WebRTC
IMS in Comparison to Proprietary Islands

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October 16, 2013
THE QUESTION – HOW DISRUPTIVE WILL WEBRTC BE?

- WebRTC is a game changing technology.

- Will WebRTC enable major disruption of next generation IP communications services?

- Will it usher in a paradigm shift moving communications services to a model of value-added features for larger services, such as social media sites and, in so doing, eliminate the need for communications as a stand-alone service for direct revenue? Or even if stand-alone communications services continue to exist, will WebRTC make the new global ecosystem simpler?

- Can this new paradigm make interoperability between communications services offerings unnecessary?

- And will the URL replace the phone #?

Can a collection of silos using WebRTC replace the PSTN/PLMN?
AGENDA

1. The Next Generation “PSTN/PLMN” experience
2. The WebRTC island model
3. The WebRTC interconnect model
4. The future PSTN/PLMN requirements
5. WebRTC & Proprietary Islands
6. WebRTC & IMS – addressing island and interconnect use cases
7. Conclusion: compare & contrast
THE NEXT GENERATION “PSTN/PLMN” EXPERIENCE

Today: Any time, anywhere, anyone universal reach for voice and SMS

Tomorrow: Universal reach for multimedia collaborative communications without the requirement that all parties sign up for the same app or CSP

Communications is the underpinning of the world’s economy

Universal Reach is vital
Both users’ calling experience and services are provided by the Called Party’s Service Provider.

This model eliminates the need for interconnection of Service Providers and places the burden of handling originations AND terminations on the Called Party Service Provider.
Traditional model for Universal Communication requires all Service Providers to be interconnected – at least for signaling. The calling party CSP sets up the call with the called party CSP.
## The Next Generation Communications ECOSYSTEM REQTS

<table>
<thead>
<tr>
<th>Req #</th>
<th>Req Name</th>
<th>Description</th>
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<tbody>
<tr>
<td>1</td>
<td>Universal IP reachability</td>
<td>People must be universally reachable via voice, video, and messaging.</td>
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<tr>
<td>2</td>
<td>Reliable calling party identification</td>
<td>Users and their CSPs need to be able to confidently identify callers and optionally screen incoming calls.</td>
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<tr>
<td>3</td>
<td>Access to trusted service</td>
<td>Users must not have to worry about a nefarious CSP causing harm on their device.</td>
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<tr>
<td>4</td>
<td>Interworking with PSTN/PLMN</td>
<td>CSPs must exist in the ecosystem that can interconnect with the PSTN/PLMN.</td>
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<tr>
<td>5</td>
<td>Calling party originating feature availability</td>
<td>Users must have access to the services offered by their chosen provider, regardless of call origin/destination.</td>
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<tr>
<td>6</td>
<td>Ad-hoc group communications</td>
<td>Users must be able to include any party in group communications.</td>
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<tr>
<td>7</td>
<td>Charging and billing framework</td>
<td>Providers must have the flexibility to support multiple charging and billing models.</td>
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<tr>
<td>8</td>
<td>Innovation</td>
<td>Providers must be capable of unilaterally offering new services without impacting universal basic communication or relying on a standardization process.</td>
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<tr>
<td>9</td>
<td>Emergency services &amp; access priority</td>
<td>Emergency services must be universally available.</td>
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<tr>
<td>10</td>
<td>Lawful intercept</td>
<td>Providers must support lawful intercept.</td>
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<tr>
<td>11</td>
<td>Address consolidation</td>
<td>Users should be able to designate a few “primary” contact points.</td>
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<tr>
<td>12</td>
<td>Address portability</td>
<td>Users should be able to port their contact address from one provider to another.</td>
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<tr>
<td>13</td>
<td>Subscriber choice of (Orig) provider</td>
<td>Users should be able to select the CSP that they want to use for originations.</td>
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<tr>
<td>14</td>
<td>Outgoing call restrictions</td>
<td>Users should be able to restrict “outgoing” calls.</td>
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<tr>
<td>15</td>
<td>Session transfer (private)</td>
<td>Users should be able to transfer an existing call to any system.</td>
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<td>16</td>
<td>Session forwarding (private)</td>
<td>Users should be able to forward an incoming call to any system.</td>
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<td>17</td>
<td>Optimal use of wireless spectrum</td>
<td>Wireless spectrum is a limited, valuable resource; an architecture that optimally uses wireless spectrum is preferred.</td>
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WEBRTC PROPRIETARY ISLANDS – User Concerns & Feature Gaps

- **User concerns:**
  - Alice must give Bob’s CSP access to her device.
  - If CSP is regulated operator, then Alice may feel secure. If CSP is unknown – maybe even Bob’s homegrown system – then Alice may not call.
  - This concern is multiplied by everybody Alice wants to call.
  - Bob might be from another country and his UI may be in a language Alice does not understand.

- **Feature gaps:**
  - Alice gets origination services from Bob’s CSP.
    - What if Alice is a business and Bob is a customer? Alice is dependent on Bob’s CSP for features.
    - How does Alice transfer Bob to an expert if Bob’s CSP doesn’t have this feature? How does Alice transfer Bob to an expert if the expert is not on Bob’s CSP network? Esp. to do a private transfer.
    - How is [private] forwarding done to an endpoint on another CSP system if there is no NNI interconnection?
    - How does Alice conference in expert if Bob’s CSP doesn’t have this feature? How does Alice conference in expert if expert is not on Bob’s CSP network and there is no NNI interconnection?
    - How does Bob’s CSP know who the calling party is?
    - How does Bob’s CSP charge Alice?
    - How does Bob’s CSP block Alice?
  - How can outgoing call restrictions be supported with no originating CSP? In enterprises? For children?

The WebRTC proprietary islands ecosystem has no NNI interconnections between islands. All communications is provided by a single CSP for any session. That CSP is the terminating party’s CSP.

[Diagram of WebRTC proprietary islands ecosystem]
WEBRTC PROPRIETARY ISLANDS – PSTN Intwking & Regulatory

• PSTN/PLMN Interworking
  - Because only 2 out of 7 billion people are internet connected today, PSTN/PLMN interconnect will be needed for years to come.
    - Need CSP to offer a WebRTC portal to make calls to PSTN/PLMN
    - How does calling party know which CSP WebRTC portal to go to in order to make the call to PSTN/PLMN subscriber?
    - How can a PSTN/PLMN subscriber call Alice if s/he does not have internet access?

• Regulatory:
  - How is legal intercept supported? Will this become the responsibility of the transport provider?
    - Even from WiFi network at a local cafe?
  - For emergency services, all governments will have to switch to a WebRTC island model
    - If an emergency services attendant has to call somebody back, then they will be dependent on the called party’s CSP system for communications features.
    - How does emergency services reliably know who the calling party is?
  - How is contact address/number portability supported?
    - Esp. for URLs with non-SP-based domains such as vanity addresses.
WEBRTC IMS: SUPPORTING BOTH ISLAND AND INTERCONNECT

• The combination of WebRTC and IMS is powerful.
• WebRTC IMS can be used in island mode for some scenarios:
  - IMS web extension for friends and family
  - IMS web extension for business partners
  - Anonymous eCommerce, anonymous business website
  - 3rd party in-app communications
• WebRTC IMS can be used in interconnect mode for some scenarios
  - In these cases, the calling party uses their chosen trusted service provider to set up communications sessions on their behalf. The calling party gives access to their device to their chosen CSP only.
  - IMS web extension for IMS subscriber
  - IMS web extension for remote worker
  - Business-to-business
  - Business-to-consumer
IMS Web Extension

- Friends and family
  - Carol provides WebRTC portal for friends and family to call her using her IMS subscription and services
  - This mitigates the “SMS start-up adoption” issue for IMS advanced services by increasing the reach of these features to non-IMS users

- Business partners
  - Carol provides WebRTC portal for business partners to call her using her IMS subscription and services

Anonymous eCommerce, businesses

- Hosted IMS service provider supports communications integration into websites for anonymous visitor to use to call into customer agents.

- Examples:
  - eCommerce communications services for retailers like Walmart
  - Business communications services for institutions like banks, insurance, healthcare, etc.
  - Public sites for government agencies, transportation services, etc.
WEBRTC IMS – ISLAND MODE (3rd PARTY IN-APP COMMS)

- **3rd Party users with temporary IMS IDs**
  - For these use cases, an IMS service provider would host IMS services for a 3rd party, such as eBay, LinkedIn, dating sites.
  - The 3rd party users would get a temporary IMS ID when they logged into the 3rd party site.
  - The 3rd party users could originate or terminate IMS services to other 3rd parties on the site.
    - Optionally, the 3rd party users can originate to PSTN/PLMN users
  - The IMS service provider could white-label their communications services or brand them on the site depending on the agreed business relationship.

- **3rd Party users with IMS subscriptions**
  - For these use cases, an IMS service provider would host IMS services for a 3rd party, such as a gaming site.
  - The 3rd party users would get permanent IMS subscriptions which they may or may not be aware of. (branded or white-labelled)
  - This model is used where the 3rd party does not have millions of users, such as Facebook, and require long-lived services such as contact list and mailbox.
WEBRTC IMS – INTERCONNECT MODE (WEB EXTENSION)

- **Web Extension for consumer IMS subscriber**
  - Supports calls to/from WebRTC IMS clients (no need to give device access to called party CSP)
  - Supports calls to/from native IMS clients
  - Supports calls to/from PSTN/PLMN

- **Web Extension for enterprise remote worker**
  - Supports calls to/from WebRTC IMS clients (no need to give device access to called party CSP)
  - Supports calls to/from native IMS clients
  - Supports calls to/from PSTN/PLMN

- **Features**
  - All IMS features are inherited for WebRTC IMS clients
  - This includes calling party ID, all charging models, outgoing call restrictions, calls to the PSTN/PLMN, [private] call transfer, [private] call forward, conferencing, call hold, etc.
  - All originating features come from the calling party CSP

- **Regulatory**
  - All IMS regulatory svcs are inherited for WebRTC IMS clients
  - This includes legal intercept, emergency calling, and address portability

The calling party CSP sets up the session to the called party CSP on the calling party’s behalf thru a standardized NNI.
WEBRTC IMS – INTERCONNECT MODE (BUSINESS)

• Business-to-Consumer
  - Supports calls to/from WebRTC IMS clients (no need to give device access to called party CSP)
  - Supports calls to/from native IMS clients
  - Supports calls to/from PSTN/PLMN

• Business-to-Business
  - Supports calls to/from WebRTC IMS clients (no need to give device access to called party CSP)
  - Supports calls to/from native IMS clients
  - Supports calls to/from PSTN/PLMN

• Features
  - All IMS features are inherited for WebRTC IMS clients
  - This includes calling party ID, all charging models, outgoing call restrictions, calls to the PSTN/PLMN, [private] call transfer, [private] call forward, conferencing, etc.
  - All originating features come from the calling party CSP

• Regulatory
  - All IMS regulatory svcs are inherited for WebRTC IMS clients
  - This includes legal intercept, emergency calling, and address portability
OPTIMAL USE OF WIRELESS SPECTRUM

• Many WebRTC enthusiasts promote the use of peer-to-peer architectures for the communications backends.

• In a wireless environment, peer-to-peer architectures are detrimental to both the system and end user. They use too much bandwidth.
  - Users without All-You-Can-Eat data plans must be careful

• A key attribute of wireless systems is call capacity. Minimizing BW per call maximizes call capacity.

• This requires optimal signaling and bearer architecture design.
  - This applies to not only audio and video conferencing but multi-party file transfer, instant messaging with payloads, such as images, whiteboard, doc share, etc.
  - SPs that are mobile aware also know to use wireless codecs for maximal efficiency (e.g. AMR instead of G.711) and to request QoS when available (ROHC reduces BW usage)
### COMPARE & CONTRAST: IMS VERSUS PROPRIETARY ISLANDS

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<tr>
<th>Reqt #</th>
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<th>WebRTC proprietary islands</th>
<th>WebRTC IMS ecosystem</th>
<th>Comment</th>
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<td>Access to trusted service</td>
<td>Partial</td>
<td>Y</td>
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<td>Y</td>
<td>IMS API stds</td>
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<td>9</td>
<td>Emergency services &amp; access priority</td>
<td>Require gov’t action</td>
<td>Y*</td>
<td>Defined in 3GPP for IMS</td>
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<td>No established convention</td>
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<td>17</td>
<td>Optimal use of wireless spectrum</td>
<td>Architecture dependent</td>
<td>Y</td>
<td>Inherent in IMS model</td>
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* solution alternatives for retrieving location info from the device are being investigated

WebRTC + Proprietary Islands cannot replace the PSTN/PLMN; IMS is a perfect complement to WebRTC.
CONCLUSION

• The combination of WebRTC and IMS is very powerful.
  - It meets all the requirements of a next generation communications ecosystem – while a proprietary island model does not.
  - It can run in standardized interconnect mode and in island mode.
  - It can also support both URL and E.164 addressing paradigms – the latter of which will continue to be attractive (and necessary) for subscribers for many years to come.

• Today, 2 billion out of 7 billion people are internet-connected; 6 billion+ have a mobile subscription. This simple fact makes the WebRTC proprietary islands model incapable of fully replacing the PSTN at this moment – even if it could meet all requirements.

• Communications is a basic underpinning of the world’s economy. Businesses must be able to call other businesses. Businesses must be able to call their customers. Customers must be able to call businesses. Therefore, universal reach must be maintained in the next generation IP communications ecosystem – PSTN replacement.
  - IMS can fully replace the PSTN when deployed along with internet access deployment. WebRTC is a perfect complement to IMS and can extend the reach of IMS further – into the internet/Web – providing “next generation universal reach”.

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