WebRTC in the Enterprise
Turning challenges to opportunities for the enterprise use cases

Tsahi Levent-Levi
tsahil@bloggeek.me
Contents

Contents................................................................................................................................................. 1
Executive Summary .............................................................................................................................. 2
About Voxbone ........................................................................................................................................ 3
About the Author ................................................................................................................................... 3
What is WebRTC? ................................................................................................................................. 4
Where does WebRTC fit in the Enterprise? ....................................................................................... 5
  1. The Contact Center ........................................................................................................................... 5
    1. Customers calling in .......................................................................................................................... 6
    2. Agents receiving the calls ............................................................................................................... 7
    3. Agents / sales reps placing calls ................................................................................................... 7
  2. Unified Communications .................................................................................................................. 8
    1. The telephony system ..................................................................................................................... 8
    2. The web conference ....................................................................................................................... 9
Barriers to Adoption ............................................................................................................................. 10
  1. Quality of Service ........................................................................................................................... 10
  2. Security ......................................................................................................................................... 10
  3. Browser Support ............................................................................................................................. 11
  4. Legacy Support .............................................................................................................................. 12
Perceived or Real Barriers? .................................................................................................................. 14
Conclusions .......................................................................................................................................... 15
Executive Summary

WebRTC is a new technology enabling voice and video communications within the Web browser without the need of any plugins or additional installation.

WebRTC democratizes access to communication technologies for those who want to use it, while reducing the friction for end users who need to communicate. In the enterprise context, WebRTC sets global communications free from its current expensive per-minute charges, and substantially improves the user’s experience of starting her conversation directly from within an application or a specific website.

This whitepaper discusses where WebRTC fits within the enterprise, covering in detail its benefits for the contact center, unified communications, web conferencing and collaboration.

The paper continues with a review of the barriers to adoption of WebRTC in the enterprise; focusing on quality of service, security, browser support and legacy support. It goes on to analyze which of these barriers are real and which are only perceived, offering possible solutions and workarounds.

If you are contemplating introducing WebRTC to your enterprise, make sure you know where it fits, what the challenges you may face, and what mitigations are available to you today.
About Voxbone

Voxbone is the market leader in providing virtual local phone numbers (often referred to as DID numbers). Its services enable cloud communications providers, telcos and enterprise contact centers to rapidly extend the reach of their voice networks internationally, at minimal costs.

The company delivers high-quality inbound SIP trunks in more than 50 countries and more than 8,000 cities around the world. Voxbone customers benefit from a fully automated and real-time service delivery process via a Web portal or an API. Voxbone is the only operator of its kind with its own number ranges (which can be geographical, mobile or toll-free), telecommunications licenses and a global private VoIP backbone. Voxbone was the first company to offer emergency-calling service accessible in multiple countries from a single IP-based interconnection. In May 2014, Voxbone launched a BETA program of its “WebRTC as a service” feature, employing its global private IP backbone to route WebRTC calls internationally, adding QoS and security to WebRTC calling.

Voxbone customer references include: Telefonica, Deutsche Telekom, Orange Business Services, NTT, Level 3, Liveops, InContact, 8x8 Inc., and other top tier providers. For more information, visit www.voxbone.com or connect with Voxbone on LinkedIn or Twitter.

About the Author

Tsahi Levent-Levi is an Independent Consultant for WebRTC.

Tsahi Levent-Levi has 15 years of experience in the telecommunications, VoIP and 3G industries as an engineer, manager, marketer, and CTO. Tsahi works as an independent consultant, assisting companies to bridge between technologies and business strategy in the domain of telecommunications.

Tsahi is also the author and editor of bloggeek.me, which focuses on the ecosystem and business opportunities around WebRTC. Tsahi has written multiple business reports covering the WebRTC market and its dynamic ecosystem of vendors.

Tsahi has an MSc in Computer Science, and an MBA degree with specializing in Entrepreneurship and Strategy. Tsahi has been granted three patents related to 3G-324M and VoIP. He acted as the chairman of various activity groups within the IMTC, an organization focusing on interoperability of multimedia communications.
What is WebRTC?

WebRTC stands for Web Real-Time Communication. In essence, it is the fusion of two separate branches in technology: VoIP and the Web.

VoIP, short for Voice over IP, is a set of technologies and techniques that enable sending media (usually voice and video) over an IP connection. WebRTC takes the concept of VoIP and fuses it into Web browsers. This enables adding rich communications into websites and mobile apps.

WebRTC does all that by offering a thin layer of Javascript APIs that are implemented by modern Web browsers, and are part of the HTML5 specification.

This means that now every web developer can add real time communication capabilities to his or her website or Web application.

Two important aspects of WebRTC:

- It is a free technology, available for anyone to use and manipulate
- It changes the definition of VoIP developers, opening up real-time communications to a large number of web developers

Together, they lower the barrier of entry for communication services to a level that enables use cases that were always necessary but never attainable with previous technologies.

WebRTC is in the process of being standardized by the Internet Engineering Task Force (IETF) and the World Wide Web Consortium (W3C), with many vendors – large and small – taking part in the effort. Even though the specification is yet to be finalized, there are already over 500 vendors and projects that are using WebRTC technology in one way or another.

Some of these vendors are focusing on the enterprise, which we will explore next.
Where does WebRTC fit in the Enterprise?

Enterprises have an insatiable need for better communication means – be it between the employees of the enterprise, its suppliers, its partners, or its customers and end users. In the past decade, we have seen the introduction of unified communications in the enterprise, which greatly improved communication between employees. During that time, communication with the “external world” hasn’t progressed as much.

The communication tools that were available to enterprises up until now are being introduced to a new technology, one with the potential to disrupt much of the current solutions deployed by enterprises.

Areas in which WebRTC is going to affect enterprise communications include:

1. The contact center
2. Unified communications

Some of these changes are going to be evolutional in nature – more akin to sustaining innovation. Other changes brought by WebRTC are revolutionary – they represent disruptive innovation.

This paper reviews the various areas where WebRTC is already making strides within the enterprise, as well as areas where WebRTC will change the face of enterprise communication in the near future.

1. The Contact Center

The contact center enables potential customers and existing customers to communicate with the enterprise. This makes it a critical asset for every enterprise.

There are three domains within the contact center where WebRTC can be integrated:

1. Customers calling in to the contact center
2. Contact center agents receiving calls
3. Agents or sales representatives calling out

It should be noted that businesses will tend to integrate WebRTC in different domains based on their use case, types of customers, and the make-up of their IT assets.
1. Customers calling in

WebRTC can be embedded in a company’s website, mobile app or on banners spread around the Internet as ad placement. This simple action enables an additional channel for users to communicate with the enterprise.

Benefits for the enterprise:

- **Reduced friction for users.** Now they don’t need to “switch channel” from Web browser or smartphone application toward dialing a phone call

- **Reduced handling time through collection of context.** The Web enables the company to know more about the customer. When a customer signs in and browses a website looking for something specific, all that information can be passed along with the call to the agent, reducing the time it takes to collect it yet again during the call itself

- **Improved quality of the call.** WebRTC introduces HD voice and the ability to add video calling, as seen with Amazon’s customer service portal, Mayday. This improves the user’s experience during his or her interaction with the company.

All of these factors contribute to a better customer experience overall, and higher productively from the contact center agent.

While click-to-call buttons have been available in the past as well, these tended to use proprietary software, and more often than not, required installation of plugins. This greatly reduced their effectiveness.

The enterprise may see additional cost savings by adopting WebRTC: More customers accessing the contact center using WebRTC through the website or a dedicated application translates to a reduced number of expensive inbound calls on toll-free numbers.
2. Agents receiving the calls

Another option in the contact center is to enable contact center agents to receive incoming calls from directly inside the browser.

This can be a seamless part of the CRM system itself. This is usually requires complex CTI integration. With WebRTC, this kind of integration becomes easier, at least for those who are not “married” to the Internet Explorer as the browser used within their contact center. For them, this yields the following benefits:

- **Virtualizes the contact center.** It frees agents from a specific machine that has all the necessary VoIP software installed, or from a specific desk with the desk phone they have to use. It allows for smaller physical office spaces to be used, and a greater flexibility in recruiting agents.

- **Tighten CRM integration.** This leads to less suppliers to work with, lowered costs, and better visibility of the contact center.

These benefits streamline the operation of a contact center and add greater flexibility to the business.

3. Agents / sales reps placing calls

Sales people need to contact potential customers. Project managers need to contact suppliers. Usually, these would be done using the personal address book of the employee or the CRM system, but the call itself would be placed on the phone. However, this method reduces visibility to the enterprise.
By adding the ability to dial a contact directly from within the CRM system, the following benefits can be realized:

- **Better tracking and visibility.** Calls made from within the CRM are automatically logged. They can later on be retrieved or analyzed as needed. Better tracking means better decision making for the enterprise. While the same can be realized through integration across telephony and IT systems, such integrations are typically complex and expensive.

Interestingly, this benefit may seem small and is therefore often overlooked. However it reduces agent handling time at a relatively low cost.

### 2. Unified Communications

UC (Unified Communications) is all about the ability to communicate in different mediums and manners within the enterprise and with the enterprise’s partners.

While the various domains of UC are merging, they can still be split into two broad groups:

1. The telephony system, where the internal communication of the enterprise is enriched by soft phone clients
2. The Web conference, where meetings are conducted virtually over the Internet

#### 1. The telephony system

Today, modern enterprises are adopting UC. These solutions usually provide some of the following key capabilities:

- Integration with the enterprise’s directory service
- Presence capability, indicating when people are online and available
• Instant messaging
• Ad-hoc file transfer
• Screen sharing
• Voice and video calling
• Connectivity to the phone system, enabling dialing in and out of the enterprise
• Conference calling, either voice or video
• Online collaboration tools

In many cases, these capabilities are being deployed on premise, with an increased adoption of cloud-based UC solution – also known as UCaaS.

However, the challenge with UCaaS is that there is still a need for both hardware and software installations within the enterprise for the endpoints – these must still be maintained by the organization, which is a challenging task in an era where BYOD (Bring Your Own Device) is becoming a norm. It requires the support and adoption of a myriad of platforms previously unseen in the enterprise.

WebRTC, being a native Web denizen, is a natural fit for cloud-based deployments. For UCaaS, WebRTC brings the following advantages:

• **AAA.** To lend a phrase from Patrice Crutel, Senior Architect at Bouygues Telecom: WebRTC enables communications to be provided *Anywhere, Anytime* and on *Any device* – a benefit that is hard to gain without WebRTC

• **Maintenance costs reduction.** By not having to deploy, upgrade, and maintain software clients on employees’ PCs, WebRTC reduces the amount of resources and hassles associated with the IT department’s communications efforts

2. The web conference

In a web conference setting today, the enterprise joins a meeting with an external entity; be it a partner, supplier or a potential customer.

Today, that means using a third-party system to conference, which may not be installed and used by your peer. If the system is in fact, not installed, he or she needs to go through the hassle of downloading and installing a plugin or an application in order to join a meeting.

WebRTC enables inviting anyone to a conference over the Internet without the need to install any plugin or application, with or without authenticating the person’s identity. This reduces the friction and increases the likelihood of an on-time, successful meeting!
Barriers to Adoption

While WebRTC has many advantages and holds a lot of potential for the enterprise, it comes with its own set of challenges, which represent barriers to the adoption of WebRTC in the enterprise.

This section will explain these barriers to adoption and analyze which of these barriers are real, and which are perceived.

1. Quality of Service

The shift from on premise communication services toward the cloud provides a QoS (Quality of Service) challenge to the enterprise. It is a move from a managed network toward the open Internet, where the quality of the connection is not controlled by the vendor providing the service.

WebRTC is part of this shift towards the open internet, as most deployments happen in XaaS (Everything as a Service) environments.

While WebRTC uses codecs and techniques that are more resilient to the nature of unmanaged networks, this is not enough. Enterprises need to make sure to place their WebRTC media servers closer to the location of their users, maintaining an infrastructure that covers their customer base. Building and maintaining such an infrastructure globally can be expensive, as well as time- and resource-consuming.

A solution to this challenge is using a third-party service that provides such capabilities.

2. Security

WebRTC offers a secure mechanism. It supports only encrypted media and entices developers to use HTTPS secure transport for their signaling. That said, when an enterprise opens up its communication channel via the Web, the potential of TDoS (Telephone Denial of Services) attacks does increase.

TDoS is basically a flood of unwanted inbound calls toward the enterprise, flooding out legitimate calls and disrupting the day-to-day operation of the enterprise. This is even more important if the communication system is deemed critical to the enterprise, as it is in many contact centers.
When the enterprise opens up communications via the Web, it needs to take precautions to ensure the system is robust enough and capable of handling possible TDoS attacks.

To overcome this challenge, enterprises need to introduce authentication as part of their WebRTC and VoIP infrastructure, making sure incoming sessions are identifiable. Another option is the use of a third-party WebRTC as a service vendor that can serve as a buffer between the Internet and the enterprise network.

3. Browser Support

WebRTC is a new specification. Development started only 3 years ago and the standard hasn’t been approved yet. However, it is already supported in a stable manner on Chrome, Firefox and Opera Web browsers.

In which desktop browsers is WebRTC supported?

Microsoft has announced its intent to support ORTC, a future API layer for WebRTC, in a future version of Internet Explorer. This intent includes adoption of ORTC by Skype. When that becomes reality is unclear.

Apple, as Apple is prone to do, has not provided any details about its intentions.

This leaves a large number of users without support of WebRTC, especially in enterprises where Internet Explorer is the preferred browser due to support of legacy enterprise systems.

This challenge can be mitigated by browser plugins\(^1\) that wrap WebRTC inside them, support for Flash where WebRTC doesn’t exist, or simply by offering WebRTC functionality only where a supporting browser is being used.

\(^1\) Popular WebRTC plugins for IE and Safari include Temasys Plugin and webrtc-everywhere
4. Legacy Support

The enterprise has existing investments in communication services. These center around PSTN and VoIP services that are already being used. Connecting these to WebRTC can be challenging.

There are three aspects that make legacy support challenging for WebRTC:

1. Codecs

<table>
<thead>
<tr>
<th></th>
<th>WebRTC</th>
<th>Legacy VoIP</th>
</tr>
</thead>
<tbody>
<tr>
<td>Voice codecs</td>
<td>G.711, Opus, iSAC</td>
<td>G.711, G.722.x, G.723, G.729</td>
</tr>
<tr>
<td>Video codecs</td>
<td>VP8 and/or H.264</td>
<td>H.264</td>
</tr>
</tbody>
</table>

The codecs used by WebRTC are different from those used by today’s VoIP deployments. This difference means that transcoding is necessary in order for a WebRTC client to properly engage in a session with an enterprise legacy system.

The video codec of WebRTC hasn’t been selected yet:

- Google’s stance is supporting only VP8 in Chrome with a focus on migrating to VP9
- Firefox supports VP8 and is in the process of adding H.264 support as well
- Microsoft announced plans to support WebRTC in the future, with H.264 only

This means enterprises will need to find ways to bridge the gap between their existing video equipment that supports H.264 to VP8 in order to support WebRTC.

Since there are no plugins for adding support of video codecs in browsers (e.g. H.264 to Chrome and VP8 to IE), transcoding is necessary to bridge the codec gap. Solutions in this domain exist today on various levels – from transcoding engines and up to SaaS solutions that enable enterprises to interoperate VoIP and video conferencing deployments with WebRTC.

2. Media Transport

WebRTC is based on the same media transport mechanisms as legacy enterprise systems. Yet, two decisions made in WebRTC make it a challenge to connect with legacy systems:
1. Mandating SRTP to provide privacy and security to all WebRTC sessions, a practice that isn’t common in most enterprises

2. Opting for the latest specifications of media transport, which are often not supported in enterprise VoIP products

To bridge the media transport gap, a gateway is necessary. This can come in the form of a pure gateway, SBC or an updated soft switch that is WebRTC-aware. As with most challenges of WebRTC, a third-party SaaS vendor can be used.

3. Signaling

WebRTC has not specified any signaling. That said, while operating within the browser, the transport used for signaling needs to be based on HTTP or Websocket. Enterprise VoIP uses SIP for signaling, where the transport is UDP or TCP.

To mitigate this, SIP has been modified to allow it to operate over Websocket, bringing it closer to the Web and enable operating it inside a Web browser.

To bridge the signaling gap, a soft switch supporting SIP over Websocket can be used; a gateway can be installed; or a third-party SaaS vendor can be used.
Perceived or Real Barriers?

There are many challenges to the adoption of WebRTC in the enterprise. Some of these stem from the way enterprises operate today, while others relate to the concepts enterprises have been educated by.

<table>
<thead>
<tr>
<th>Barrier</th>
<th>Severity</th>
<th>Why?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Quality of service</td>
<td></td>
<td>WebRTC suffers from the same QoS challenges of any other cloud-based VoIP service. This requires a well-thought out infrastructure to be put in place or the adoption of a third-party SaaS vendor to add QoS to communications.</td>
</tr>
<tr>
<td>Security</td>
<td></td>
<td>The security threats in WebRTC for the enterprise are real, but their mitigation is no different than that of any other area where the enterprise is opening itself up towards the internet.</td>
</tr>
<tr>
<td>Browser support</td>
<td></td>
<td>WebRTC isn’t supported on all browsers. While there are mitigations to this in the form of plugins and Flash, they are not suitable for every use case and scenario.</td>
</tr>
<tr>
<td>Legacy support</td>
<td></td>
<td>Supporting legacy requires change in existing enterprise infrastructure or the introduction of gateway equipment. This can be expensive, depending on the exact requirements. An alternative to DIY is to use a third-party SaaS service that gateways between WebRTC and SIP.</td>
</tr>
</tbody>
</table>

Severity of the barriers to the adoption of WebRTC in the enterprise

---

2 In this table, Severity indicates availability of existing solutions that can mitigate the barrier.
Conclusions

WebRTC is a new technology that has gained huge popularity across industries. It is available today under certain restrictions, and is capable of supporting many different use cases.

Within the enterprise, WebRTC fits well in the contact center and unified communications, introducing an evolutionary progress to the existing systems. There are vendors who are experimenting with WebRTC, pushing the envelope and redefining communications for the enterprise.

It should be clear from this paper that introducing WebRTC to an enterprise comes with its own set of challenges. Depending on your use case, you will be able to overcome them. That said, the biggest challenge with WebRTC is one of perception – of the need to take a fresh look at enterprise communication systems and decide where WebRTC fits.

If you plan on introducing WebRTC to your enterprise, make sure to take the following steps:

1. **Play with WebRTC** – Take the time to use WebRTC on your own. See what it is capable of doing. Cut through the hype and doubts you’ve heard and read about by experiencing WebRTC firsthand. Use a SaaS solution to test WebRTC without any investment in software or infrastructure.

2. **Define your use case** – Decide what it is you want to achieve. At this step, ignore the technology or the challenges.

3. **Find a quick win** – See if WebRTC fits well for your use case. See if reducing the scope of your use case can make it easier to adopt WebRTC successfully.

4. **Use existing tools** – There are many WebRTC enablers out there – free and paid, on-site software or as a service. They can reduce your effort and time to market considerably.

Choosing not to use WebRTC is a valid decision, since some barriers do exist. Just be aware that there will be competitors and upstarts making the decision to embrace WebRTC and reap its benefits before you can.