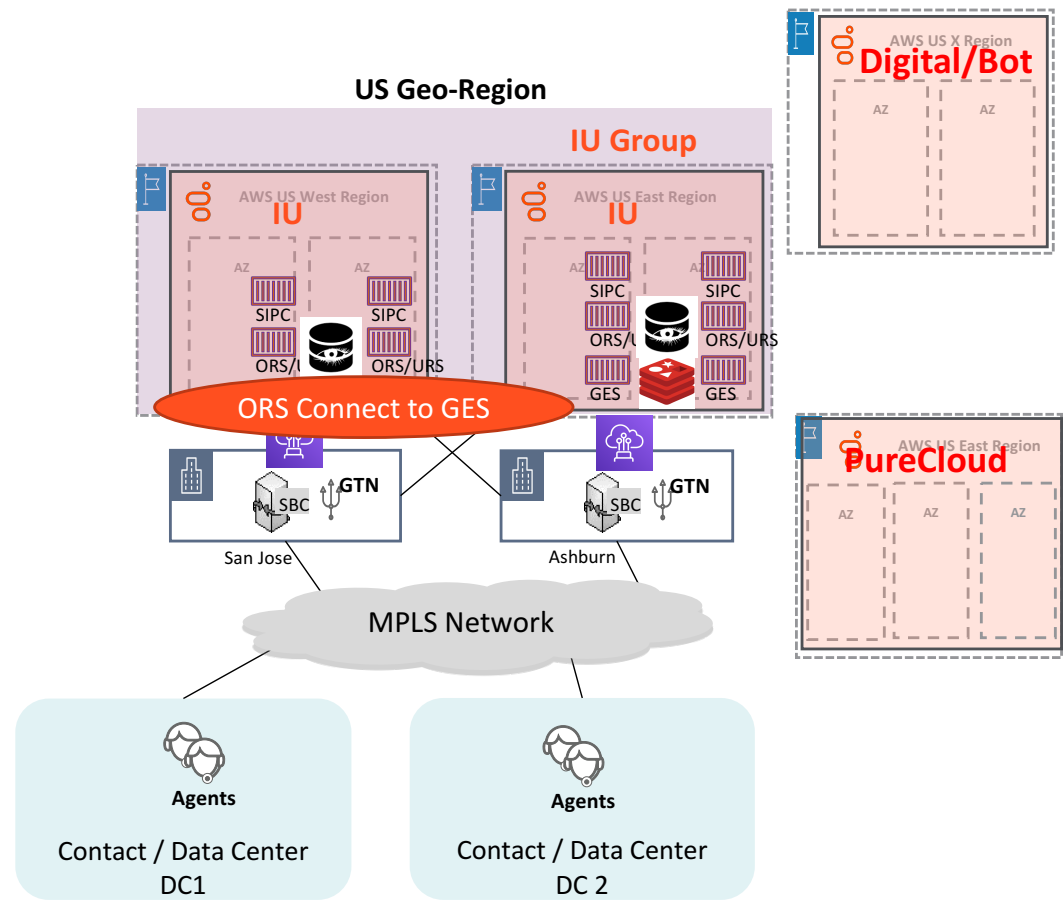
Voice



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Voice failover is at the
Network provider level

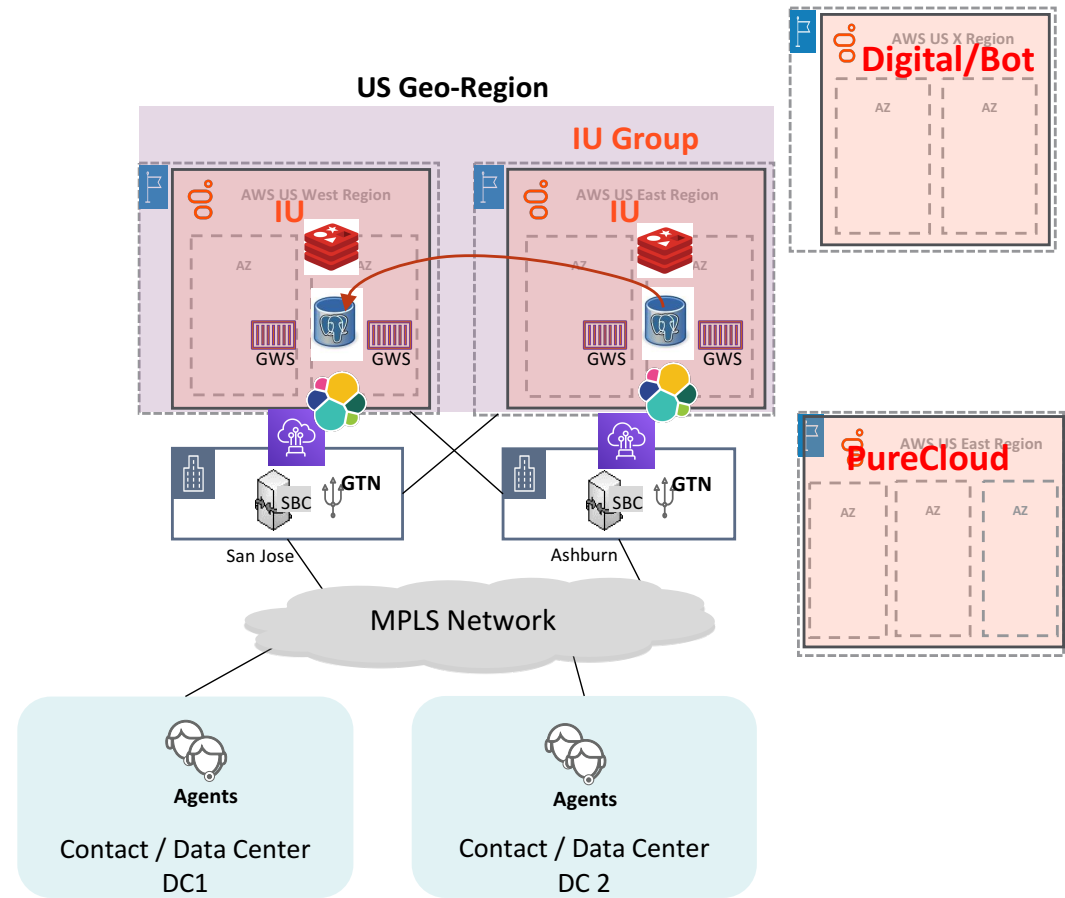




GWS/WWE



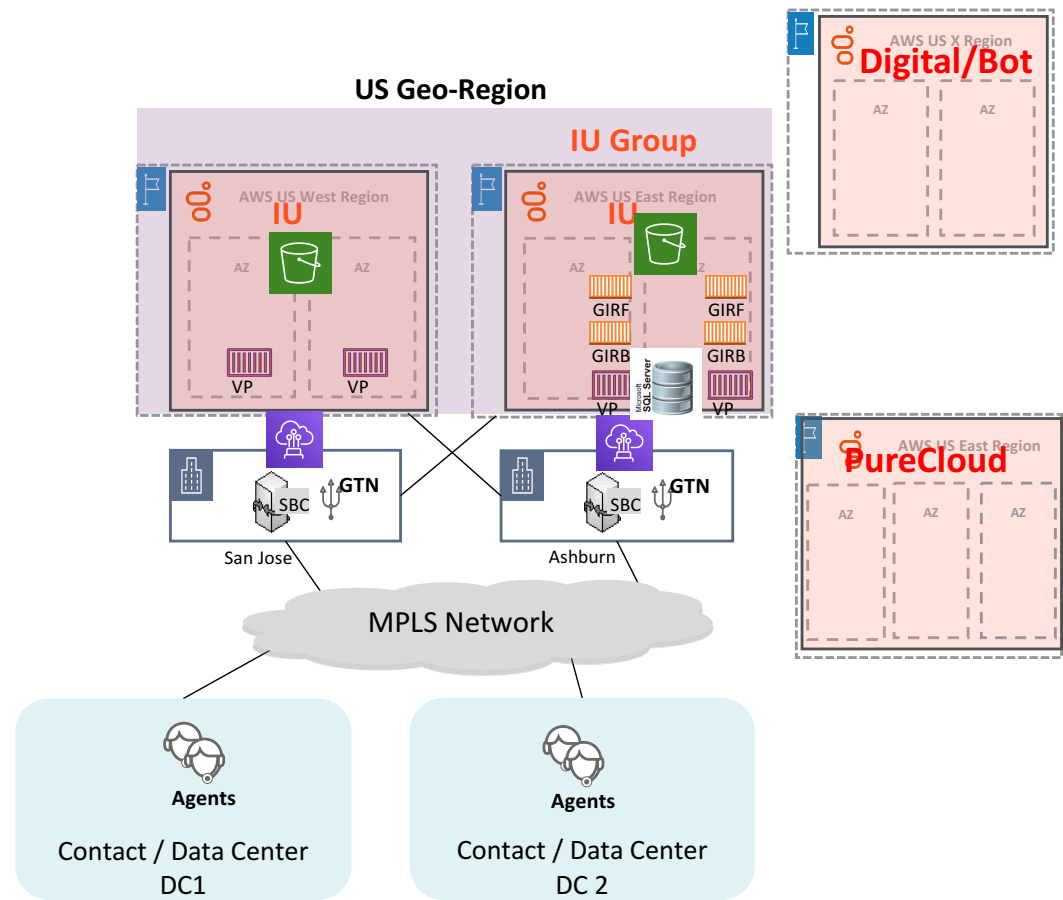
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Recording



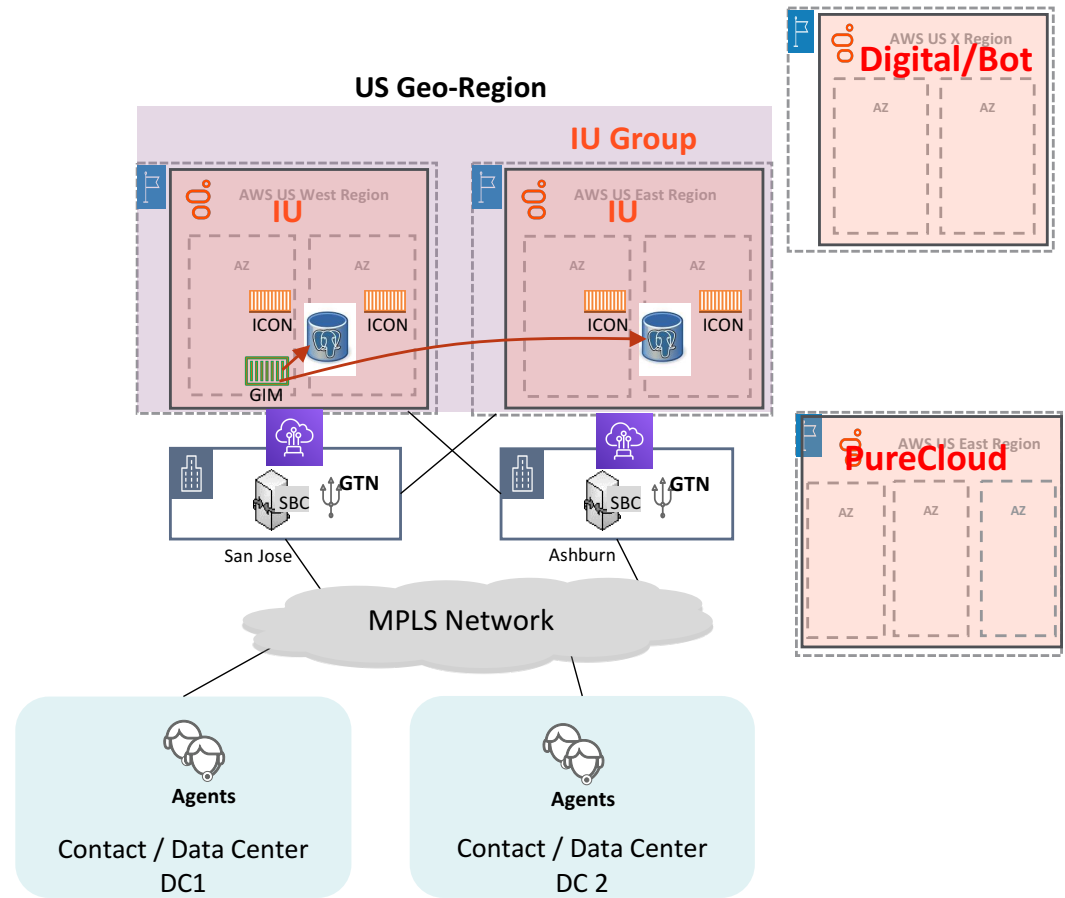
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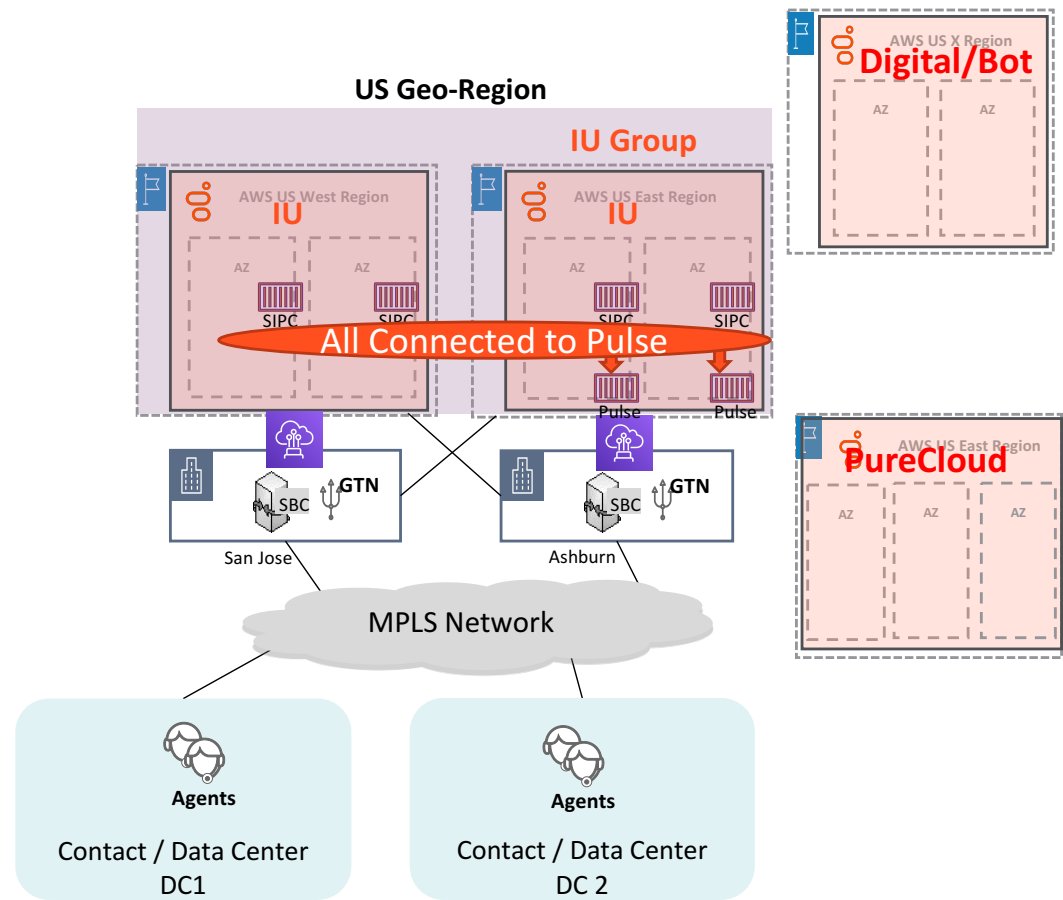


Reporting



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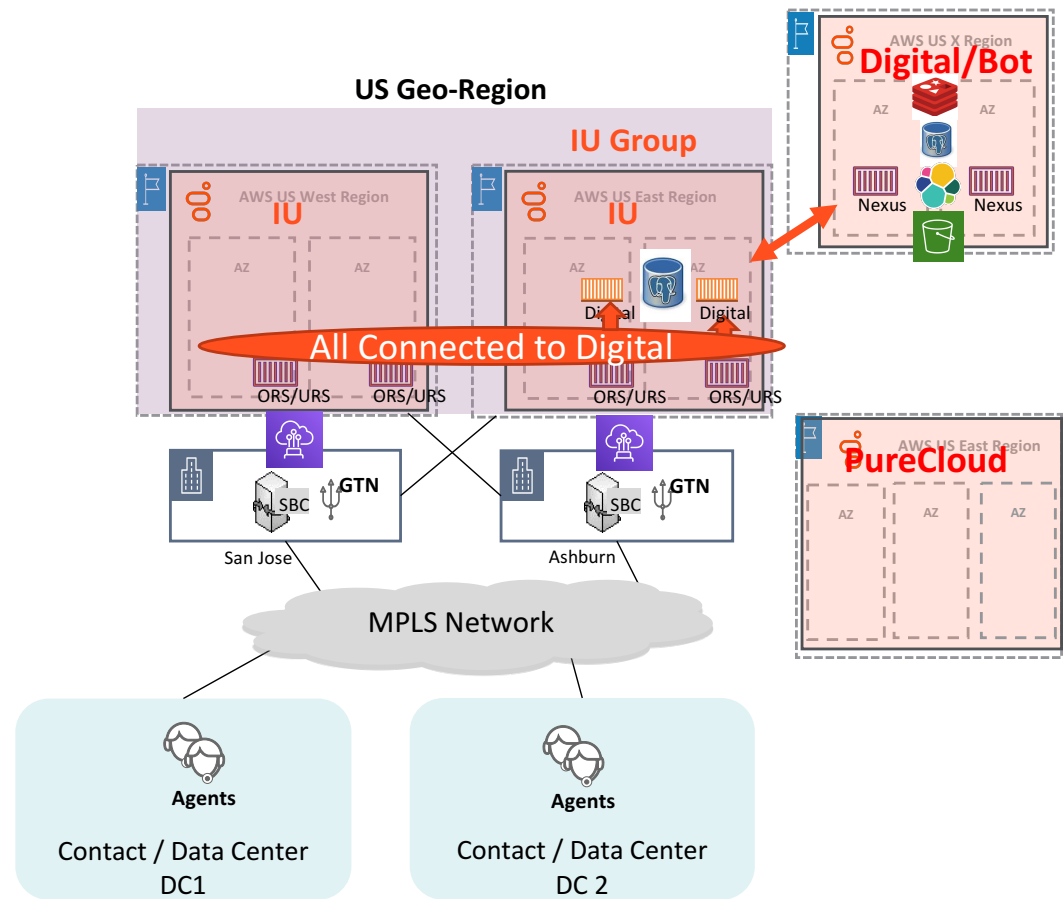




Digital



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Availability Capabilities



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Points of failure

Service	In Region – distributed across AZs	Cross-Region	Data store – distributed across AZs
Workforce Management	A-B, N+1	No	A-B pair
Voice Routing	N+1 (A-A pairs)	Yes	N+1 – cross-region
Voice Mail	N+1 (A-B pairs)	Yes	N+1
Telephone Network	A-A SBCs	Yes	NA
Screen/Interaction Recording	A-A pair, A-B pair and N+1	Yes	N+1 and A-B pair
Real-time Reporting	N+1 (A-B pairs)	No	A-B pair
Digital/Task Routing	A-B pair, N+1	No	A-B Pair, N+1
IWD	N+1	No	N+1, A,B
Platform Administration	A-B pair	No	A-B pair
Outbound	A-B pair, N+1	No	A-B pair
Interaction Analytics	A-B pair	No	A-B pair
Inbound Voice IVR (designer and external)	N+1, A-A pair	Yes	NA

Points of failure

Service	In Region – distributed across AZs	Cross Region	Data store – distributed across AZs
Historical Reporting	A-B pair, A	Yes – GIM is not	A-B pair
Designer, Analytics and Post Call Survey	A-B pair	No	A-B pair
Data Download (WFM, Historical, UCS, Recordings)	A and N+1	No	N+1
Co-Browse	N+1	No	NA
Callback - Web	N+1	No	N+1
Callback - In Queue	N+1	No	N+1
Agent/Supervisor Desktop	N+1	Yes	N+1, A-B pair
Agent Setup	N+1	No	N+1, A-B pair
WebRTC	N+1	No	NA
3 rd Party WFM	A-B	Yes	NA
Voice and Digital Bots	N+1	No	N+1, A-B

FUTURE - Support of other services across AWS regions

Failures conditions covered - AWS region failure, complete service failure, MPLS failure

We are investigating architecture to support the following services across AWS regions

- (Active) Pulse – in plan – limited view only
- (Backup) Genesys WFM – in plan – Cold standby automation-switchback
- (Active) Chat/Messaging – same as voice today
- (Backup) Designer – should be warm – with the ability to do minimal changes (e.g. change base data tables)
- (Active) WebRTC – same as voice today
- (Active) GES/Callback – support active backup region
- (Backup) GCXI/GIM –Cold standby and switchback automation
- (Active) Outbound Campaigns – support active backup region
- (Active) Email – same as voice today
- (Backup) Agent Setup – It is deployed today but can not do writes – Do not have a good solution for this now – TBD
- (Active) Co-Browse - should be same as voice today

Understanding Failure Modes

What to expect when the system experiences failures – with Smart Failover



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Others to add

- Add Co-Browse
- IWD
- WebRTC
- 3rd party WFM
- Bots
- Task
- Interaction Analytics

Primary AWS Availability Zone Failure

Functionality	Operational Impact	Representative Experience	Customer Experience
Agent login (GWS, SIP Server)	No impact	No Impact	No Impact
Callback (ORS, GMS)	No impact	No Impact	No Impact
Historical data feed	Delayed Reporting BI feed is affected if the system that performs the upload is within the failed AZ. The data is not lost. The upload will resume later when the AZ is recovered; the data will be provided retroactively.	No Impact	No Impact
Designer applications (Designer, Designer Application Servers)	No impact	No Impact	No Impact
Call Routing (SIP Server, ORS, URS)	No impact	No Impact	No Impact
Agent and Queue Provisioning (GAX, framework platform)	GAX session is affected if the back-end server is within the failed AZ. The user will have to re-login to the operational back-end server. Agent Setup session is NOT affected.	100% Logged out of supervisors and admins Will recover on next login	No Impact
Historical and real-time reporting/monitoring tools (Pulse, GI2, GIM, ICON)	Delayed Reporting BI feed upload is affected if the system that performs the upload is within the failed AZ. The data is not lost. The upload will resume later when the AZ is recovered; the data will be provided retroactively.	No Impact	No Impact
Recording playback and viewing (GIR components)	No impact	No Impact	No Impact
Genesys WFM	No impact	No impact	No impact
Voicemail (Feature Server)	No impact	No Impact	No Impact
Digital (Chat, Email, etc.)	No impact	No impact	No impact
Outbound	No impact	No impact	No impact



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Primary AWS Region Failure

Functionality	Operational Impact	Representative Experience	Customer Experience
Agent login (GWS, SIP Server)	Agent will be automatically re-login into Alternative (Secondary) region. SIP Phone will have to re-register.	Automatically reconnect Phone re-registers to secondary	Active Calls Dropped
Callback (ORS, GMS)	The callbacks will not executed until Primary is back up and running.	Automatically reconnect Phone re-registers to secondary	Delayed Callbacks
Historical data feed	You will not have access to historical data until the primary is back up and running.	Automatically reconnect Phone re-registers to secondary	No Impact
Designer applications (Designer, Designer Application Servers)	You will not be able to make any changes to the designer application until Primary is back up and running.	Automatically reconnect Phone re-registers to secondary	No Impact
Call Routing (SIP Server, ORS, URS)	Active calls that were associated with Primary are lost. All new calls will be send to the secondary GTN and proceed through IVR; the calls will queue up until the agents log in and Ready. No impact to calls already be processed by the Secondary.	Automatically reconnect Phone re-registers to secondary	Active Calls Dropped
Agent and Queue Provisioning (GAX, framework platform)	You will not be able to make any provisioning changes (adding agents, groups, queues, etc.) until Primary is back up and running.	Automatically reconnect Phone re-registers to secondary	No Impact
Historical and real-time reporting/monitoring tools (Pulse, G12, GIM, ICON)	You will not be able to access the real-time reporting tools until Primary is back up and running. The data is not lost. The upload will resume later when the Primary is recovered; the data will be provided retroactively. ICON in the recovery site keeps performing its background jobs (collecting reporting statistics). Statistics previously collected by ICON in the Primary site, as well as the statistics in the Recovery site, will be utilized by the Reporting tools when Primary is back up and running	Automatically reconnect Phone re-registers to secondary	No Impact
Recording playback and viewing (GIR components)	You will not have access to recordings in primary until it is back up and running. Recordings in secondary will be available via regional UI.	Automatically reconnect Phone re-registers to secondary	No Impact
Genesys WFM	You will not be able to perform any WFM function until Primary is back up and running.	Logged out of WFM will not have access till primary recovers.	No Impact
Voicemail (Feature Server)	You will not have access to an voicemails stored in Primary until Primary is up and running but will be able to access voicemails in the secondary.	Automatically reconnect Phone re-registers to secondary	Recovered on next call
Digital (Chat, Email, etc.)	You will not be able to perform any chat or email function until Primary is back up and running.	Automatically reconnect Phone re-registers to secondary but the ability to process chat and email interactions is not available.	Chat is unavailable to customers.
Outbound	You will not be able to perform any outbound Campaign function until Primary is back up and running.	Automatically reconnect Phone re-registers to secondary but the ability to process outbound Campaign interactions is not available.	Active Calls Dropped

GTN Failure – UI connections through GTN

Functionality	Operational Impact	Representative Experience	Customer Experience
Agent login (GWS, SIP Server)	Agent will automatically re-login into Alternative (Secondary) GTN. SIP Phone will have to re-register.	Automatically reconnect Phone re-registers to secondary	Active Calls through failed GTN Dropped
Callback (ORS, GMS)	No impact except If the primary GTN fails, Web callbacks will be not executed until Primary GTN is back up and running.	Automatically reconnect Phone re-registers to secondary	No Impact
Historical data feed	Must reconnect through the secondary GTN.	Automatically reconnect Phone re-registers to secondary	No Impact
Designer applications (Designer, Designer Application Servers)	Logged out and will have to log back in via secondary GTN.	Automatically reconnect Phone re-registers to secondary	No Impact
Call Routing (SIP Server, ORS, URS)	Active calls that were associated with GTN are lost. All new calls will be send to the secondary GTN and proceed through IVR; the calls will queue up until the agents log in and Ready. No impact to calls already be processed by the Secondary.	Automatically reconnect Phone re-registers to secondary	Active Calls through failed GTN Dropped
Agent and Queue Provisioning (GAX, framework platform)	Logged out and will have to log back in via secondary GTN.	Automatically reconnect Phone re-registers to secondary	No Impact
Historical and real-time reporting/monitoring tools (Pulse, G12, GIM, ICON)	Logged out and will have to log back in via secondary GTN.	Automatically reconnect Phone re-registers to secondary	No Impact
Recording playback and viewing (GIR components)	You will not have access to recordings in primary until it is back up and running. Recordings in secondary will be available via regional UI.	Automatically reconnect Phone re-registers to secondary	No Impact
Genesys WFM	Logged out and will have to log back in via secondary GTN.	Logged out of WFM will not have access till primary recovers.	No Impact
Voicemail (Feature Server)	Active voicemail messaging being recorded that were associated with the GTN are lost. No impact to accessing existing voicemails from either region.	Automatically reconnect Phone re-registers to secondary	Recovered on next call
Digital (Chat, Email, etc.)	No impact for Chat. Genesys will not be able to retrieve or submit email messages to the corporate eMail server accessible via MPLS. You will not be able to perform any email function until Primary GTN is back up and running.	Automatically reconnect Phone re-registers to secondary	No Impact
Outbound	Logged out and will have to log back in via secondary GTN plus lose of active outbound calls going through the failed GTN and If the primary GTN fails, will not be able to initial any new outbound calls until the primary GTN is up and running again.	Automatically reconnect Phone re-registers to secondary	Active Calls through failed GTN Dropped

GTN Failure – UI connections through Internet

Functionality	Operational Impact	Representative Experience	Customer Experience
Agent login (GWS, SIP Server)	SIP Phone will recognize failure of GTN; expiration of the SIP registration through the failed GTN may produce "Voice Channel is Out Of Service" warning on Desktop. SIP Phone will establish new registration via the other GTN. The Agent Desktop will automatically attempt to re-establish the Voice Channel. Agent does not need to re-enter login credentials.	Automatically reconnect. Once the SIP phone is re-registered, it will be back to normal	Active Calls through failed GTN Dropped
Callback (ORS, GMS)	No impact except if the primary GTN fails, Web callbacks will be not executed until Primary GTN is back up and running.	See above behavior	No Impact
Historical data feed	No Impact	See above behavior	No Impact
Designer applications (Designer, Designer Application Servers)	No Impact	See above behavior	No Impact
Call Routing (SIP Server, ORS, URS)	Active calls that were associated with GTN are lost. All new calls will be send to the secondary GTN and proceed through IVR; the calls will queue up until the agents log in and Ready. No impact to calls already be processed by the Secondary.	See above behavior	Active Calls through failed GTN Dropped
Agent and Queue Provisioning (GAX, framework platform)	No Impact	See above behavior	No Impact
Historical and real-time reporting/monitoring tools (Pulse, GI2, GIM, ICON)	No Impact	See above behavior	No Impact
Recording playback and viewing (GIR components)	No Impact (use regional Uis to access the recordings in the different regions)	See above behavior	No Impact
Genesys WFM	No Impact	No Impact	No Impact
Voicemail (Feature Server)	Active voicemail messaging being recorded that were associated with the GTN are lost. No impact to accessing existing voicemails from either region.	See above behavior	Recovered on next call
Digital (Chat, Email, etc.)	No impact for Chat. Genesys will not be able to retrieve or submit email messages to the corporate eMail server accessible via MPLS. You will not be able to perform any email function until Primary GTN is back up and running.	See above behavior	No Impact
Outbound	lose of the active outbound calls going through the failed GTN and If the primary GTN fails, will not be able to initial any new outbound calls until the primary GTN is up and running again.	See above behavior	Active Calls through failed GTN Dropped