

Bring Watson to Your Telephone: Introducing the IBM Voice Gateway



IBM **Voice Gateway**



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Performance is based on measurements and projections using standard IBM benchmarks in a controlled environment. The actual throughput or performance that any user will experience will vary depending upon many factors, including considerations such as the amount of multiprogramming in the user's job stream, the I/O configuration, the storage configuration, and the workload processed. Therefore, no assurance can be given that an individual user will achieve results similar to those stated here.

Customer services today

Web based support is going through a cognitive bot revolution

- Making it cheaper and faster to handle common queries
- Handling queries 24 hours a day, 365 days a year

Call center challenges

- Cost of optimization
- Wait time reduction
- Improve customer satisfaction
- Easier access to internal documents and info

Why not take the cognitive chat bots we are using online, and integrate them into telephone based support?



Increase

Opportunity to Sell

When a customer call is resolved the customer cross-selling acceptance rate is increased by 20%



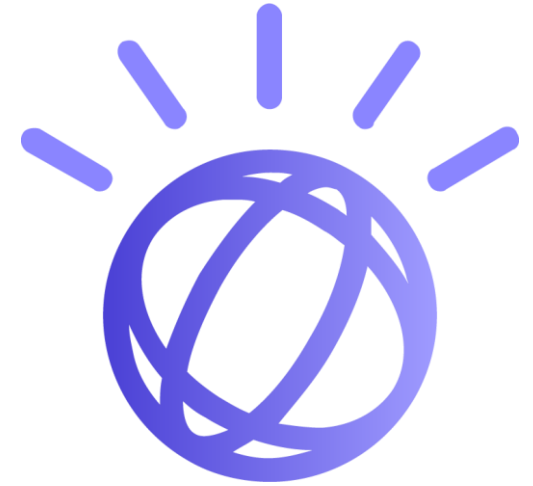
Improve

Customer Satisfaction & FCR

A 1% improvement in FCR = 1% improvement in customer satisfaction

Watson Voice Services Today

- Speech To Text service transcribes what a person is saying
- Conversation service derives the meaning of what someone has said, and if trained on what to respond with will provide a text response
- Text To Speech service will synthesize an audio version of the text response from Conversation
- These services are very powerful, but you need a solution to orchestrate between them and to provide telephone based connectivity



Introducing the new IBM Voice Gateway

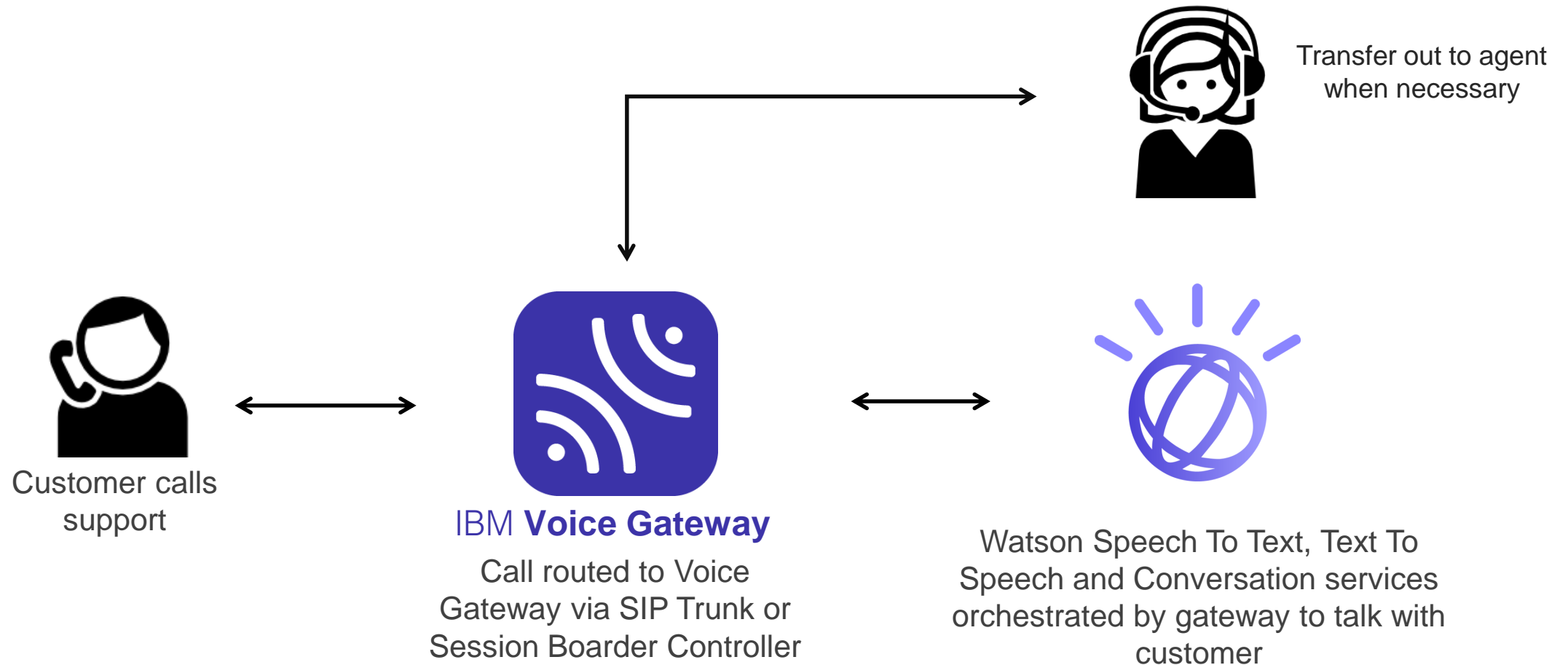
What is it?

- Next generation Cognitive Agent platform
- Expandable solution to allow customization including calling out to on-prem systems, as well as bringing in additional analytics services
- Cloud native, Microservice solution (Docker images)
- Horizontally scalable to meet demand
- Deployable to on premise networks or the cloud
- Provides a SIP endpoint for connecting to, and orchestrating between, Watson services
- Part of an omni-channel support solution covering phone, web, and social channels



IBM Voice Gateway

Use case 1: Cognitive Self-Service Agent

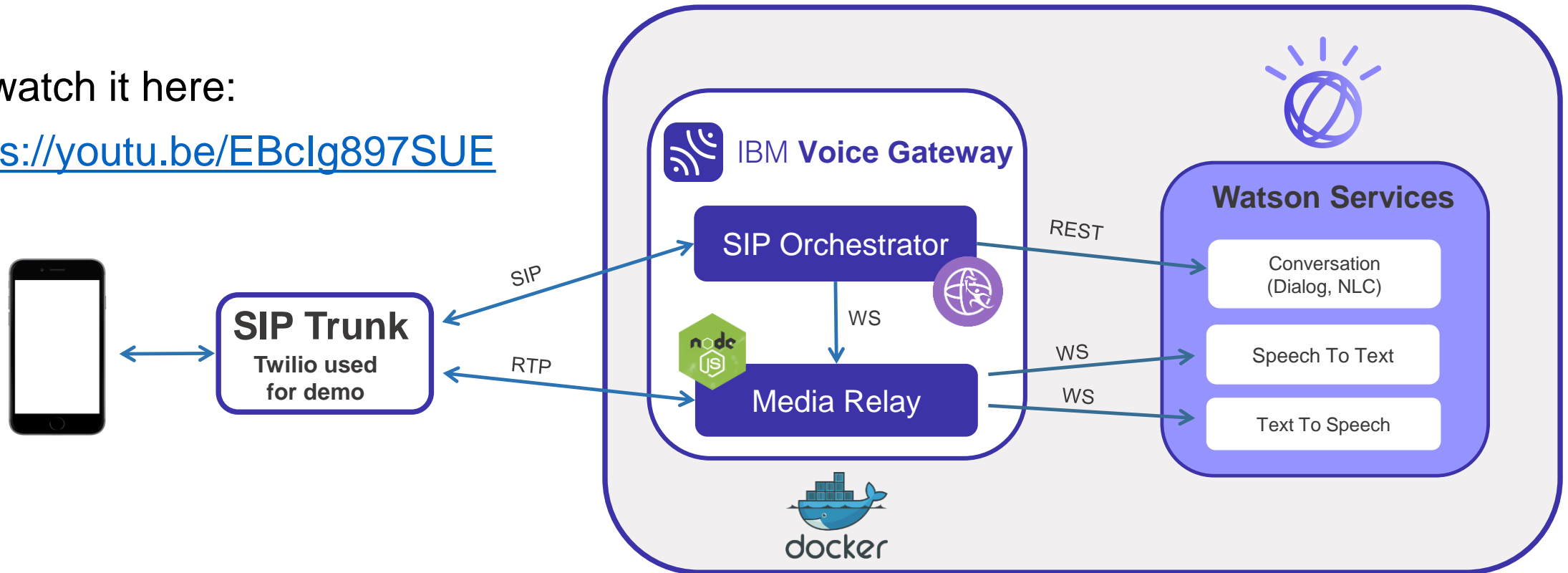


Self-Service Agent Demonstration

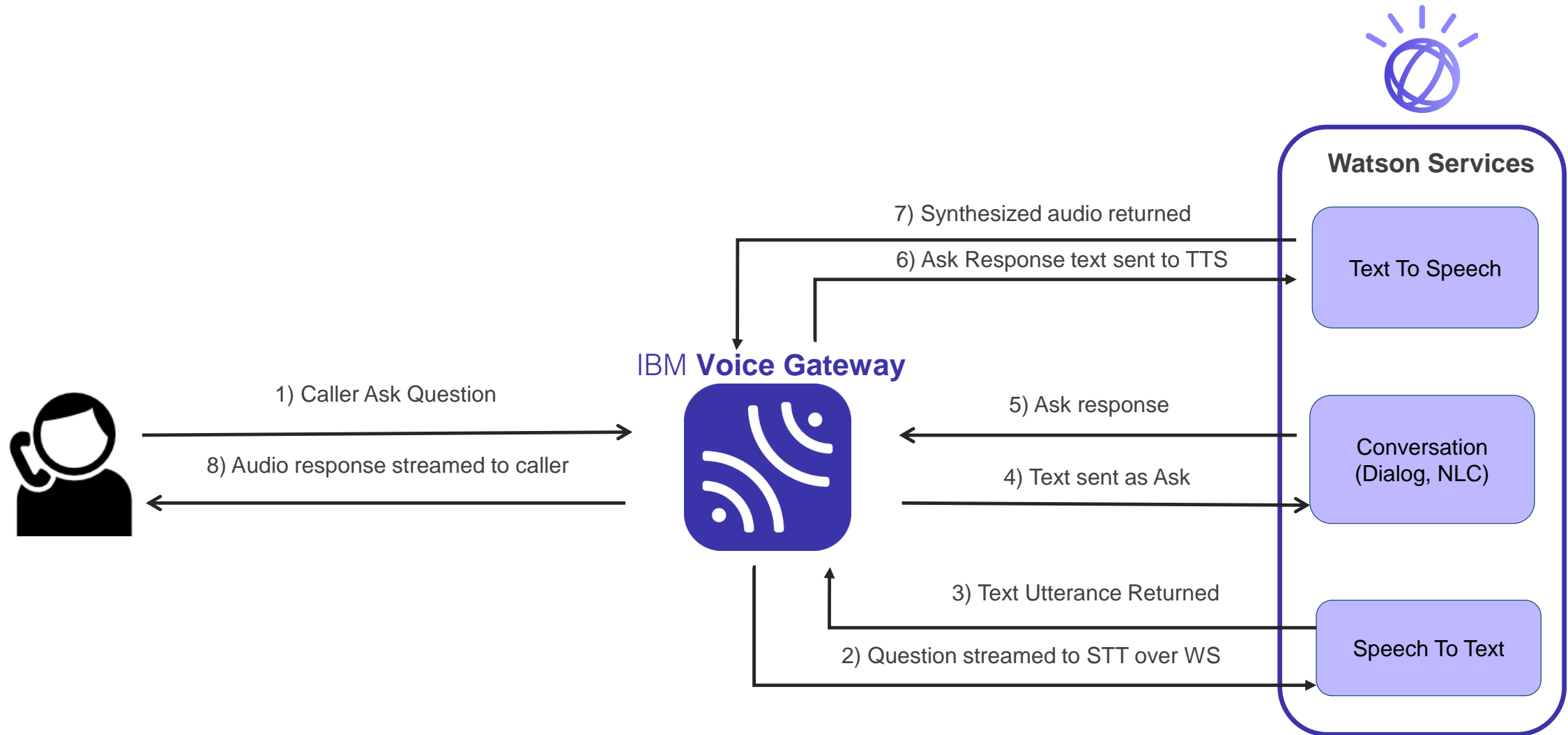
Call demo at:
855-969-4241

Or watch it here:

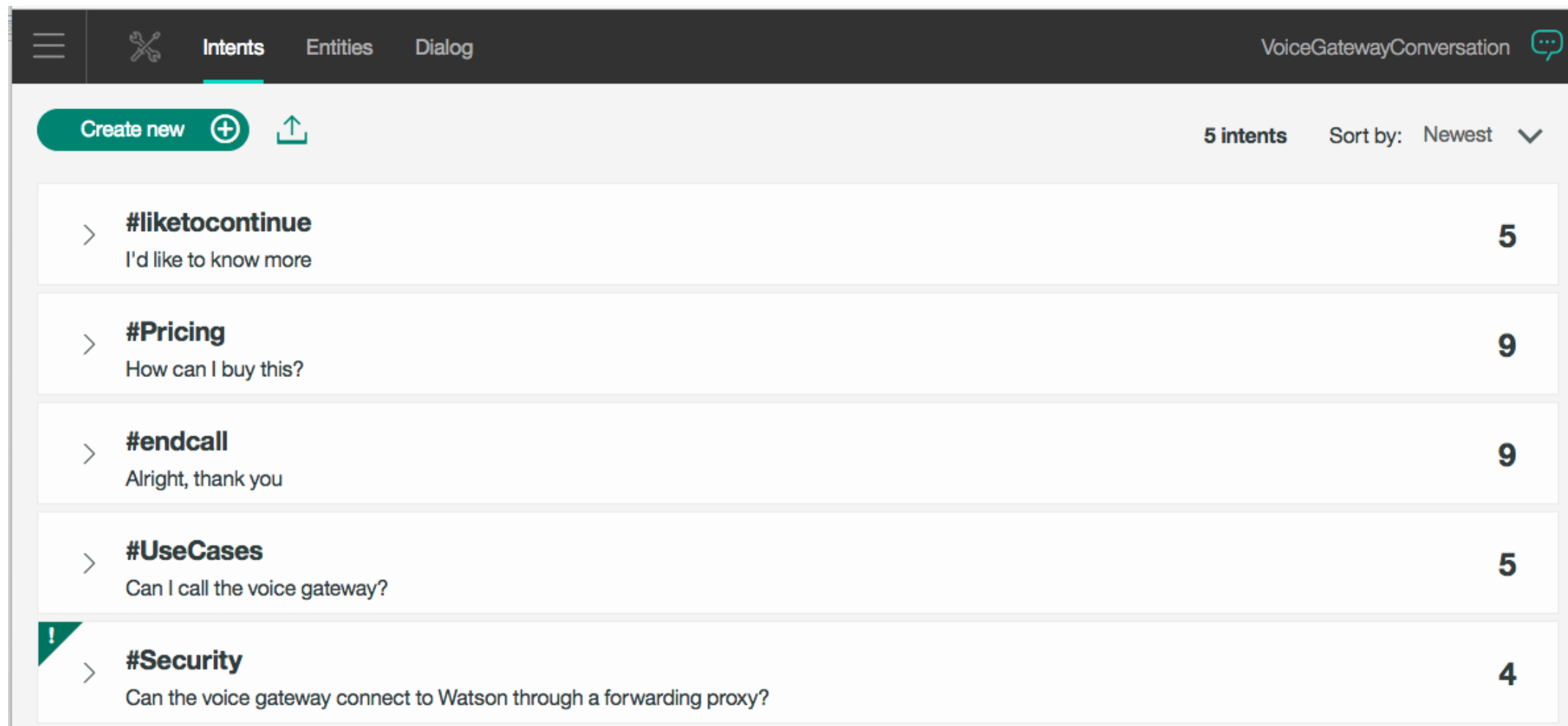
<https://youtu.be/EBclg897SUE>



Self-Service Agent: Single Turn Orchestration Flow



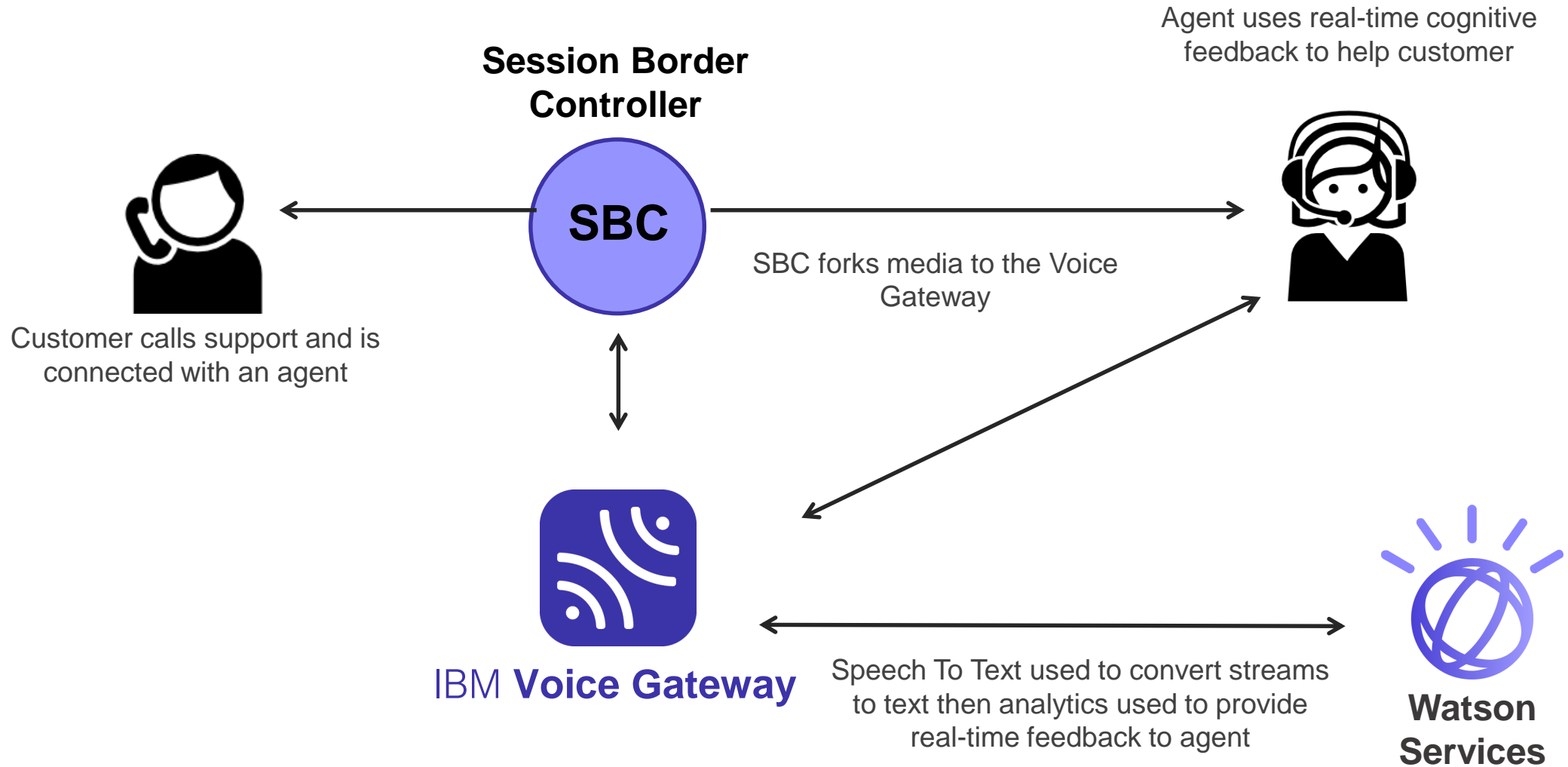
Conversation Example



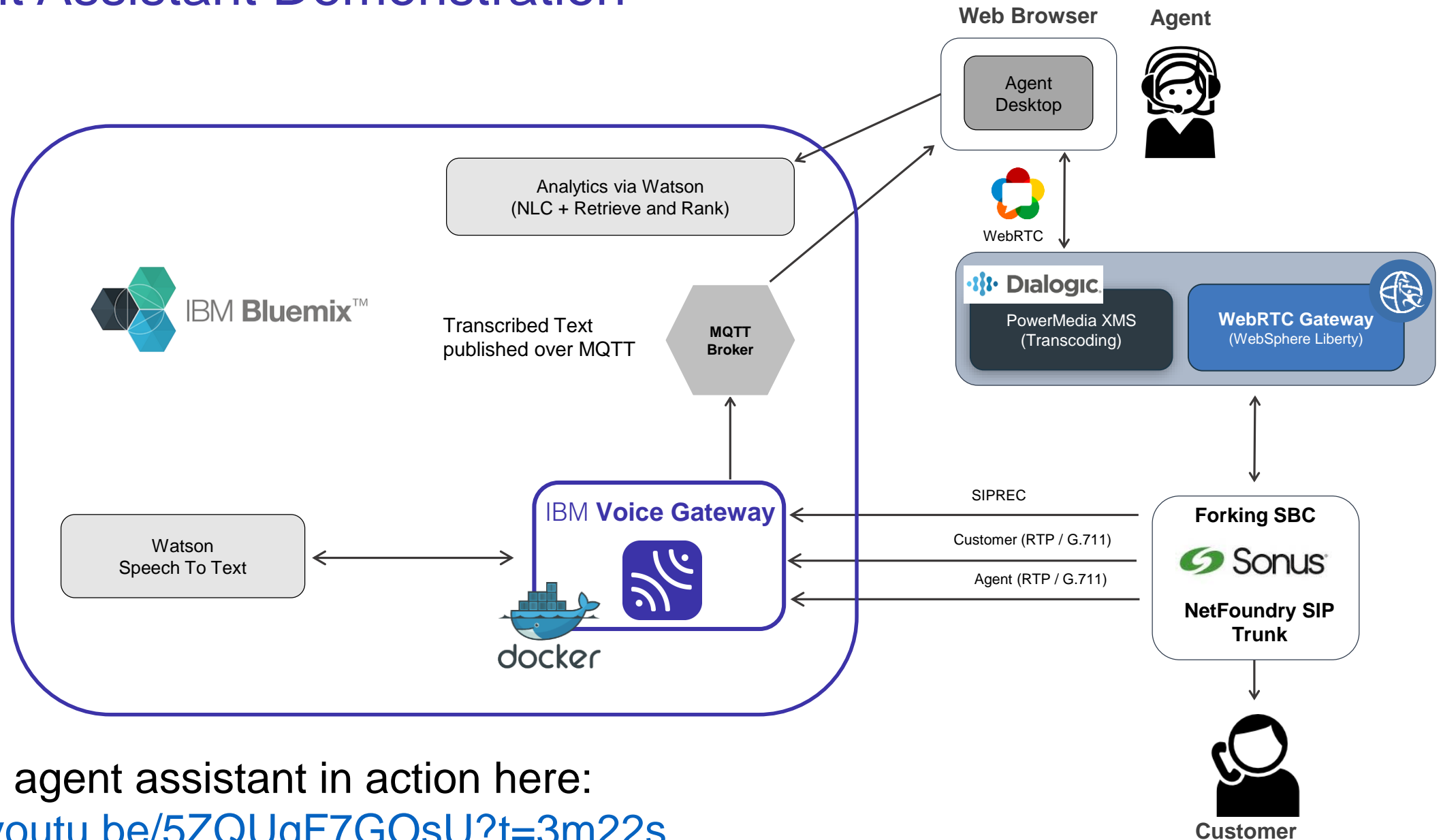
The screenshot shows the 'Intents' tab in the IBM Watson Assistant interface. The header bar includes a menu icon, a wrench icon, and tabs for 'Intents', 'Entities', and 'Dialog'. The page title is 'VoiceGatewayConversation'. Below the header, there is a 'Create new' button with a plus icon and an upload icon. The main content area displays a list of five intents, sorted by 'Newest'. Each intent entry includes a chevron icon, the intent name (starting with a hash), a sample utterance, and a count of training examples.

		5 intents	Sort by: Newest
>	#liketocontinue I'd like to know more	5	
>	#Pricing How can I buy this?	9	
>	#endcall Alright, thank you	9	
>	#UseCases Can I call the voice gateway?	5	
!	#Security Can the voice gateway connect to Watson through a forwarding proxy?	4	

Use case 2: Cognitive Agent Assistant



Agent Assistant Demonstration



See the agent assistant in action here:
<https://youtu.be/5ZQUgF7GOsU?t=3m22s>



Self-Service Agents

Point of sale agent

Pre-screening agent

Credit checking agent

Support agent

Booking agent



Agent Assistants

Point of sale agent assistant

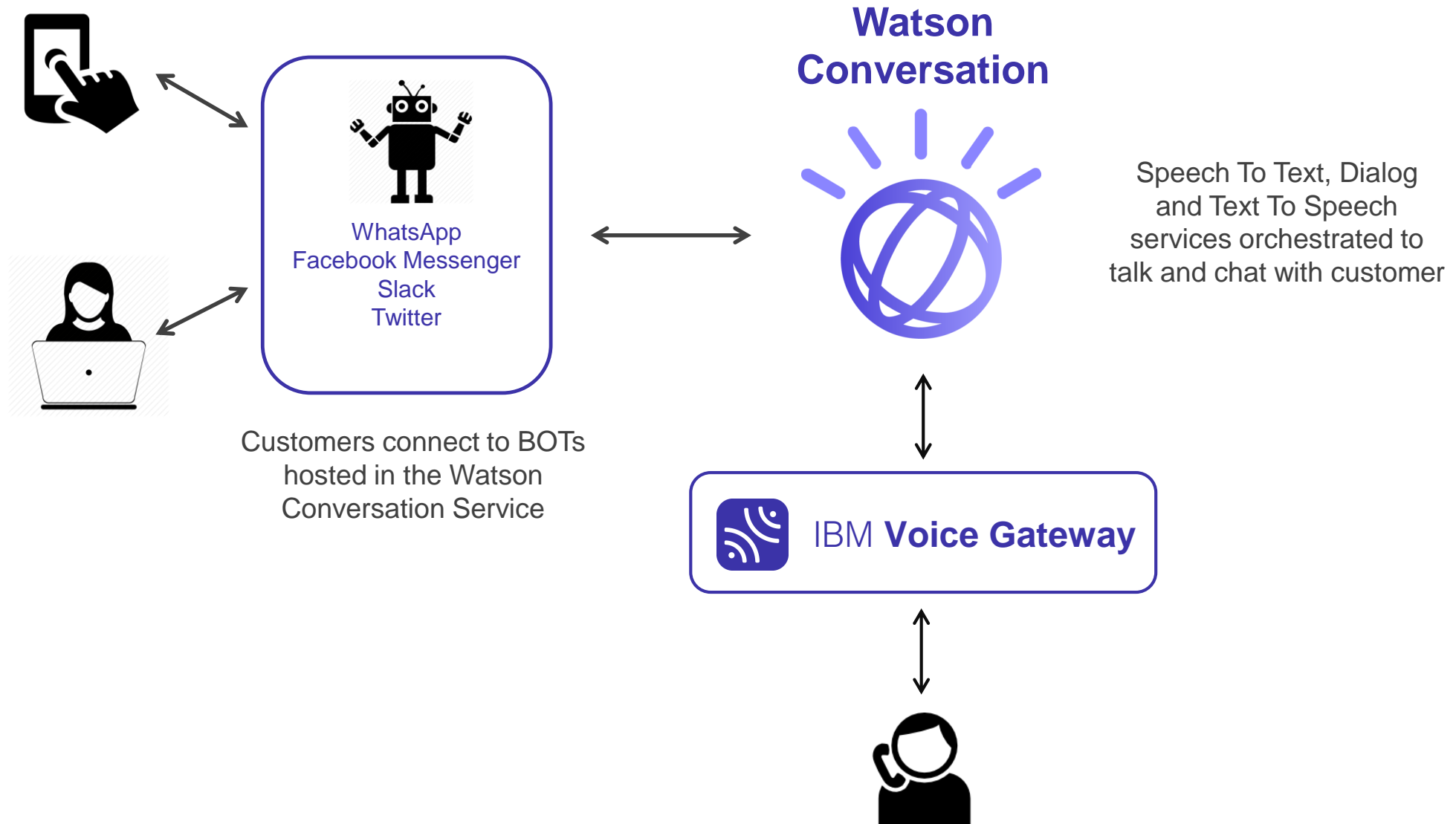
Real-Time trouble shooter

Agent coaches and trainers

Healthcare diagnostic assistant

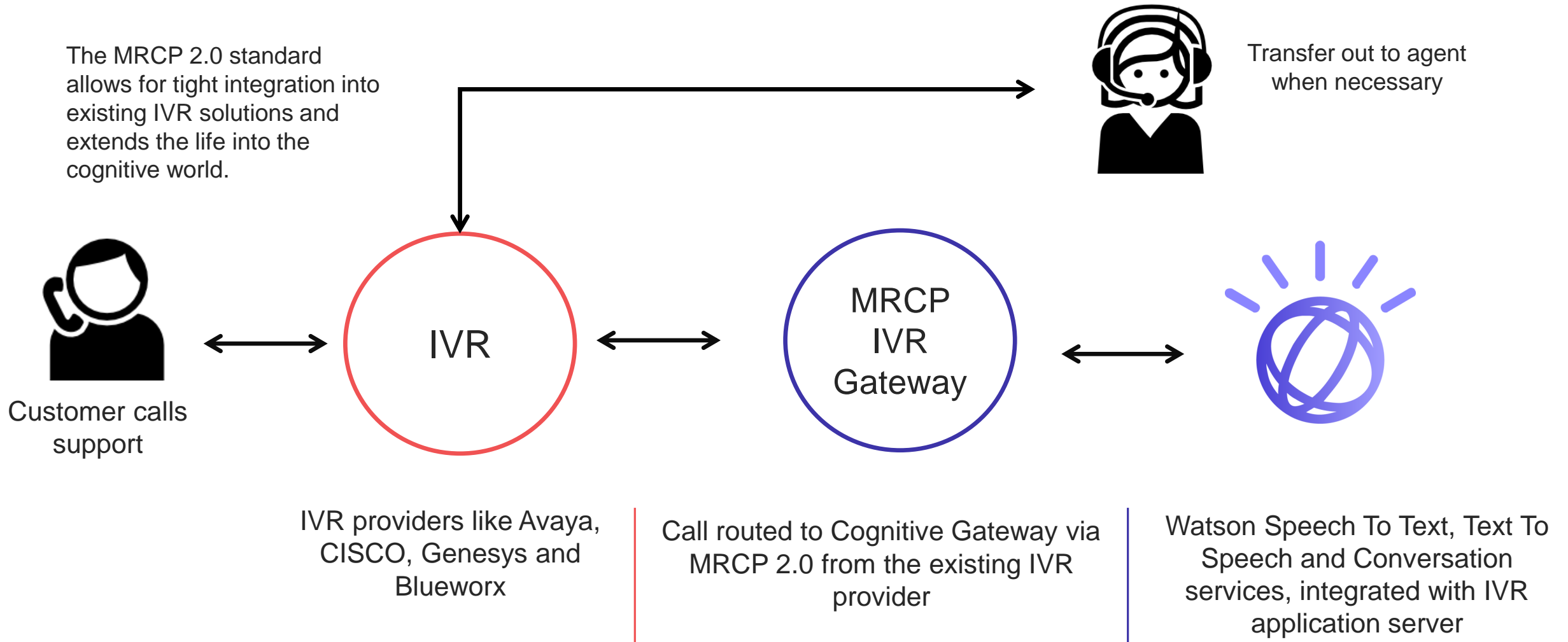
Transcriptions

Omni-Channel Cognitive Agents



Use case 3: Cognitive IVR

The MRCP 2.0 standard allows for tight integration into existing IVR solutions and extends the life into the cognitive world.



IBM Voice Gateway for Watson

Under the hood

IBM Voice Gateway Microservice Composition

Composed of two co-dependent Docker containers

SIP Orchestrator (SO) Microservice

- Runs on WebSphere Liberty
- Handles all SIP signaling
- Watson Conversation orchestration
- Controls the media relay through a web socket connection per call
- Acts as a SIP endpoint or a SIPREC server depending on use case

Media Relay (MR) Microservice

- Runs on Node.js
- Transcodes between RTP and raw PCM (for Watson services)
- Orchestrates Speech To Text (STT) and Text To Speech (TTS)
- Publishes text utterances to SO
- Synthesizes text utterance from SO



IBM Voice Gateway

Microservice Architecture

Microservices

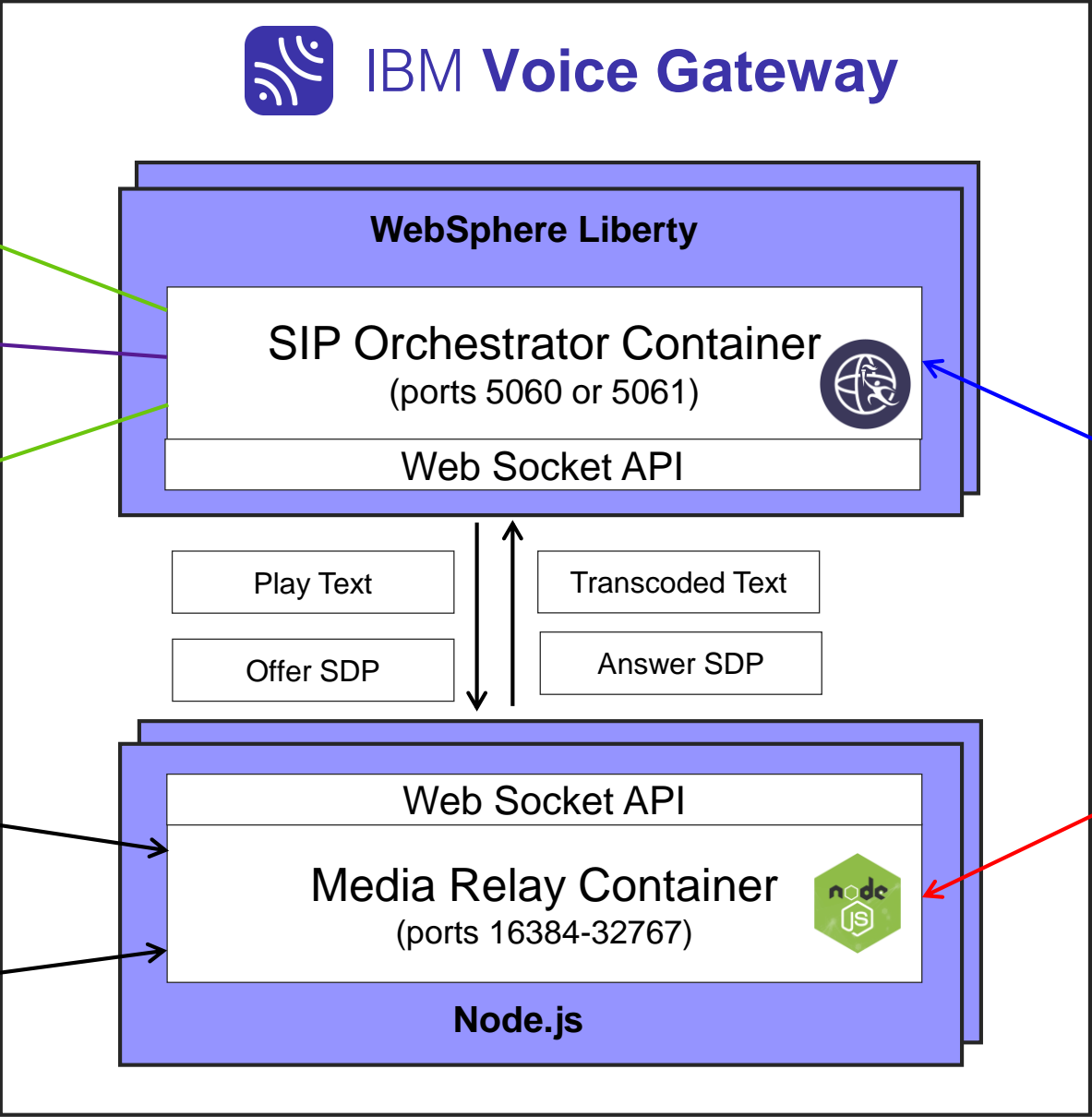
Reporting
(Splunk, REST)

Transcriptions to
MQTT Broker

Watson
Conversation
Service

Watson Speech
To Text Service

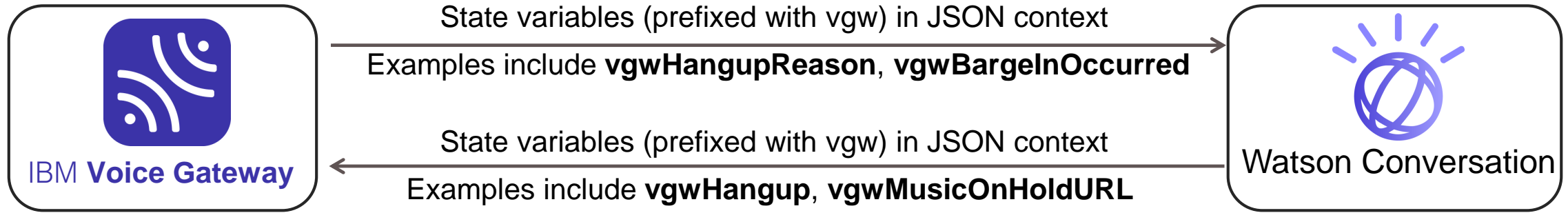
Watson Text To
Speech Service



- ← MQTT
- ← REST APIs
- ↔ Web Socket APIs
- ↔ SIP/SIPREC
- ↔ RTP/G.711

SIP Trunks,
SBCs,
SIP Load Balancer,
SIP Endpoints,
Etc.

Customizing the Voice Gateway when acting as a self-service agent

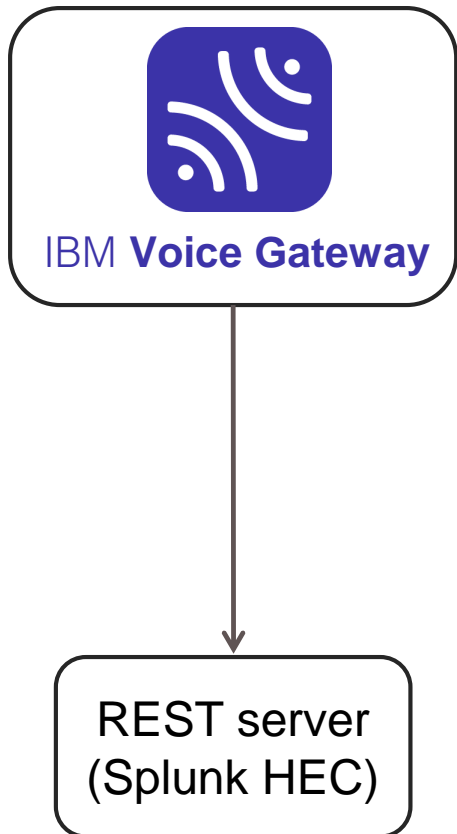


Gateway API exposed to the Watson Conversation service for:

- Call control (hangup, transfer)
- SIP header access for logging (Request, To and From URIs, etc.)
- Speech control (switch language, STT confidence and alternates)
- Music on hold and audio wav file playback to caller
- Error message handling (transfers, error utterances)
- Contact center integration

Reporting from the Voice Gateway

Reporting events published from the voice gateway



Call Detail Record Events
Splunk event headers
Start and Stop time
Call length
SIP details (e.g. SipTo, SipFrom)
Number of turns
Number of barge ins
Watson transaction latencies
Intents details (#, list of all)
And more...

Conversation Turn Events *
Splunk event headers
Input text
Output text
Intents
Entities
Context state variables
Conversation ID
Turn counter
And more...

* JSON from Conversation response

Securing the IBM Voice Gateway

The voice gateway supports the following:

- Connecting to Watson over TLS
- Connecting to Watson via a forwarding proxy
- Mutual authentication for REST and Web Sockets
- Supports for SIPS
- Supports trust and key store configuration
- Default trust store with certs for Watson connectivity



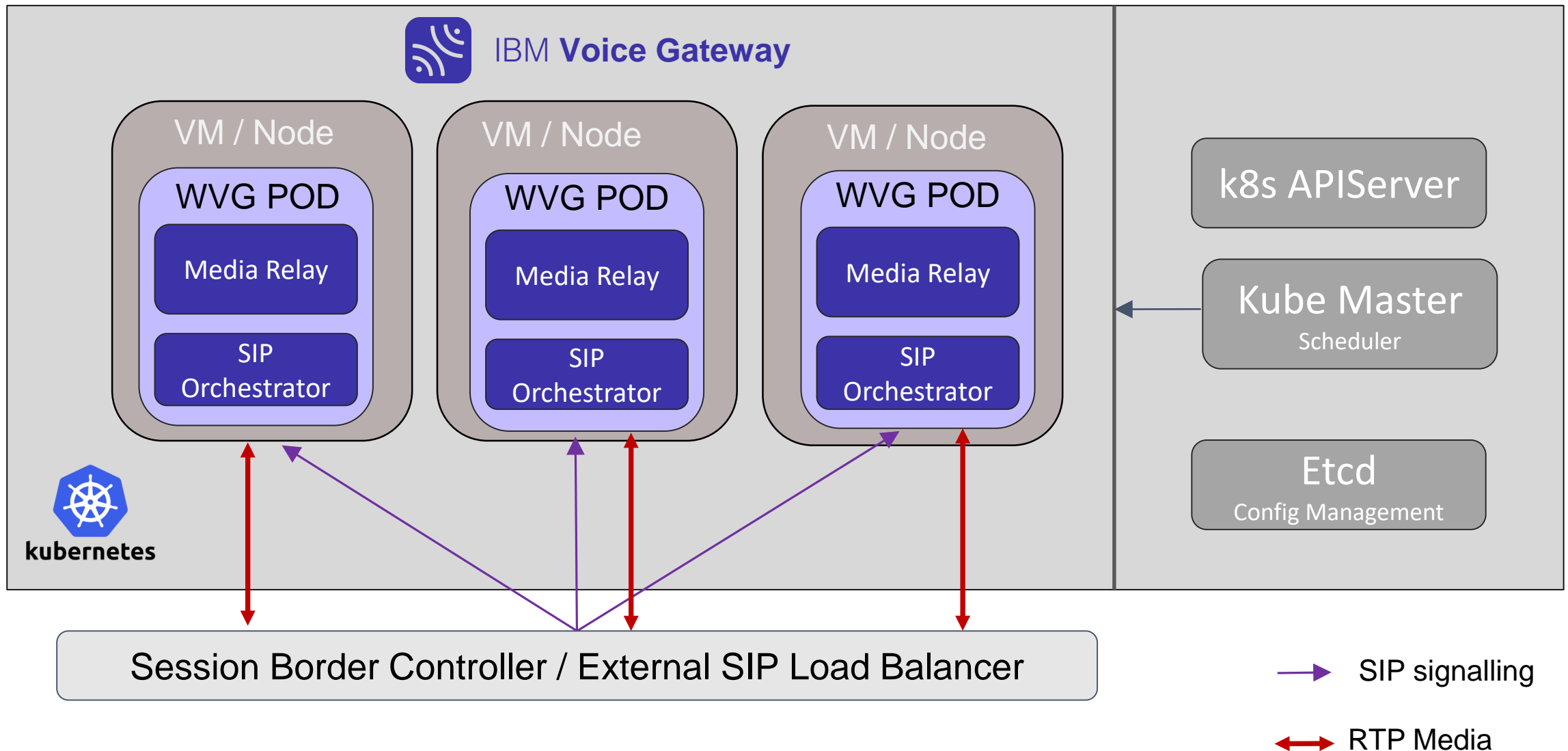
IBM Voice Gateway

HA using Kubernetes (k8s)



- Kubernetes used for container orchestration and scheduling
- A Voice Gateway pod consist of a single SIP Orchestrator and Media Relay container
 - Pod deployed in Net Host mode to expose VM IP addresses and ports
 - Only one Voice Gateway Pod per node (enforced with k8s configuration)
- External SIP Load Balancing of k8s pods
 - SIP LB statically updated with POD address details
 - POD must be queisced of all active calls before taking out of service
- Sample kubectl scripts available here:
 - <https://github.com/WASdev/sample.voice.gateway.for.watson>
- IBM Spectrum Conductor for Containers tested
 - Recommended for an on premise Docker substrate

IBM Voice Gateway HA using Kubernetes

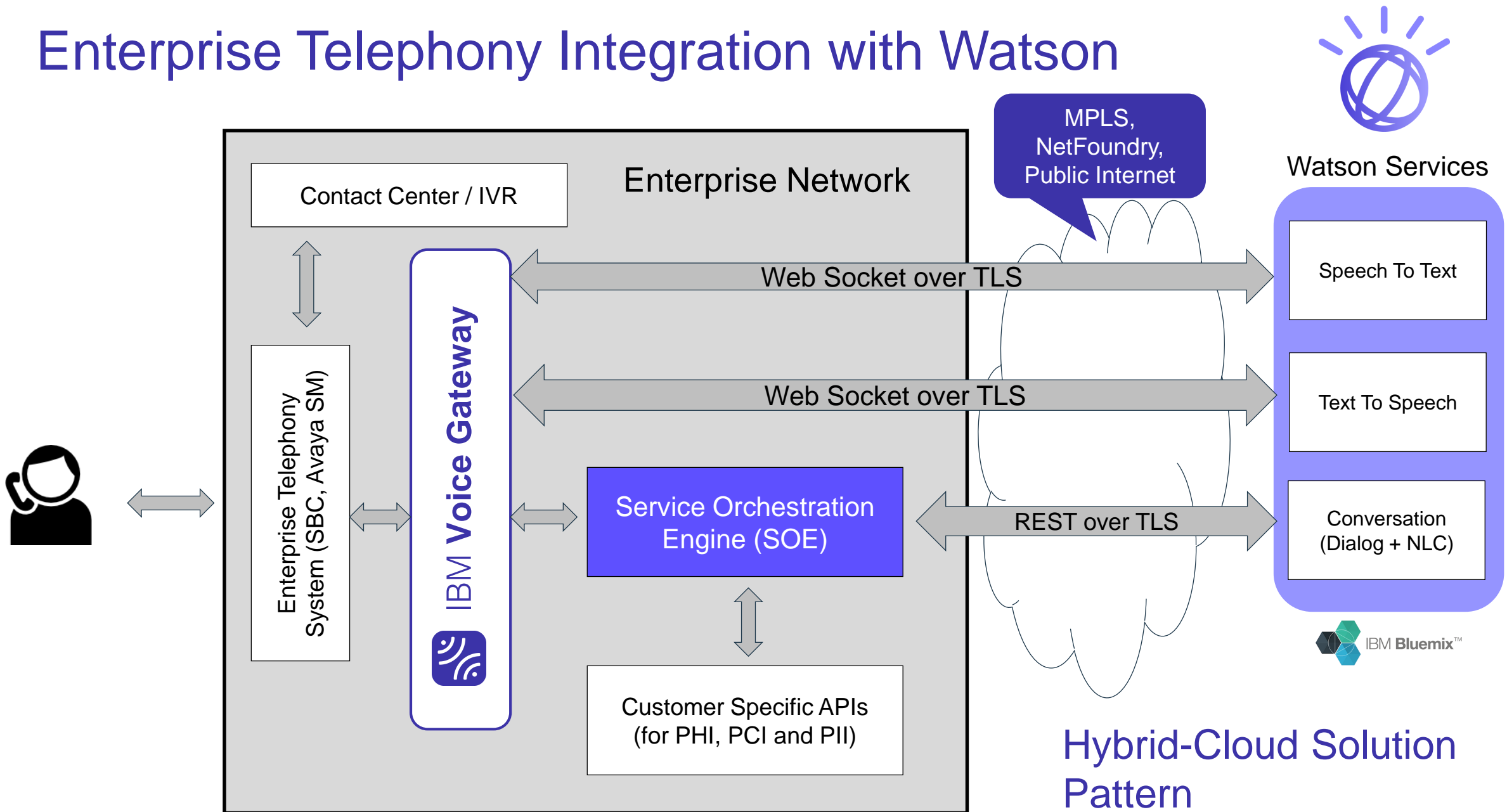


Enterprise Integration

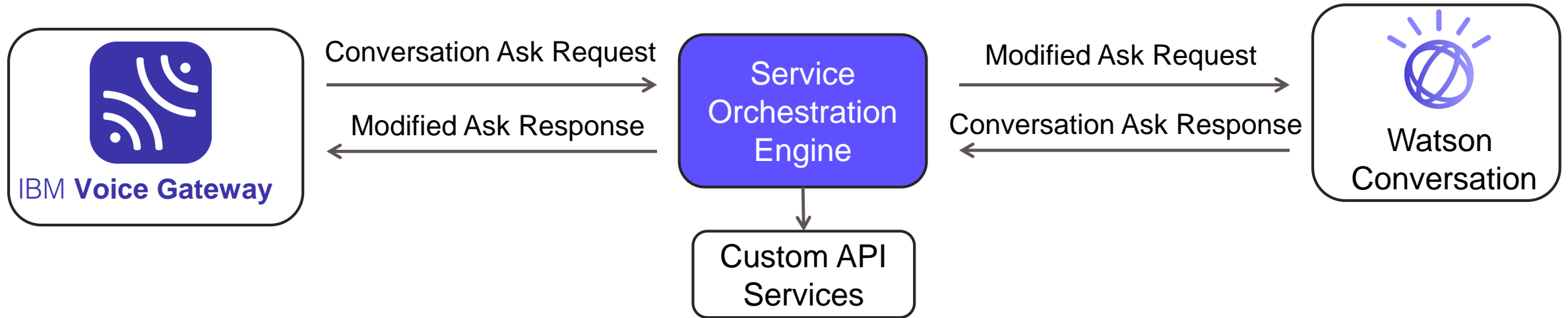
Enterprise integration requirements

- Integrate with contact centers and enterprise telephony systems
- Compliance requirements (e.g. HIPAA, PHI, PCI and PII)
- Integration with existing Systems of Record
- Voice analytics
- Voice security (e.g. hybrid connectivity, authentication, etc.)
- De-identification of Watson Conversation requests

Enterprise Telephony Integration with Watson



Service Orchestration Engine (SOE) Sample



Why most deployments will need an SOE:

- De-identification of Watson Conversation requests
- Personalize the Watson Conversation responses
- Use telephony features like Caller-id, DTMF, etc.
- Integrate with API's to enhance the user interaction
- Exploit Voice Gateway features using state variables
- Voice security integration using DTMF or biometrics

SOE Banking Sample Application shows:

1. How to call API's to enhance WCS responses
2. How DTMF can be used to process user input
3. How to log the interactions to WCS
4. How to approach building your own SOE
5. How to enable user security
6. How to personalize the interactions

<https://github.com/WASdev/sample.voice.gateway/tree/master/soe>

IVR and Contact Center Integration

Voice gateway integrates with existing IVRs and Contact Centers using SIP initiated call transfers:

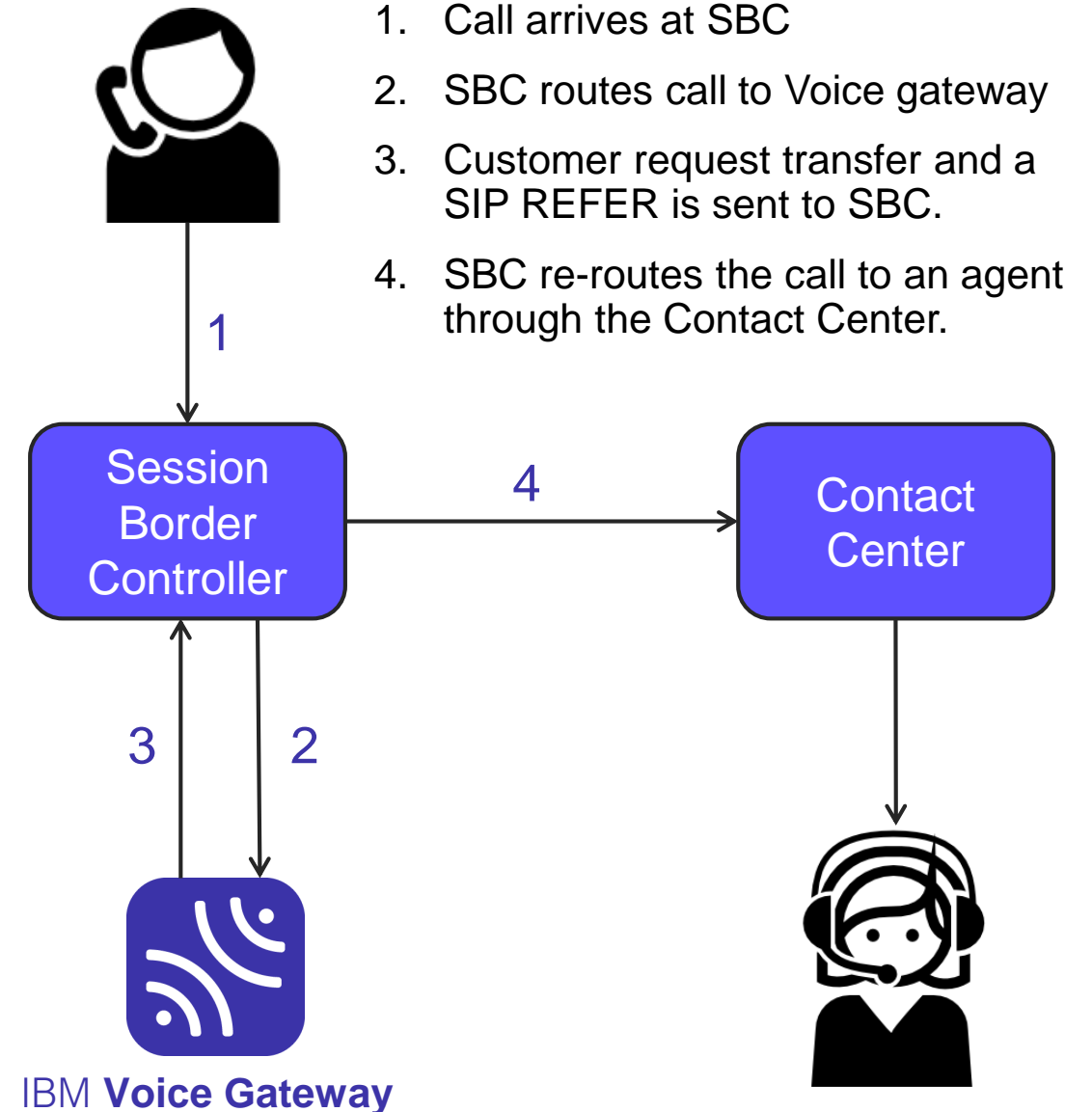
- Transfer to voice gateway from IVR
- Transfer to Contact Center from voice gateway

Session Border Controllers can handle SIP REFER messages and perform the transfer:

- SBCs catch refer and perform the transfer

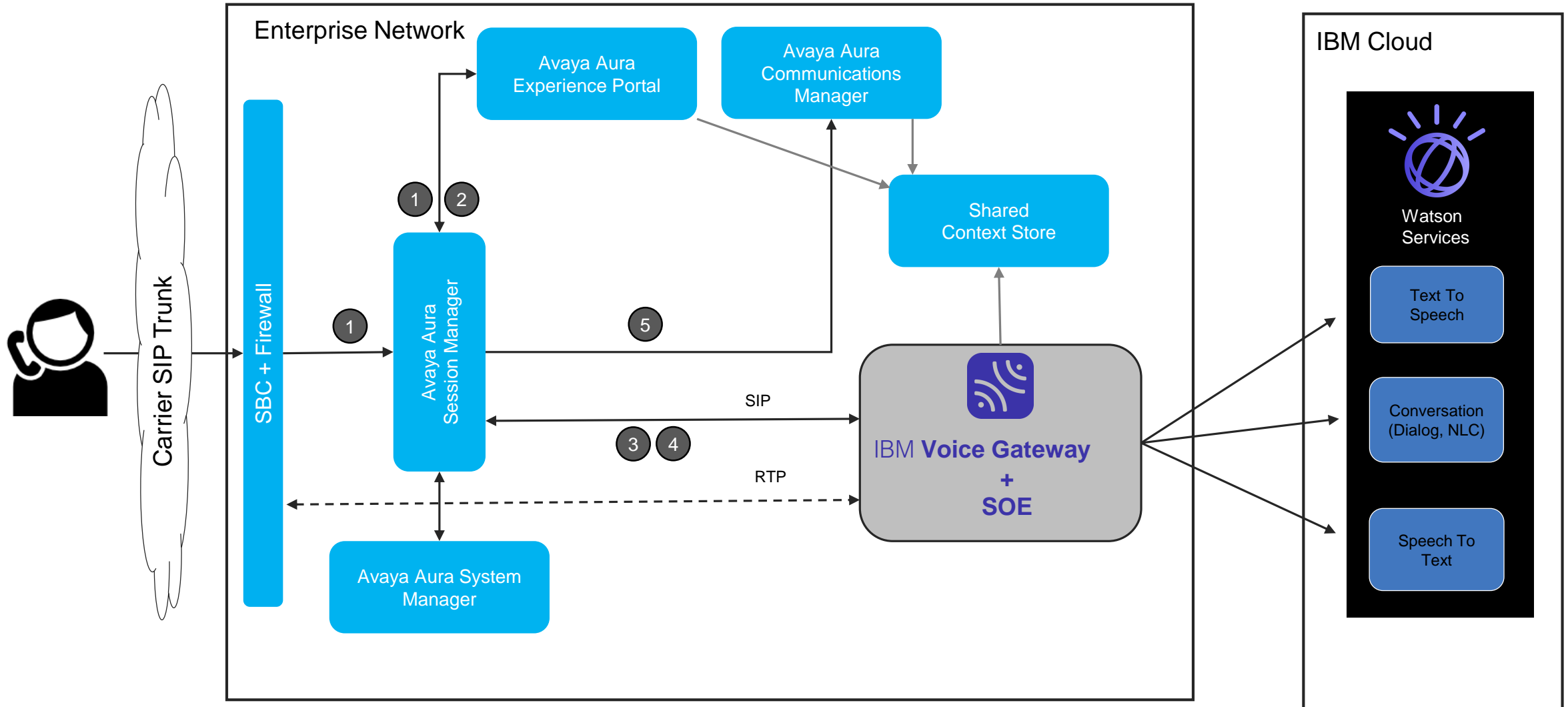
Agent dashboards integrate via:

- Metadata exchanged in SIP signaling
- Conversation history published from an SOE

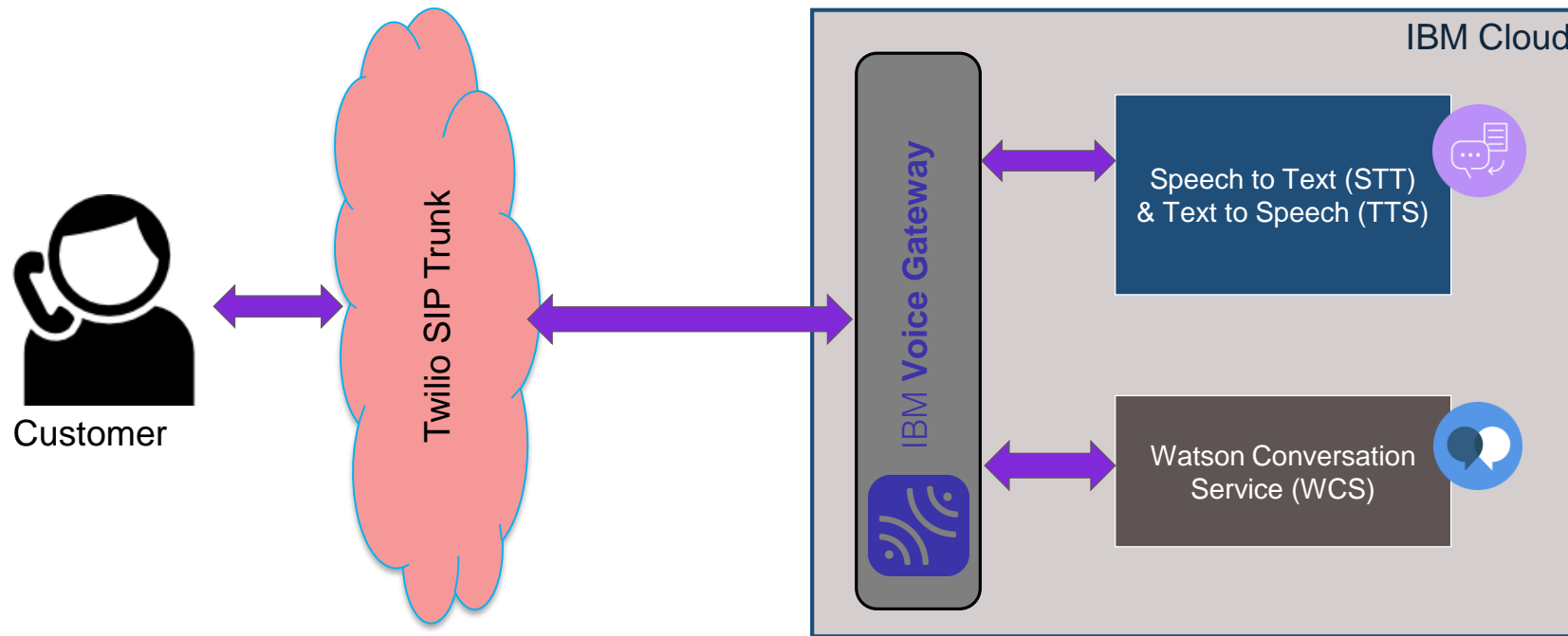


IBM Voice Gateway Avaya Integration:

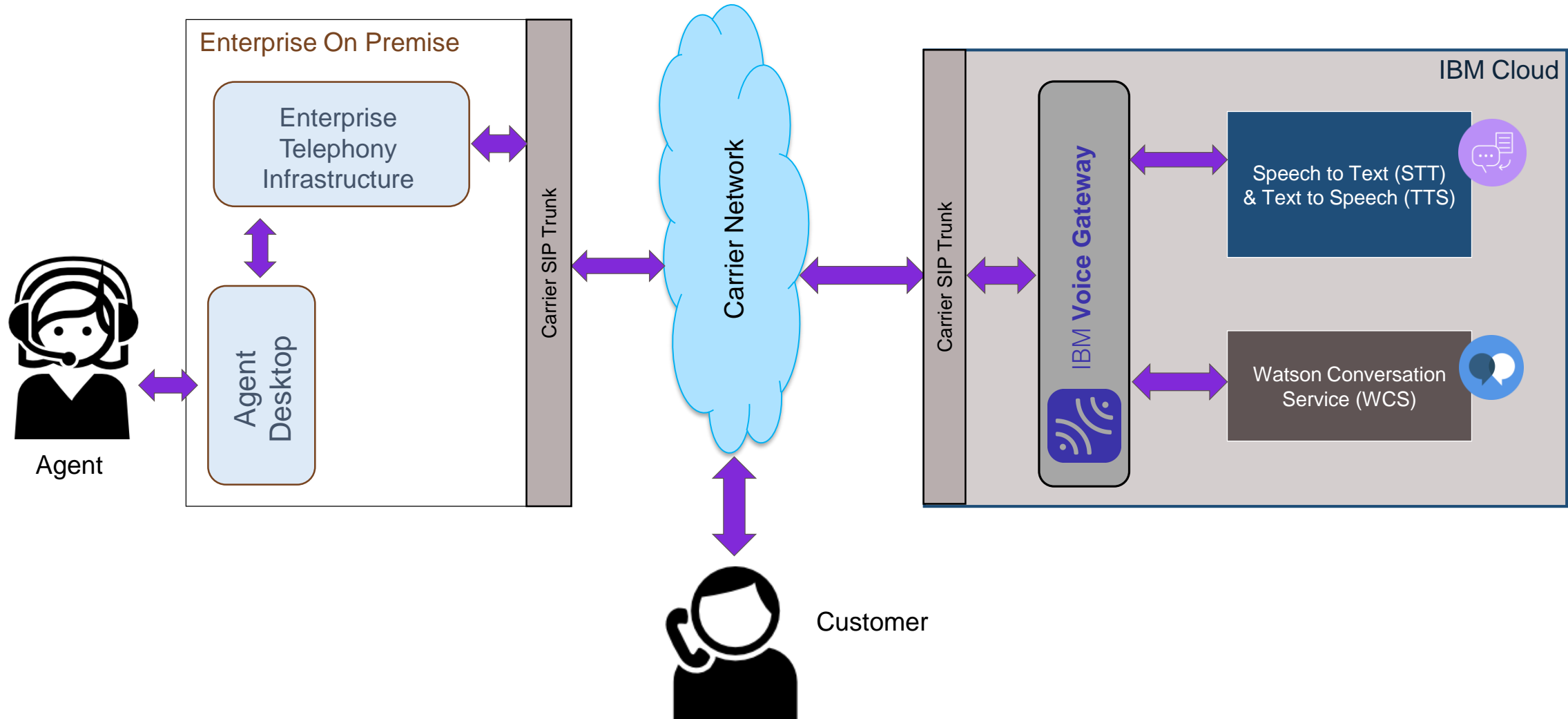
Transfer from Experience Portal



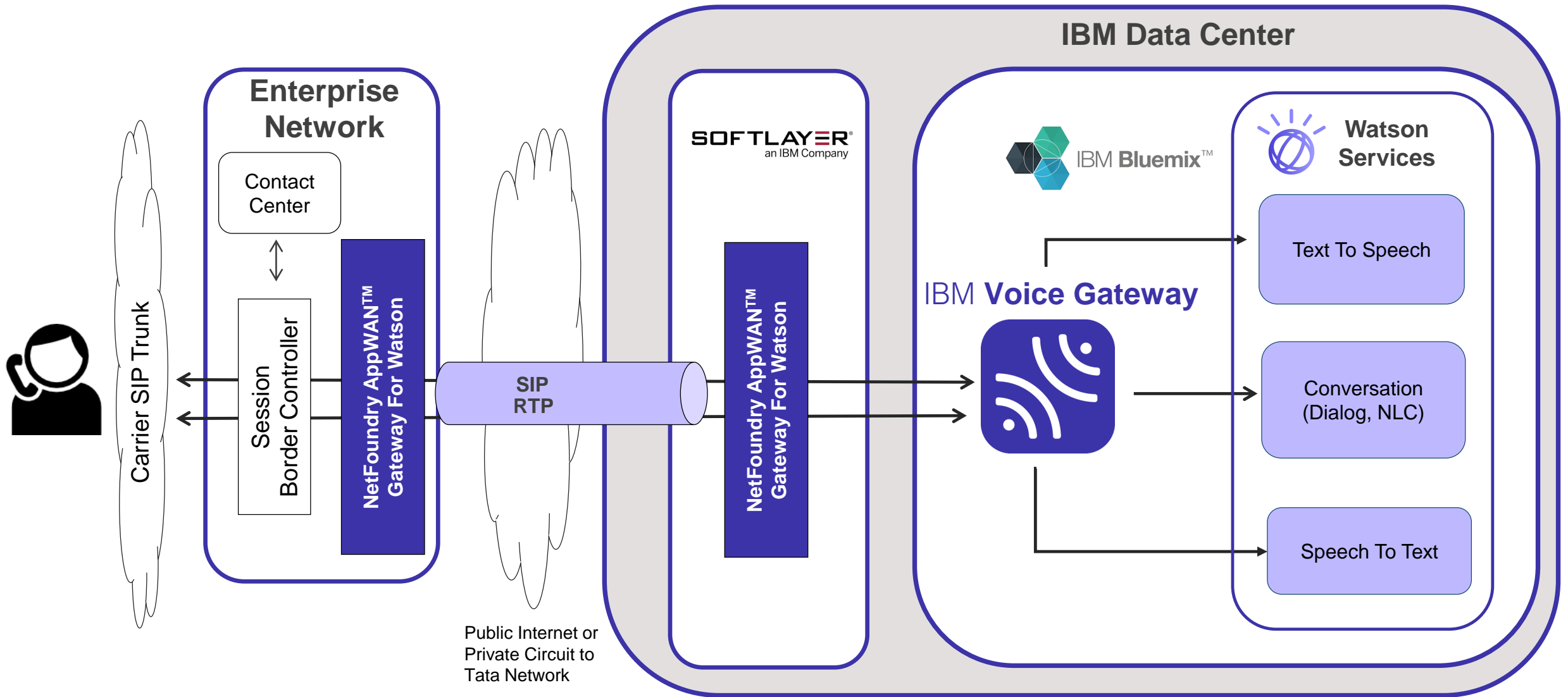
IBM Cloud Integration via Twilio



IBM Cloud Integration via telco carrier



IBM Cloud Integration via Tata NetFoundry AppWAN™



Conclusion: Why Cognitive Voice Agents

Better than traditional IVRs

- Understands natural language, agents are conversational
- Fewer opt-outs means lower contact center cost
- Can handle deeper, more complex conversations
- Can handle multiple intents in a single call

Deep Analytics lead to improved KPIs

- All aspects of system contribute to analytic processing. For example:
 - Barge-in correlation points to areas to focus training and improvements
 - Opt-outs correlated to points in conversation lead to improved flows

IBM Voice Gateway for Watson

Get started now!

How to get started

- Link to Docker images in DockerHub (developer only license)
 - <https://hub.docker.com/r/ibmcom/voice-gateway-so/>
 - <https://hub.docker.com/r/ibmcom/voice-gateway-mr/>
- Link to documentation in Knowledge Center
 - <https://ibm.biz/VoiceGatewayDoc>
- Link to samples in public GitHub Repository
 - <https://github.com/WASdev/sample.voice.gateway>
- Get questions answered at dwAnswers forum
 - <https://developer.ibm.com/answers/topics/voicegateway/>
- Marketplace link (includes video demonstration)
 - <https://www.ibm.com/us-en/marketplace/voice-gateway>

Become part of our community on Slack!



First register with the ibm-cloud-tech team here:

<http://ibm.co/2mbIgXr>

Then join the #ibmvoicegateway channel here:

<https://ibm-cloud-tech.slack.com/messages/ibmvoicegateway>

Next Steps

Sign up for the IBM Voice Gateway workshop: <https://register.gotowebinar.com/register/5841896976551330561>
18th July 11am EST

- Technical Presentations
- Hands-on Exercises
- Instructor Led demonstrations

This workshop will showcase and position the IBM Voice Gateway and cognitive call center solution and show how to implement a cognitive call center solution with self-service agent capability by using IBM Voice Gateway and IBM Bluemix Watson Services.

You will learn about:

- How to implement IBM Voice Gateway solution
- Use different languages from Watson (English to Spanish)
- Create new / or building upon an intent with evolution of conversation
- Provide different answers to a question - via Watson conversation entity
- Train Watson to provide better answers
- Set different response voices (Male/female)
- Have a Service Orchestration Engine (SOE) to call out for Watson to provide dynamic content in a response

InterConnect 2017



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