Successful Standards for the Internet

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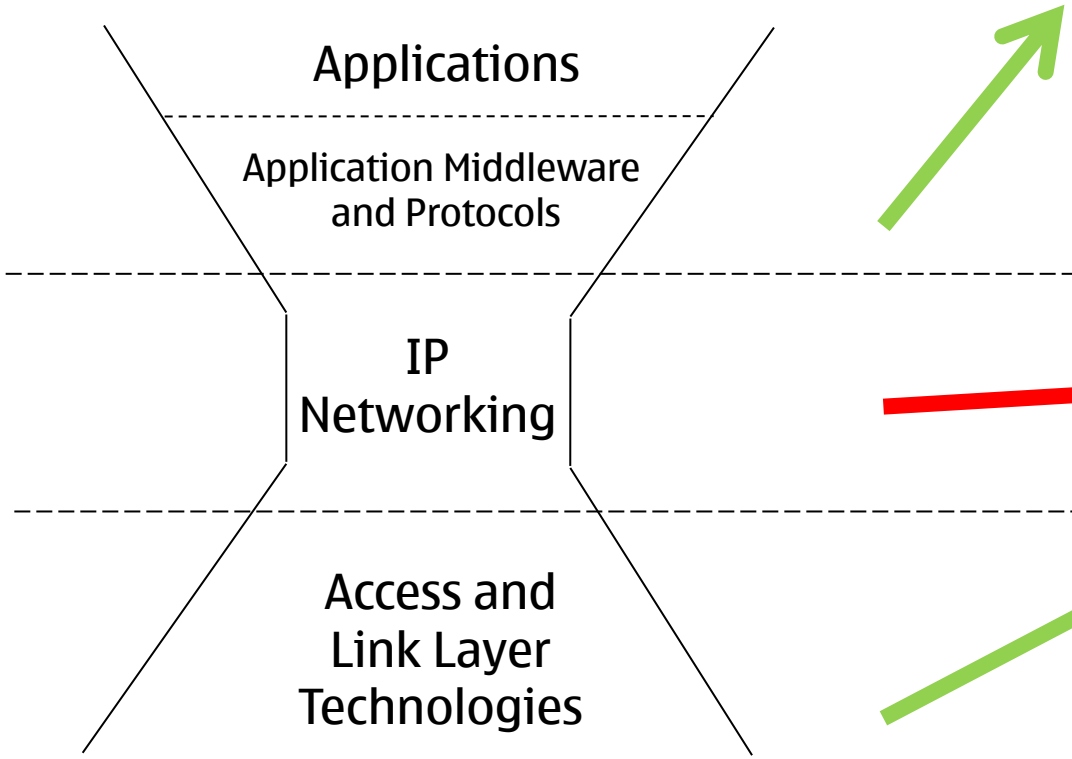
Internet Deployment Speed



"No need to wait for anyone"
Incremental upgrade at endpoints

"It just works"
Ossification?

"Simple, just make it faster"
Operator business model
Incremental upgrade of links

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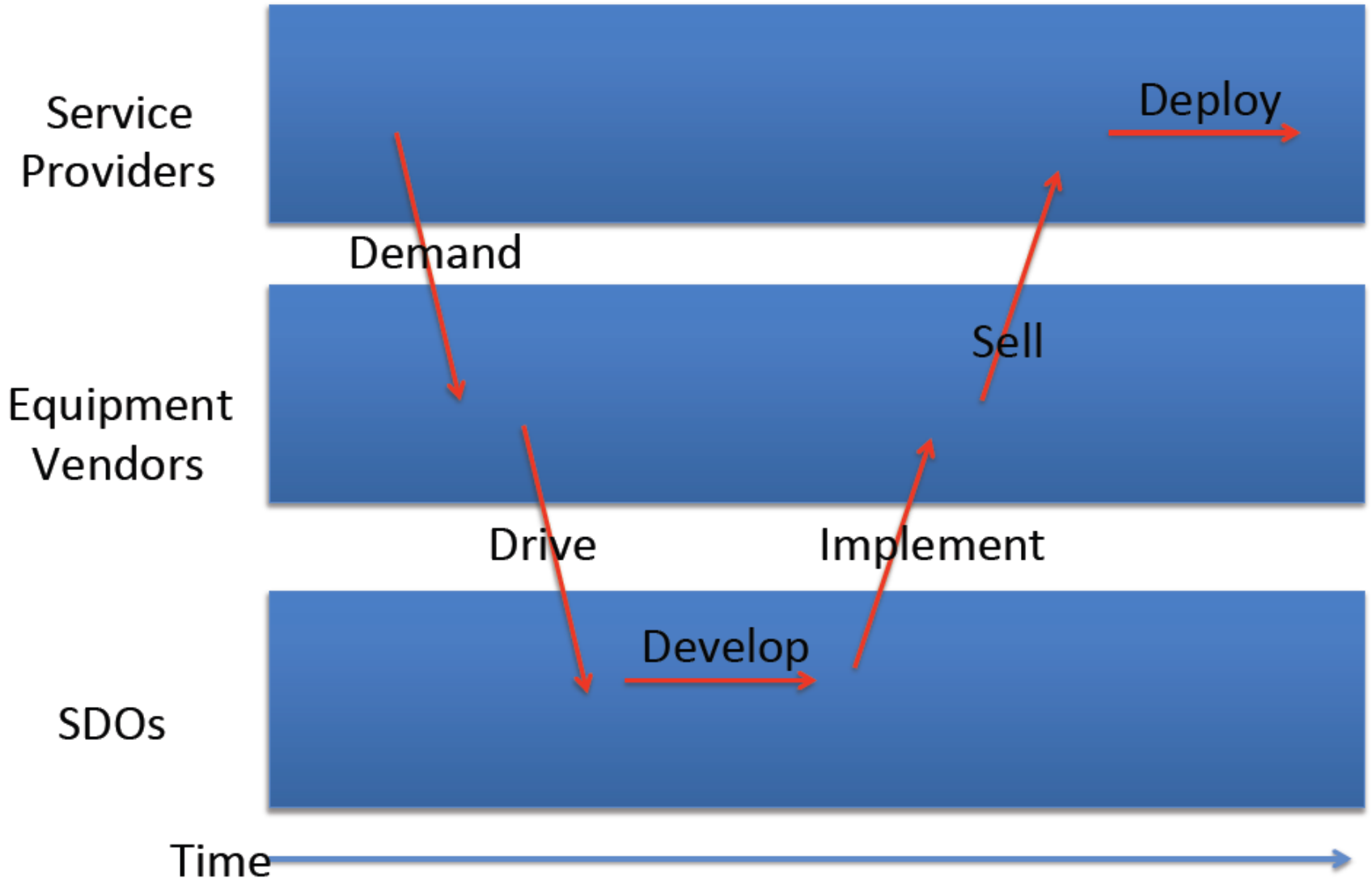
Telecom Innovation Cycle



(Original by Jonathan Rosenberg, Skype, IETF plenary)

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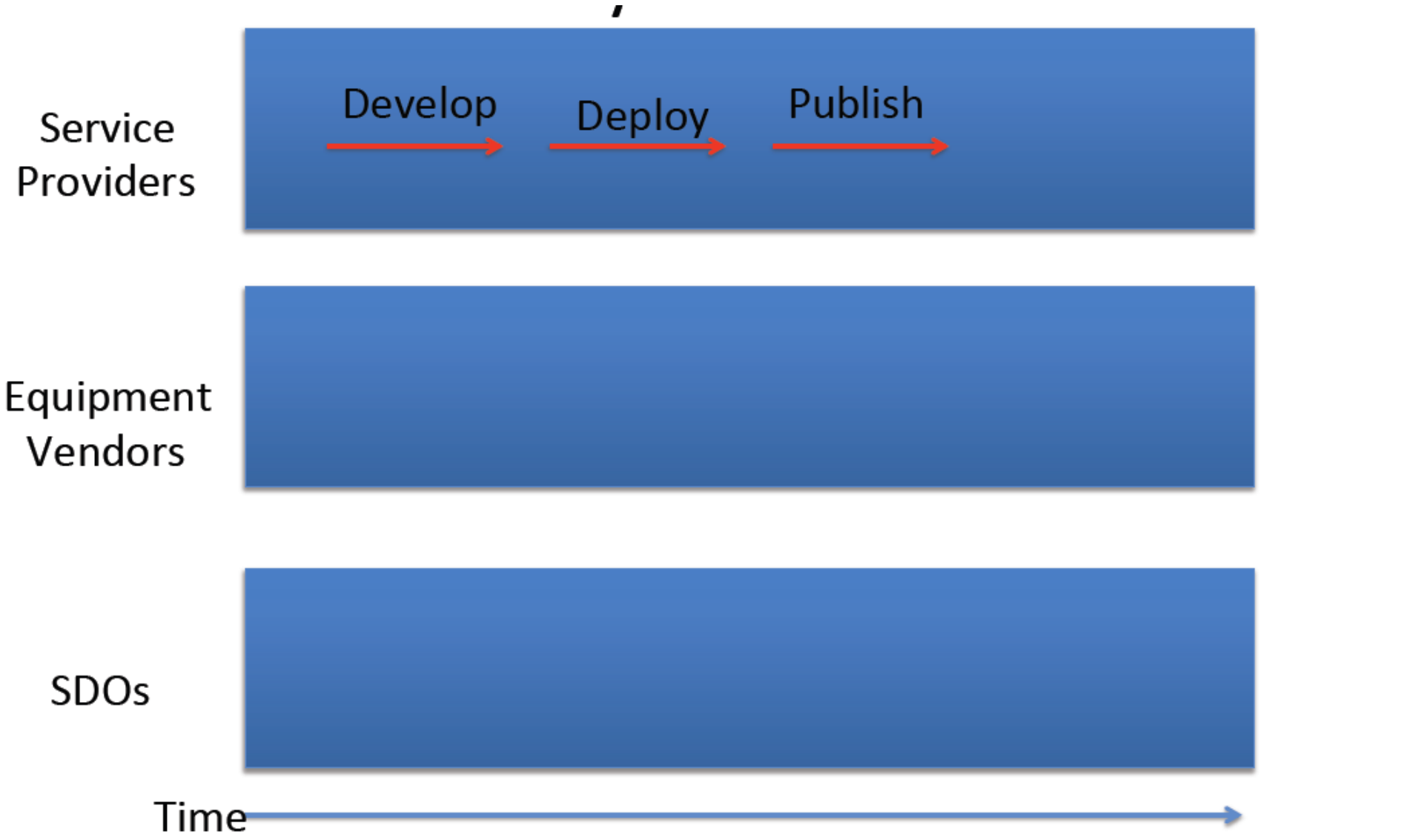
Internet Services Innovation Cycle



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Reasons for Deployment Failure

	QoS	Multi-cast	Mobile IP	IPSec (e2e)	IPv6
Not manageable across competing domains	✞	✞			
Not configurable by normal users (or apps writers)	✞			✞	
No business model for ISPs	✞	✞		✞	✞
No initial gain	✞	✞			✞
80% solution in existing system	✞	✞	✞	✞	✞ (NAT)
Increase system vulnerability	✞	✞	✞		

(Applied from a presentation by Prof. Henning Schulzrinne, Columbia University)

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Classic Case Studies

- QoS vs. More capacity
  - Do you want to make your network ten times faster or ten times more complex?
- Mobile IP vs. App layer mobility
- IP multicast vs. App layer overlays
- SIP vs. Skype
  - Telecom vs. Internet innovation cycle
- New application protocols vs. HTTP

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Recipe for Success

- Alignment of incentives
  - Those who have to invest will get the value
  - E.g. mobile operators investing in LTE vs. Skype
- Incremental deployment
  - Minimize dependencies to other stakeholders
- Openness
  - May be decisive when there are competing alternatives
  - Open specification, open maintenance, freedom from usage restrictions
- Technical excellence
  - Modularity, extensibility

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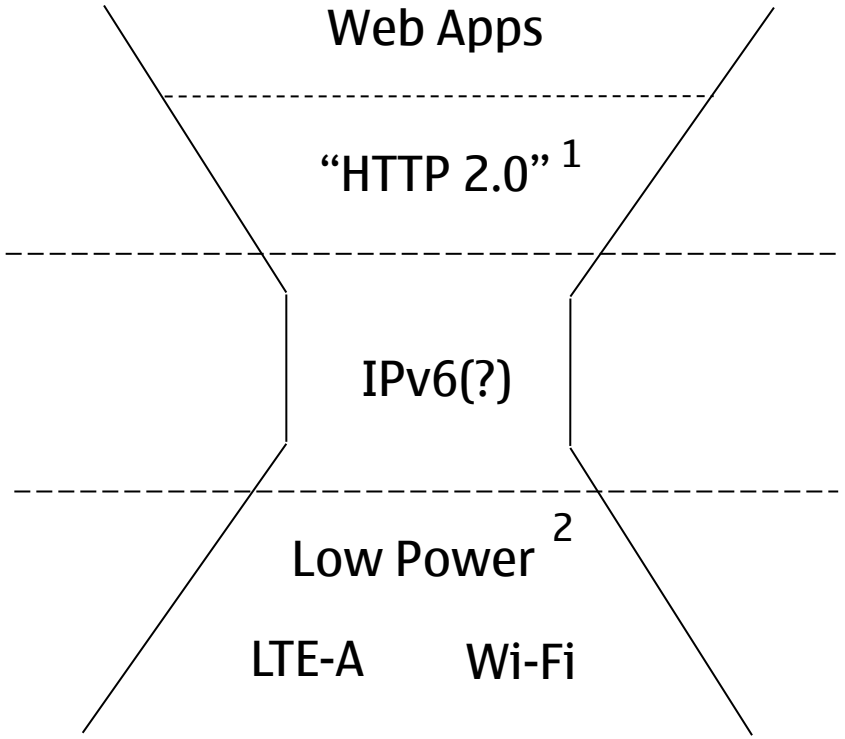
Linear Prediction for Internet in 2020?



- Billions of connected nodes
  - PC, tablet, smartphone
  - Gadgets and sensors
- Exponential traffic growth
  - Video, telepresence, virtual worlds
- Data and services in the cloud
- E2E security and mobility
  - But not on IP layer

Hopefully someone messes this up and we get something new! ☺

[1] HTTP 2.0, Websockets, RTP

[2] Next gen of BT-LE, 802.15.4, 802.11

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