



Convergence ?

Geoff Huston
Chief Scientist
APNIC





Networking 101

- Communications networks were traditionally constructed to meet the requirements of the intended service
- For example:
 - The dynamics of the human voice and the PSTN
 - Voice range covers 300 Hz to 3500 Hz
 - Poor high frequency response reduces intelligibility
 - Dynamic range of 70db
 - Delay within 400 ms
 - Limited Total Harmonic Distortion
 - Digitally, voice can be mapped with with 8000 samples per second, with each sample quantized to 256 discrete levels: 8KHz of 8 bit samples
 - The PSTN is a time switched network with a base 125usec clock pulse
 - “Digital Circuits” are derived from these time-switched 64K synchronized bit streams, using multiples of this basic service “atom”
 - Voice networks are highly constrained systems that operate to a HCF service model



Architecting Networks for Data

- Data networks are different....
 - There is no fixed “speed” unit
 - There is no fixed minimum bit error rate
 - Loss, jitter and latency variance tolerance
 - There is no particular service model:
 - Variable speed, bandwidth, times, reliability,...
- Data networks have variable control models, with a strong pressure to operate a lowest common denominator service model with edge-based control imposition



The “Full Service” Provider

- Operates a variety of different networks, each attuned to differing service requirements
 - PSTN
 - Video reticulation
 - Data circuit services (DSN, Frame, ATM)
 - Data cloud / VPN services (EtherSwitching)
 - Access networks (DSL, Cable)
 - IP
 - MPLS
 - Lambda services
 - OOB, Command and Control networks



What's wrong with this?

- Proliferation of special purpose networks within each “full” service provider’s infrastructure – high operating costs, low revenue yields
- But all these little networks are just shovelling digital packets around
 - Why does the communications service operator need to construct and operate many distinct networks?
 - If all these ‘networks’ are just moving packets around, why can’t this be achieved within a single packet-switching plane?
 - Higher volume lowers unit cost, doesn’t it?



Welcome to "Convergence"!



The Converged Utopia

- A small number of vertically integrated “full” service providers leveraging their underlying infrastructure investment into a high yield, high margin service delivery retail system using a single network platform for comprehensive service delivery
- Low cost, high value, strong service control, fantastic margins!



Wouldn't it be good if...

- You could operate all forms of real time and data services within a single network and a single switching plane
- Your carriage plane could be triggered to support graded service responses for each class of service usage
- You could support both high resilience high quality real time and various profiles of data services, and all points in between within a common switched network platform
- You only needed a single protocol, a single carriage architecture and a single OSS (and a single operator!) to drive the entire network operation



And wouldn't it be even better if...

- You could account for, and tariff, the end user value of delivered services rather than just switched packets
- Customers paid you for value-added service solutions, rather than the marginal cost of packet delivery



So is IP the Holy Grail of Convergence?

- Does IP offer the industry the reality of “convergence”?
- Can we load up the totality of all kinds of service profiles upon a single IP substrate?
- Can we run all service profiles, all security domains, all network models, upon a single IP switching plane and a single network operational platform from core through to edge?
- Will this offer the service provider enterprise more efficient cost structures with higher revenue leverage?
- Can we really reconstruct massive vertically integrated communications service providers using IP as the convergence lever?



Or is this Hopelessly Unrealistic?

- The drive for convergence of services in a single delivery system is a persistent theme in this industry:
 - Mixing Data and Voice streams with ATM
 - Mixing circuits and packets with MPLS
 - Mixing Video, Voice and Data with Triple Play
- Each new generation of carriage technology is heralded as the harbinger of a wonderful new converged era of communications service provision



What if...

- “Deregulation” was more than industry lip service to a vague political premise?
- We experience intense competition at every level of the service delivery enterprise?

In other words:

What if we acknowledge today's reality?

Is “convergence” still a valid concept?



The Unconverged Reality

- Deregulation, intense competition, branching role specialization at every level
- Resulting in
 - many parallel service delivery networks, many network operators,
 - industry-wide duplication of activities,
 - continual exposure to inefficient resource use,
 - exposure of niche markets,
 - limited planning capability,
 - high investment risks,
 - high costs,
 - low operating margins,
 - continual restatement of investor expectations,
 - negative returns on equity investments,
 - continual recycling of management and staff



The Unconverged Reality

- Deregulation, intense competition, branching role specialization at every level
- Resulting in
 - competitive discipline placed on service providers
 - market forces match supply to demand
 - pricing based on cost of supply, not value of service
 - service delivery skill specialization
 - service innovation
 - continuous industry response to meet current user needs



“Convergence” vs Reality

- Voice is no longer the emperor of communications – its reign is over
 - Voice is becoming just another UDP application (and a low volume one at that)
 - Voice signalling is just a SIP rendezvous question
 - VOIP + ENUM is inevitable
 - Sooner or later
 - Somehow or other



“Convergence” vs Reality

- Triple Play time is over – BitTorrent won!
- It's a service network, not a forcing function - support the user to run what ever services they want rather than force feeding the user with a limited set of services that the service provider finds easy to deliver



“Convergence” vs Reality

- Value-Added service networks are causing value added service network providers to go value-added negative earnings per share
- Overlay-based services now own the user



“Convergence” vs Reality

- The Internet’s major leverage was always cheaper price and lowest common denominator service profiles in the network
- Arming networks with complex quality and service manipulation capabilities is a business lose
 - arming networks with adequate bandwidth is a superior strategy – QoS, NGNs and their converged friends have completely lost the plot



“Convergence” vs Reality

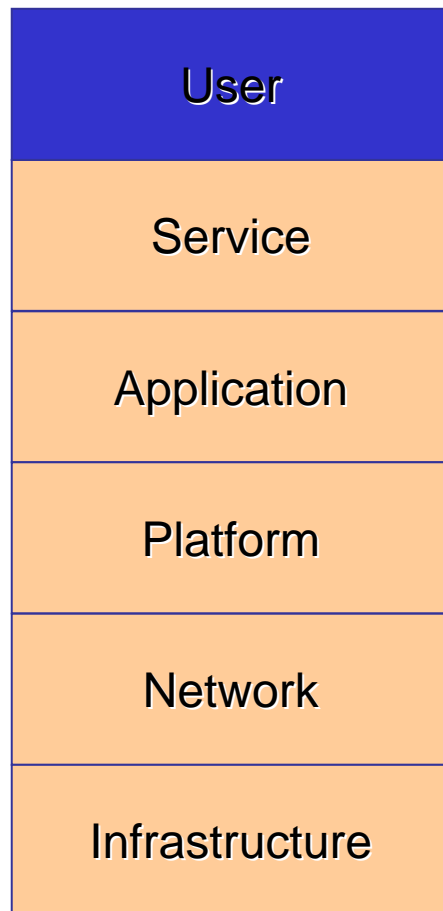
- IP Transit is a volume-based low-value commodity activity
- IP Access is a volume-based low-value commodity activity
- Adding value to packet pushing happens as an end device to end device transaction



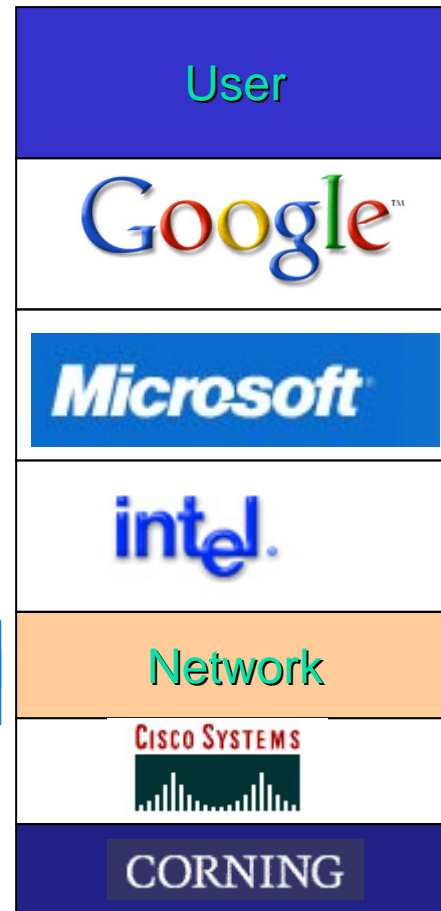
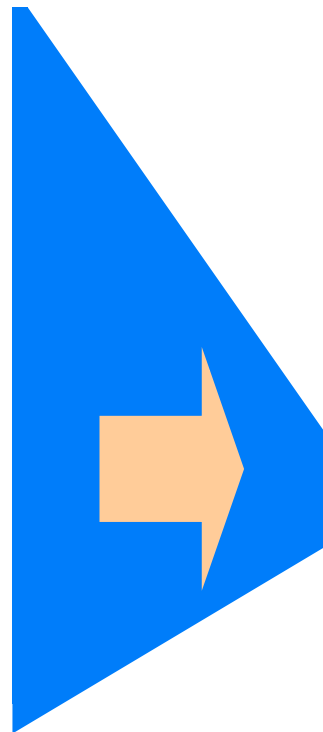
“Convergence” vs Reality

- There is no next vertical “killer app”
- Overlays have already claimed the user!
 - Think XML, Ajax, RSS, Rendezvous, Torrents, Podcasts

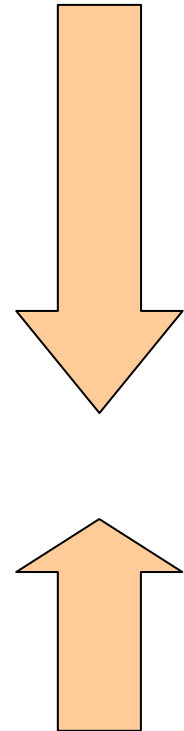
Today's Carrier Squeeze Play



Nostalgia



Reality





Today's Operating Principles

- Stick to the basics - keep the overheads low and keep the network offering simple, stable, fast and cheap
- User value construction is happening over the top of the network through overlay structures
 - Open the network edge up for innovation
 - Stop playing pointless cat and mouse games with selective service interception!
- Really Useful Networking is a lowest common denominator packet carriage utility



What have we learned?

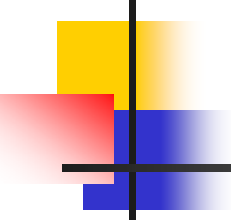
- Vertically integrated service providers are fading away into history - the deregulated competitive service industry continues to specialize rather than generalize at every level

“Convergence” is now obsolete



End-to-End really IS important!

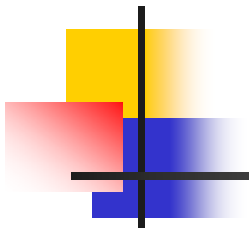
- Valued service delivery is changing – we are now seeing user value based on interactions across overlay systems that treat the network as a simple transmission service
- As it should be!



The Converged Utopia of the old world carrier industry remains only as a piece of dull, unimaginative, nostalgic monopolistic mythology within today's communications industry



The Unconverged Internet world is
diverse, vibrant, innovative, exciting and
very much alive



And maybe that's a
Very Good Thing!