

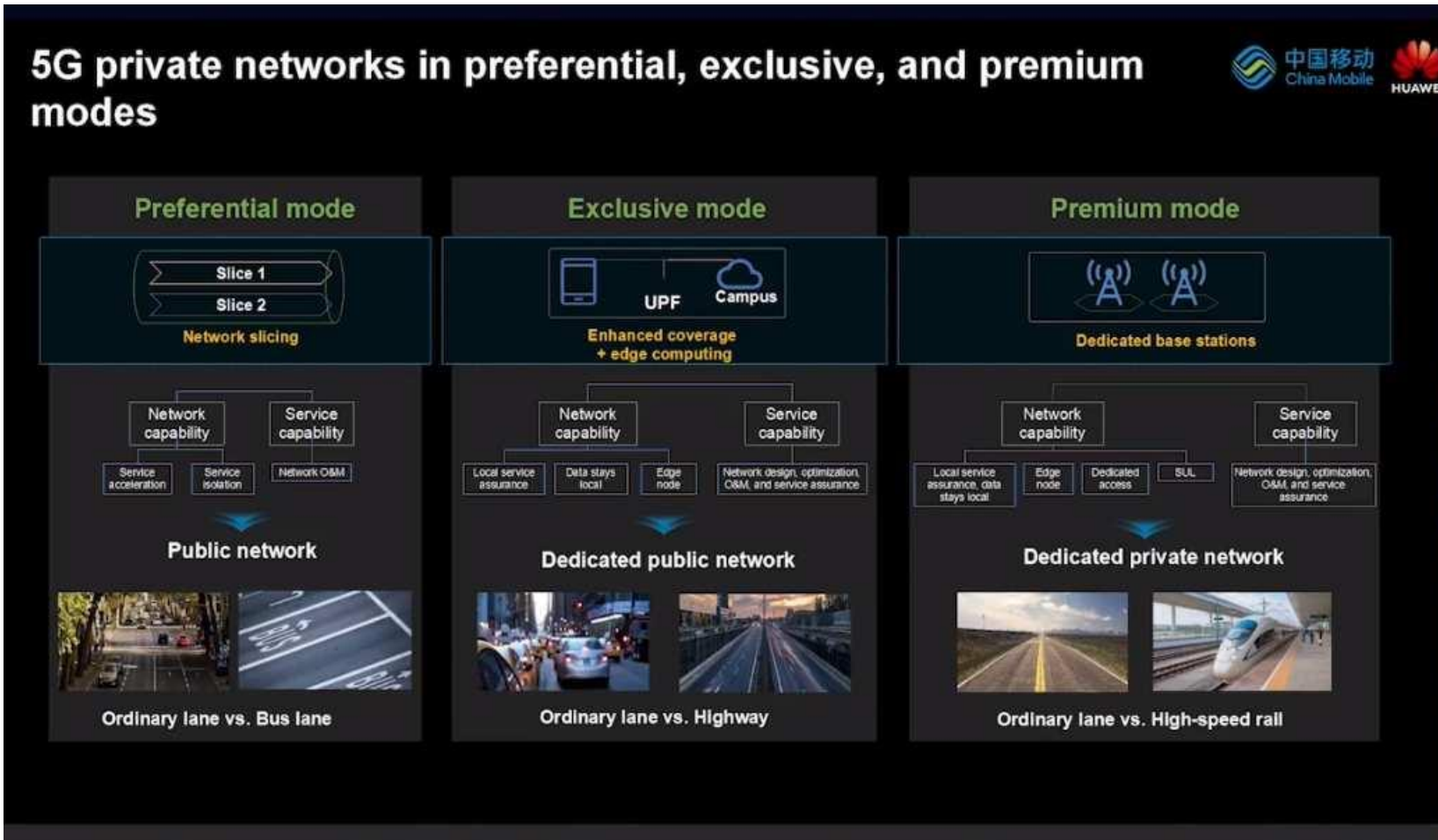


5G

Bob Frankston <https://Frankston.com>

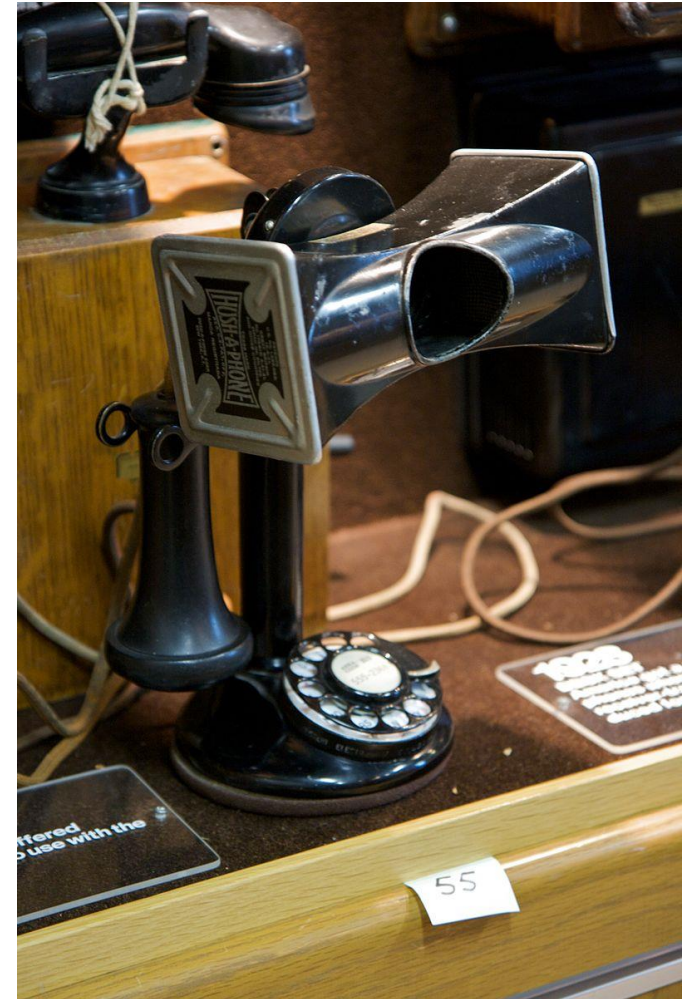
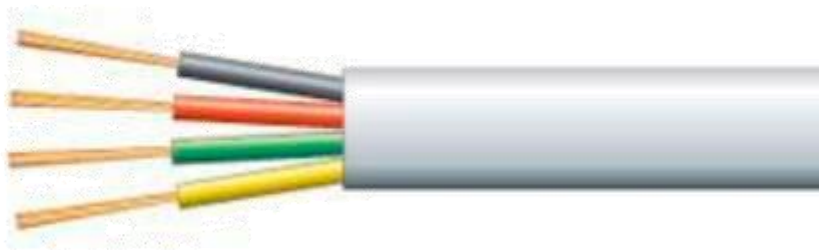
Blu.org 21.Oct.2020

Fast Lanes! Fuck Neutrality.



1956 Hush-a-Phone

- The phone existed to deliver a service
- Carterfone 1968 – you can own the instrument
- Answering: Service or a machine!
- *Telecom Sells Services*
 - *Infrastructure is just a cost center*
 - *Captures all the value*



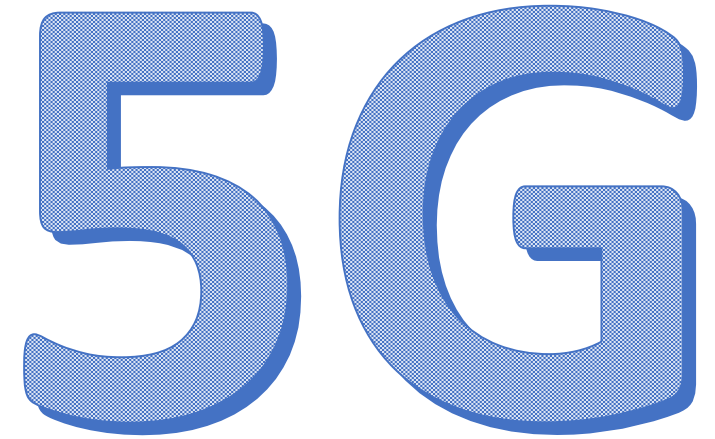
Telegraphy, Telephone, Television

- Great feat of engineering!
- Required every element of the system mesh precisely
 - Think of the 1930's and the microsecond timing for television!
- Expensive to preserve a voice signal over a distance
 - Led to research into “digital”
 - Oops – we got intelligence in our device
- Yet we still continue whole systems engineering.

(Re)factoring & Systems Architecture

- The mistake of Red/Green
 - Allowed value to escape the network!
- The revenge of cellular and lazy engineering
 - Unwinds the world back before hush-a-phone
 - Terribly fragile protocols
 - Single frequency signaling
- Yet today telephone is an app in our phones
 - Can use any transport!
 - Value has zoomed out of the network

The solution!

A large, stylized blue logo for 5G. The characters '5' and 'G' are rendered in a bold, sans-serif font with a halftone dot pattern. The '5' is on the left and the 'G' is on the right, both with a slight 3D effect.

- Make the network special again!
- Brand a radio as 5G!
- And then use the brand on a network
- Engineers and academics are complicit in aiding and abetting
 - Most 5G research is about local radios
 - Claims are all about a special network
- Ignore Wi-Fi 6 and alternatives!
- Drag value kick and screaming into the network.

Discovery of Best Efforts

ALOHAnet in Hawaii – radio packet network

- No Network service

Spring 1973 Class

- Metcalfe used Coax as an ether
- Advisor wanted proof it “worked”
- I just saw opportunity

Key is software

- Enabled a conversation
- Didn't rely on a network provider to maintain salient characteristics

Discovery of VoIP

- Packetized voice existed – isochronous!
 - VoIP is impossible – ear is too sensitive to jitter and noise
 - Yet analog cell phones worked
- VocalTec origin story
 - Use on local LAN
 - **Discovered** it being use on wider Internet
- Versus Telecom
 - Could not pay for favors
 - Didn't have to, had the PSTN
 - Despite telcos!

VoIP write Larger → Zoom et al

- Why is Zoom + voice free!
- Why are is talking without video expensive
- Why did picture phone fail?
 - It had to keep promises at any cost
 - It had to cost more than a voice call
- More anomalies: Telegrams → Message Units → Minutes
- Some got lost in translation

It doesn't make sense!

- Traditional engineering
 - Build up layers of abstraction
 - Hierarchical dependence
 - Implicit Assumption of inherent meaning
- Problem Solving
 - Have to build a solution to a well-stated problem
 - Careful planning
 - And standards
 - *Important in the world of hardware!*

Millstones of Engineering

- Purpose-built - Intelligence in the network
 - IEEE-1394 (Firewire)
 - CEBus (vs X10)
 - SS7
 - ...5G
- Problem with that approach
 - Limited by use cases
 - Others can't add (AKA take) value

The Concept of Software

- Works with abstractions
 - Meaning is NOT inherent in symbols (AKA bit strings)
 - Meaning comes from contact
 - Move physical objects by moving references, not things
- A world turned upside down
- Very agile

Intelligence leaves the network

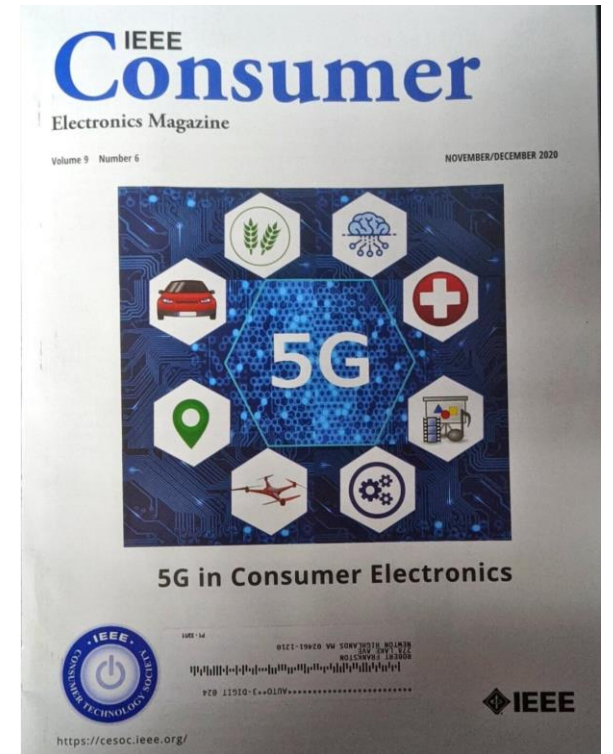
- Modelled on post office & railroads
 - Transport meaning as freight
 - Dumb end points so must preserve salience
 - A separate facility for each purpose
- Intelligent endpoints
 - Can program-around whatever
 - Can discover uses for any facilities available

What is a network?

- Network is a generic term
- What we mean is a provider owning a path
 - Enables preserving salient properties
 - No need for intelligence at the endpoints
- Alternative
 - Model on roadways with packets wending their way
 - No guarantee of delivery – just best efforts
 - Thus no need for a “provider”
 - Can composite out of local facilities

How do you pay for the network?

- All the value has left the network
- Drag it back in
 - Offer priority passes for special treatment (fast lanes)!
- This works because
 - People assume some bits are more special than others
 - Researchers and engineers naïve play into this
 - Articles say “5G” instead of “generic connectivity” or “Wi-Fi 6”



Infrastructure!

- Value is in the whole
 - So pay for the whole like roads
- Composite paths out of locally owned facilities (at scale)
- Become owners – no monthly fee.
- More import: **No paywall**
 - Enables connected devices
 - Defaults to not-fail
 - *And there is no edge, no network-as-such*

No use case for 5G vs. generic connectivity

- Generic connectivity works!
 - The smart network approach prevents innovation
 - It defaults to success
 - Added capacity helps all applications
 - No need for multiple broadbands!
- But people still think their application is special
 - We used to need a voice network
 - That's still the design point.
 - Con academics to say "5G" instead of connectivity and don't mention WiFi!
- More important – it means the old business model can be revived?

What we do need

- Locally owned infrastructure
- Understanding the Internet is more than the Interweb
- Recognizing that endpoints are software (in things)
- *A new literacy*

A Resource-based approach

- Discover uses for what we found around
 - Can't ask for favors for yourself
 - But can ask on behalf of the community
- More resources create more opportunity
- Fungible, AKA best-efforts, connectivity is the universal fluid