

H.264 as MTI for rtcweb

Jonathan Rosenberg

Bo Burman

The Cisco Announcement Redux

- Open Source under BSD and binary module we distribute, we pay MPEG-LA
- Binary versions for Win, Mac, Linux, Android – community can contribute builds for others. Build tools open sourced, you can verify binary signature we distribute matches your build from source
- Minimal constraints for us to pay – we need to distribute; “About” recognition; must be possible for user to disable
- Cisco commits to support and pay barring unforeseen changes in H.264 licensing environment

What can you use it for?

- Open source – anything. Its BSD. If you distribute it you might be subject to MPEG-LA licensing terms. Note first 100k are free.
- Binary Module
 - Not restricted to webRTC
 - Can work for an OS – e.g., Debian can pull the binary module on install of Linux.
 - Can work for server software too
- Binary module usable for all things under MPEG-LA type (a) license
- See

<http://www.mpegla.com/main/programs/AVC/Docume>

Ship Date

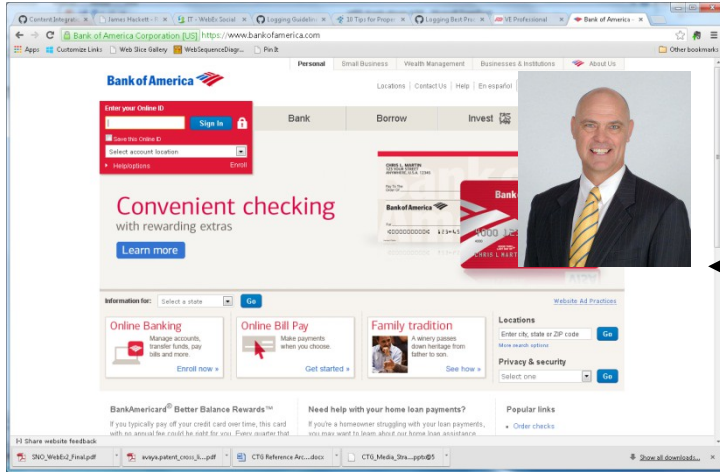
Cisco will push first version of source into public repo before the end of the year and hopefully earlier

Binary version available only after Jan1 due to MPEG-LA cap

The Factors for Consideration

Factor	Why and for whom	H.264	VP8
Interop with installed user base	Enabler for existing players to build web clients Enabler for B2C apps (customer support) – interop with installed video base in contact center	Green	Red

B2C Example: Talk to Investment Broker



Jill goes to bank website, wants to speak with her investment broker Bob.



Bob's bank has deployed videophones to desktops, he takes call from there.

The bank is not going to rip out and replace their existing video devices and softclients and contact center with something new. They want INTEROPERABILITY.

The Factors for Consideration


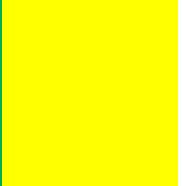
Factor	Why and for whom	H.264	VP8
Availability of Experts and tools	Important for larger players to build their own – most do that today	Green	Red
Multiple Software Codebases	Many implementations in software of H.264. Almost uncountable number of applications VP8 – 1 codebase in usage 6 apps listed – 4 from Google Why? Flexibility, maturity		
SDO Standard	Important for change control – particularly for those who implement.		

Hardware Acceleration

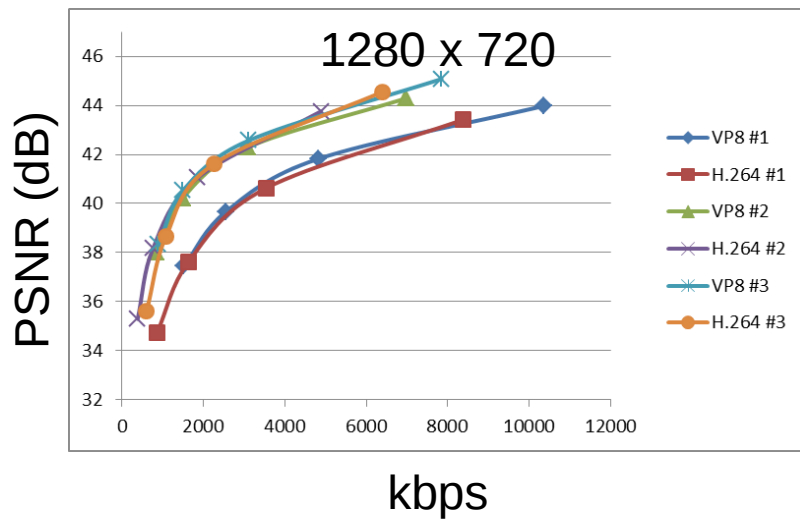
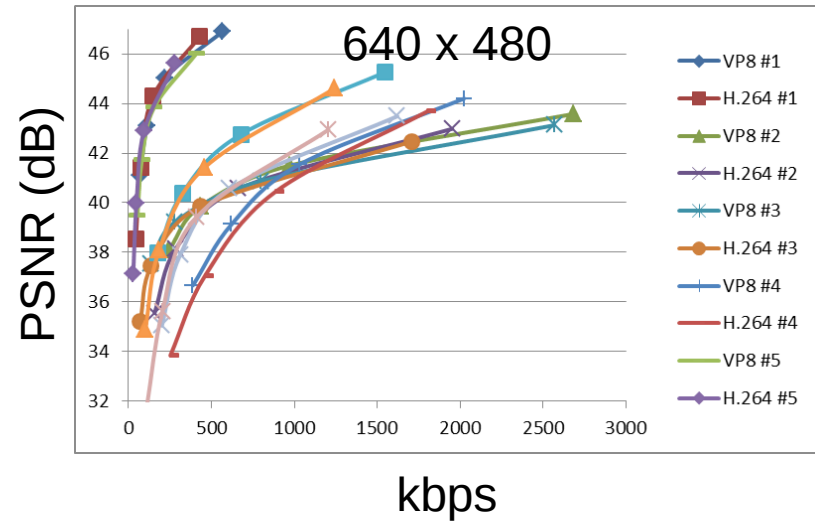
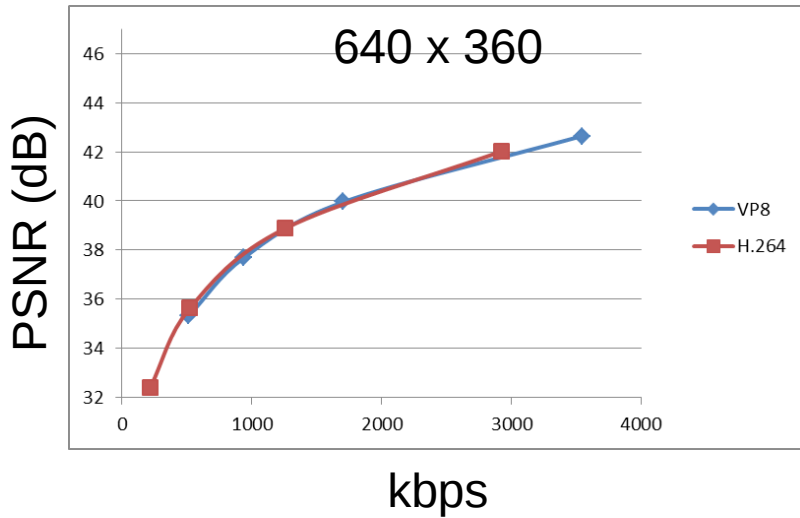
- In-Market Chipsets
 - 100% of all chipsets listed in Strategy Analytics Handset Components technology market share have acceleration for H.264 encode and decode in hardware – covering almost all in-market smartphones
 - Only 4 chipsets in market have VP8 acceleration:
 - Qualcomm Snapdragon 800 (Goog Nexus 5, LG G2, Samsung Galaxy Note 3, Nokia Lumia 1520, Sony Xperia Z Ultra)
 - Samsung Exynos 5420 (Samsung Galaxy Note 3)
 - Rockchip RK3xxx (Android tablets in Asia)
 - Nvidia Tegra 4 (Android tablets by Asus, HP, Toshiba)

Software API access for realtime encode/decode is variable with upwards trend in availability

The Factors for Consideration

Factor	Why and for whom	H.264	VP8
Hardware Acceleration	Enabler for higher quality on mobile, of somewhat diminishing importance as CPU speeds increase		

Performance Evaluation

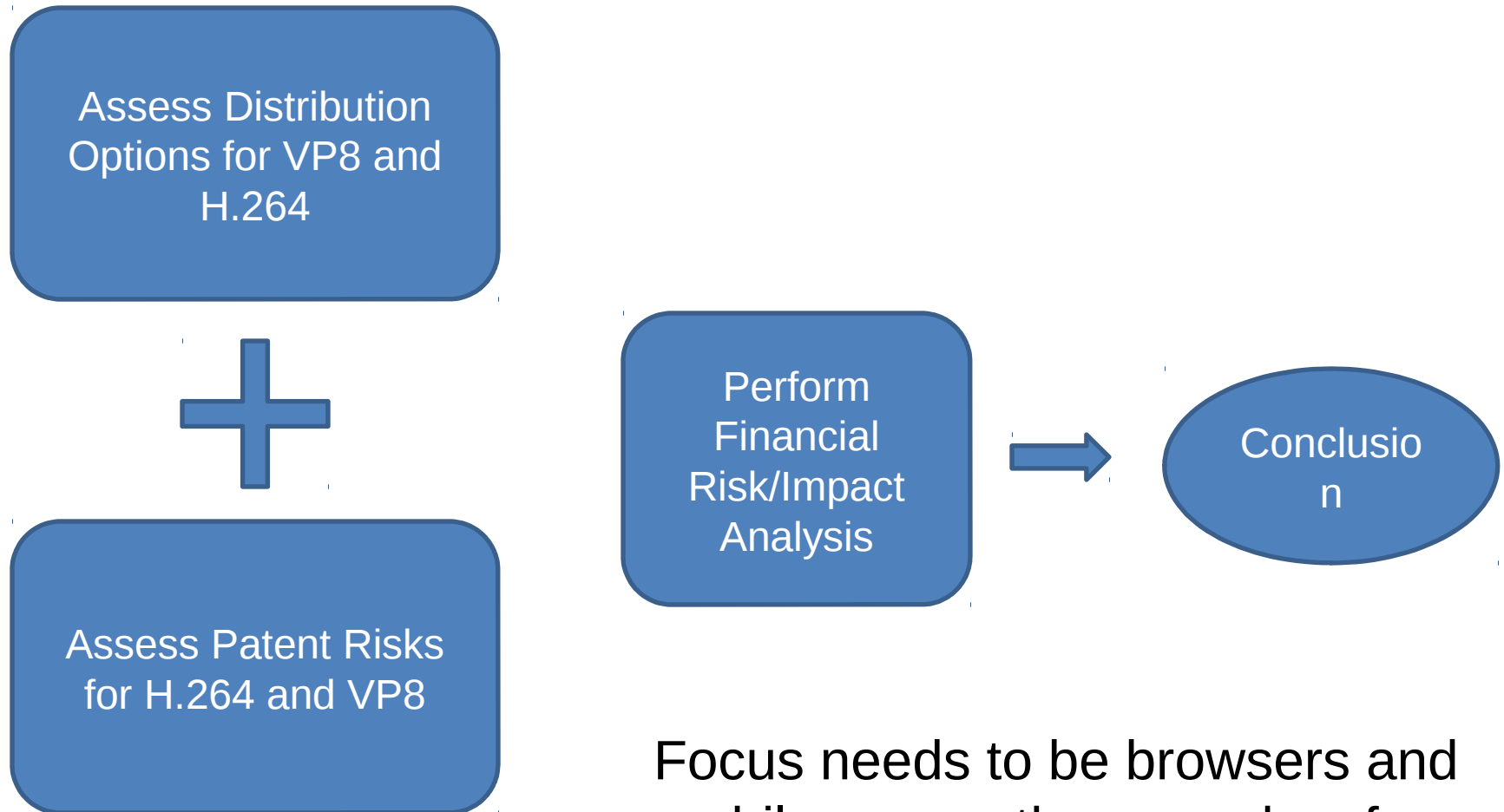


	H.264 CBP vs VP8	H.264 CHP vs VP8
No rate control	H.264 1% better	H.264 25% better
With rate control	H.264 1% better	H.264 24% better

The Factors for Consideration

Factor	Why and for whom	H.264	VP8
Quality	<p>Minimum bar necessary for usability – but this is the MTI and represents the lower bound. Widespread commercial deployment of H.264 CBP today indicates clear viability.</p> <p>High probability of most browsers going to H.264 High (same license terms as CBP) which outperforms VP8.</p>		

Looking At Distribution Holistically



Focus needs to be browsers and mobile apps – those are key for success of webRTC

Patent Risk

Factors for risk of new patent-holders emerging and suing:

	H.264	VP8
Years in-market	10	2
Revenue base to target by those seeking compensation	Enormous – billions (Blu-Ray, countless commercial products)	\$0 (all existing VP8 apps are free)
Breadth of target companies	Enormous – consumer electronics, software, SaaS, all geos and market segment	Only two – Google, Mozilla (no longer in Skype)
Extent of patent analysis work	Many lawyers and many years	New
Existing lawsuits from patent holders	None	Nokia – in progress
Conclusion	Low Risk	High Risk

Distribution of H.264 – its about options

Category	Options	Comments
Operating Systems	<ol style="list-style-type: none">1. All major mobile device/OS combos already pay and distribute H.2642. Cisco binary distribution model available for all OS's	OS distribution not required for success of webRTC on desktop (sorry Fedora, Debian)
Browsers	<ol style="list-style-type: none">1. Distribute and pay your own way2. Cisco binary distribution model available (Mozilla)	
Mobile Apps	<ol style="list-style-type: none">1. First 100k are free - distribute your own2. Android covered by Cisco binary module3. Distribute >100k and pay your own way4. Rely on OS distribution – Android, hopefully IOS	Very few IOS apps every see 100k downloads

Its about Risk/Impact Assessment

	Risk	Likelihood	Impact
H.264	100k distros on IOS, AND No solution from Apple AND Cannot afford \$0.20 per app	Low	Med
	New patent holders emerge for H.264 and demand unreasonable fees	Low	High
VP8	Nokia conclusion results in inability to distribute VP8 at all	Med	High
	Nokia conclusion results in ability to distribute VP8 but at moderate cost	Med	Med
	New patent holders emerge for VP8 and demand unreasonable fees as a consequence of IETF selection of VP8 as MTI and subsequent deployments	High	High

Analysis points to H.264 as the better choice

Overall Analysis Results

Factor	H.264	VP8	Blocker and for Whom?
Interop with Install Base	Green	Red	VP8 for existing players
Availability of Experts	Green	Red	No
Multiple Codebases	Green	Red	No
SDO Standard	Green	Yellow	No
Hardware Acceleration	Green	Yellow	No
Quality	Green	Green	No
Financial Risk	Yellow	Red	VP8 too high for large players. For small players, “its not free” is a complaint but objective risk analysis still points to H.264

Conclusion

- Selecting VP8 will turn away the existing players due to interop and financial risk and introduces a real financial risk for the smaller players, likely causing webRTC to fail to reach critical mass
- Selecting H.264 will enable the existing players and is objectively the lower financial risk option. Higher chance of success for WebRTC.
- Work is active on achieving RF status for H.264 on two fronts – MPEG WebVC (CBP) and MPEG-LA revisit