

NeXtworking'07
Berlin, 19th April 2007

The Bloated IP protocol

or
How you loose track of what you are doing in the first place

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creating and sharing knowledge for telecommunications

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bloat:
Noun

S: (n) **bloat** (swelling of the rumen or intestinal tract of domestic animals caused by excessive gas)


Verb

S: (v) **bloat** (become bloated or swollen or puff up) "*The dead man's stomach was bloated*"

S: (v) **bloat** (make bloated or swollen) "*Hunger bloated the child's belly*"

Software bloat, or **bloatware**, is a term used in both a neutral and disparaging sense, to describe the tendency of newer [computer programs](#) to be larger, or to use larger amounts of system resources ([mass storage](#) space, [processing power](#) or [memory](#)) than older versions of the same programs, without concomitant benefits being provided to end users.

Bloat is ascribed to various causes including: the tendency to replace efficiency-focused applications with less efficient enhanced versions, inefficiencies or unnecessary modules in program design and operation, and the incorporation of extended features which will be extraneous or low value for most users but slow down the program overall even if unused.

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Overview

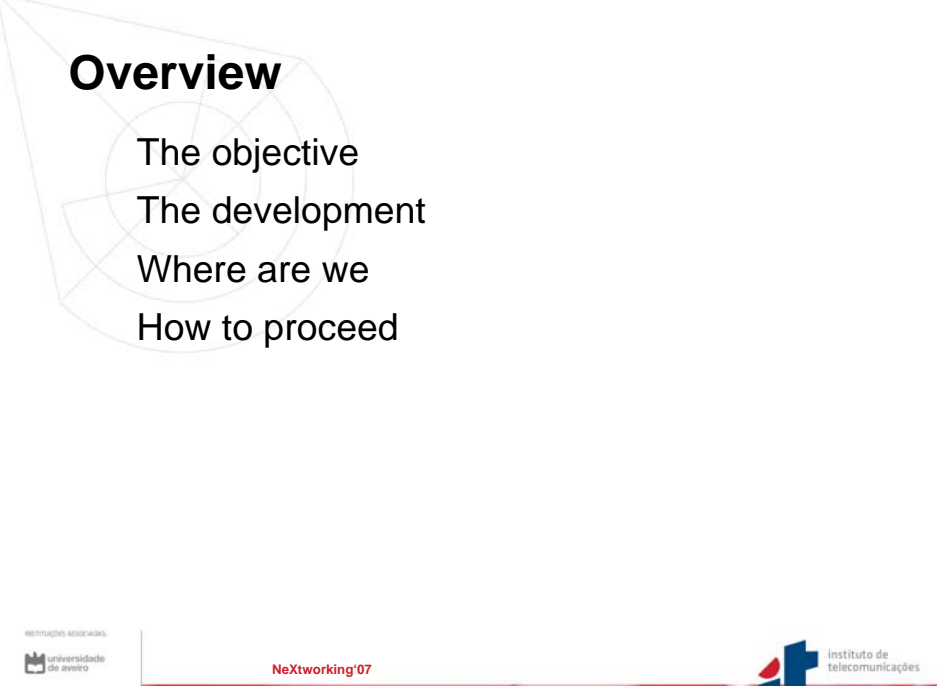
- The objective
- The development
- Where are we
- How to proceed

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IP ambition

- Simple
- Minimal features
- Provide for interconnection of systems

1.2. Scope

The internet protocol is specifically limited in scope to provide the functions necessary to deliver a package of bits (an internet datagram) from a source to a destination over an interconnected system of networks. There are no mechanisms to augment end-to-end data reliability, flow control, sequencing, or other services commonly found in host-to-host protocols. The internet protocol can capitalize on the services of its supporting networks to provide various types and qualities of service.


RFC 791

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IP – not OSI

Upper	FTP	Telnet	HTTP		Application
					Presentation
					Session
Transport	TCP	UDP			Transport
Internet	IP				Network
Link	Ethernet	packet radio	Point-to-point		Data Link
Physical					Physical


TCP/IP OSI

IP successful because it had not the complexity of OSI: was simpler, able to run in much less powerful boxes, less prone to errors.
 IP streamlined protocol implementation and feature.



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Data and Control

Streamlining blurred distinction between several functional aspects.
 The separation between control and data plane is one of those
 routing a good exception, in-band signaling.


“ICMP, uses the basic support of IP as if it were a higher level protocol, however, ICMP is actually an integral part of IP, and must be implemented by every IP module.”
 RFC 792

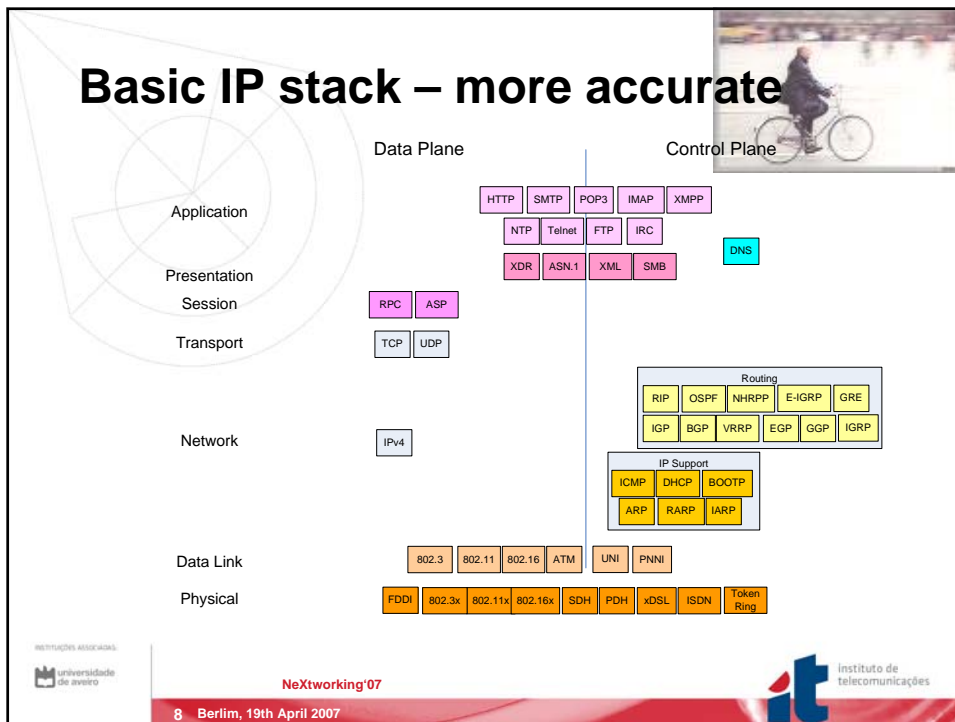
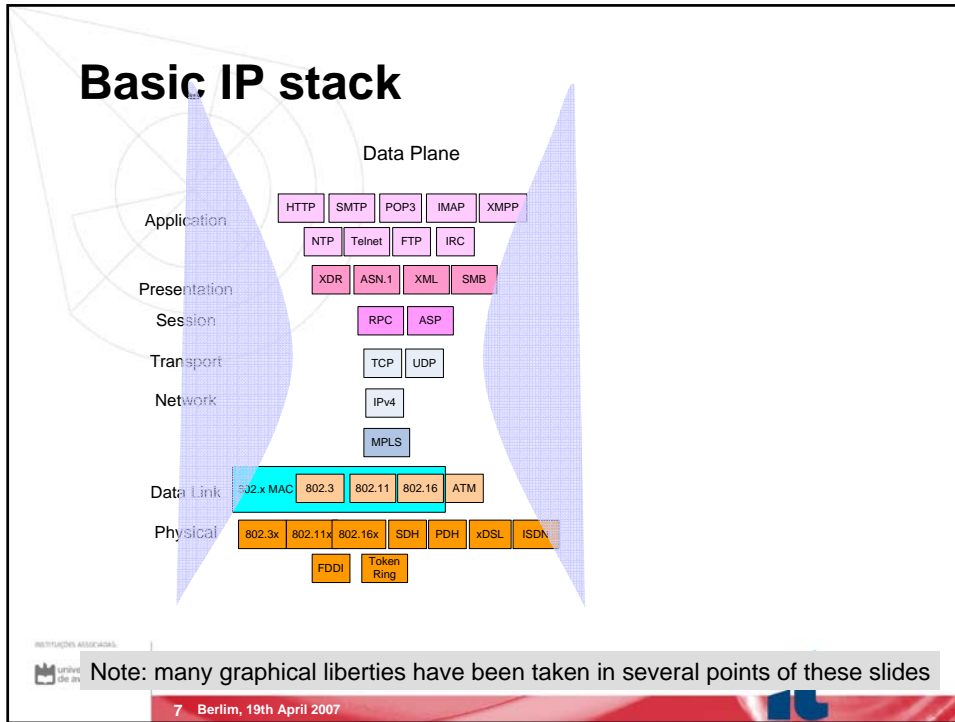
“ICMPv6 is used by IPv6 nodes to report errors encountered in processing packets, and to perform other internet-layer functions, such as diagnostics (ICMPv6 “ping”). ICMPv6 is an integral part of IPv6 and MUST be fully implemented by every IPv6 node. “
 RFC 2463

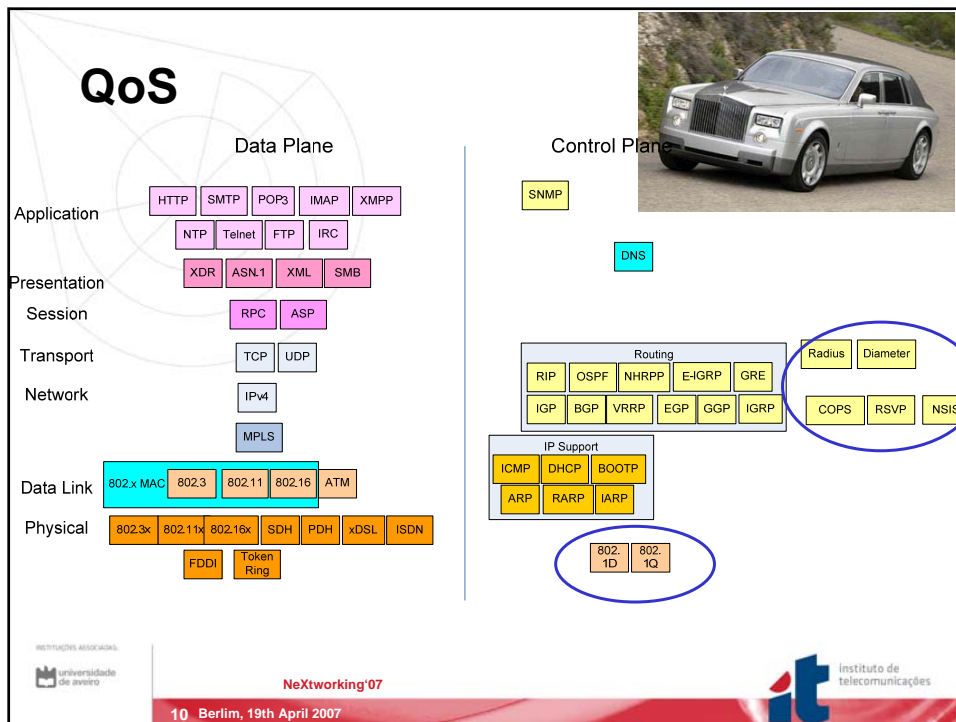
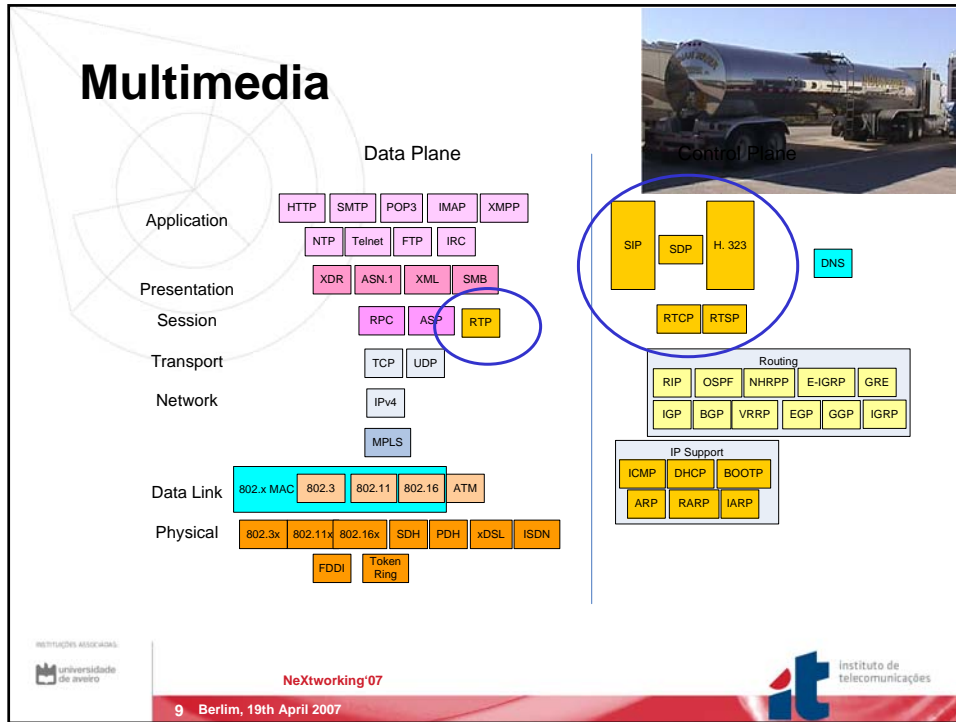


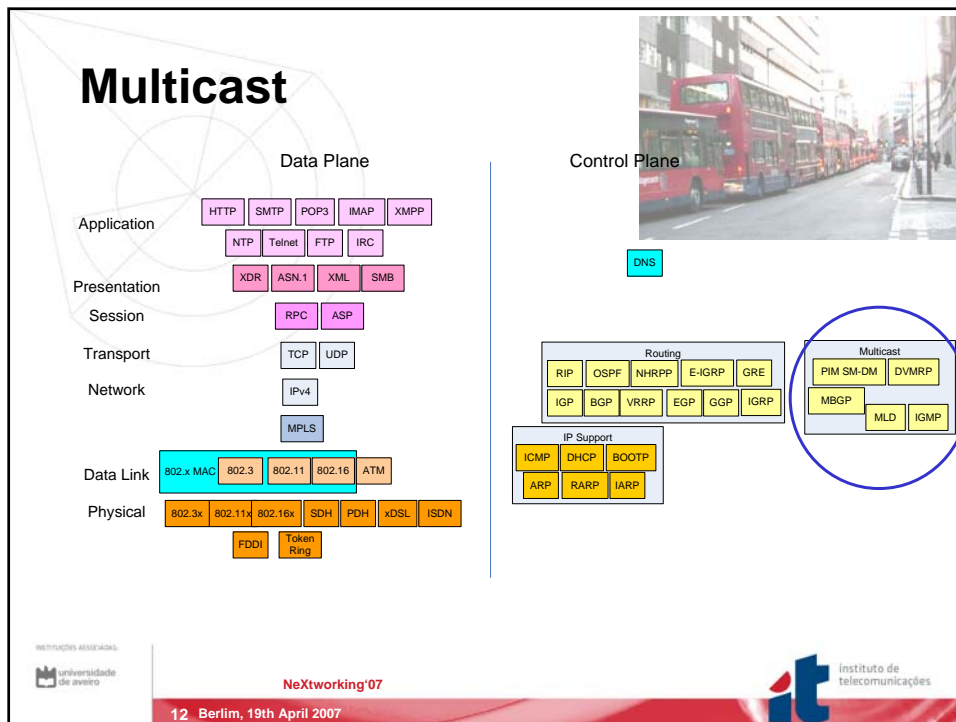
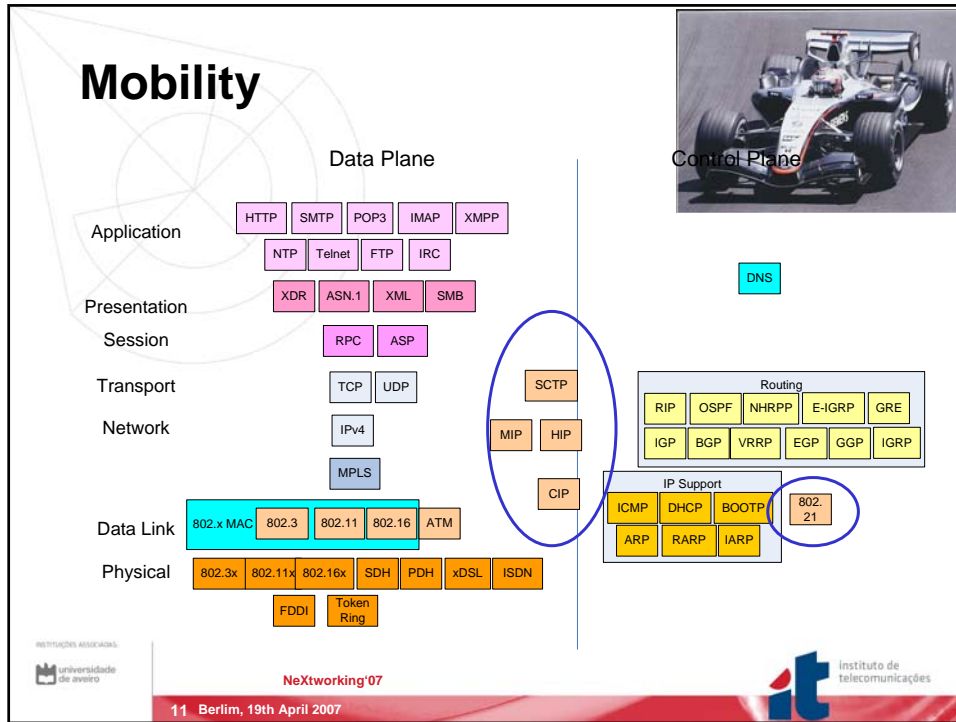
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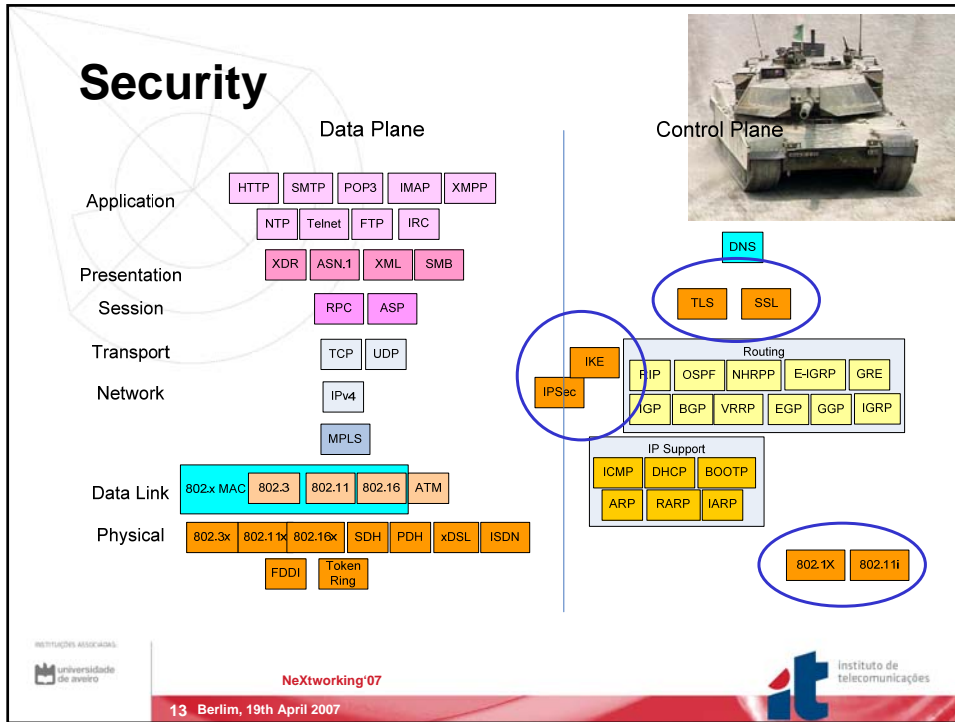
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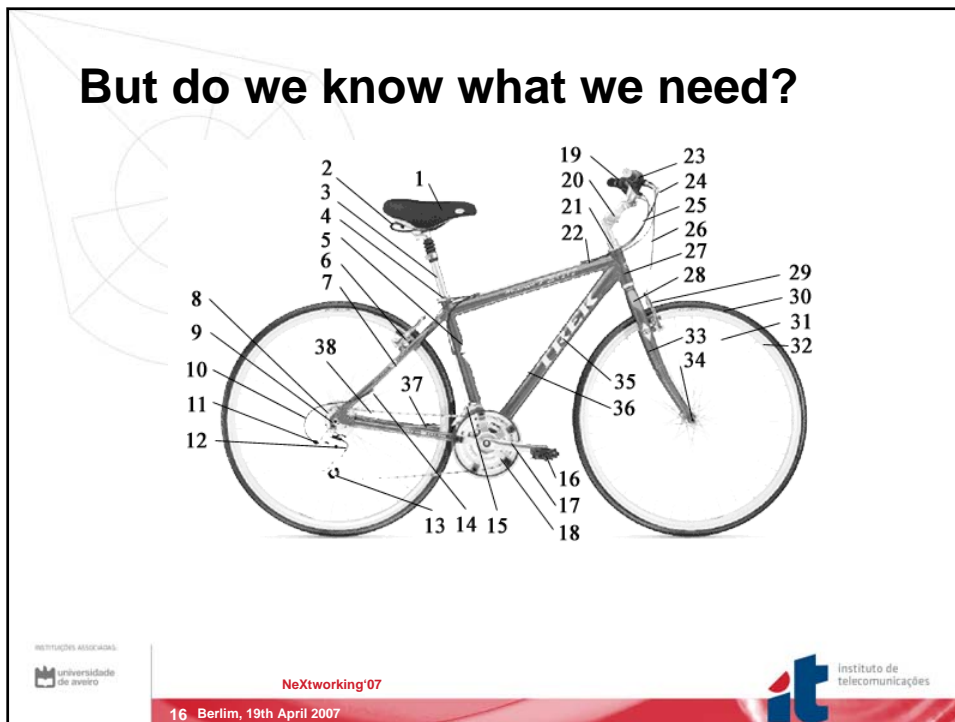
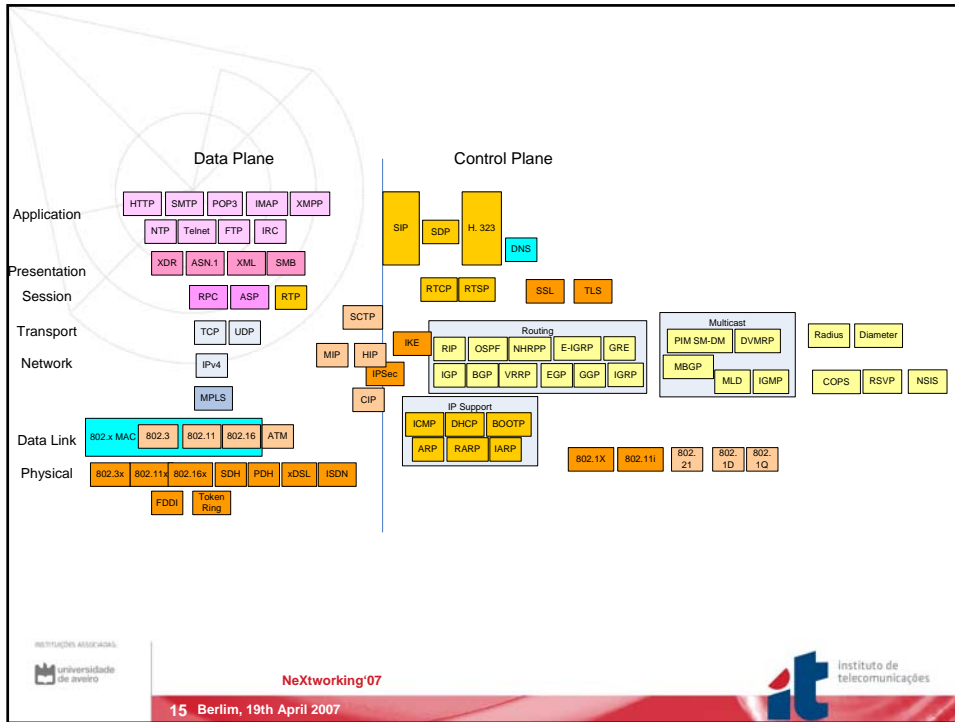












The world changed

- ✂ The early requirements for the IP protocol are now easily overcome by lower layer technologies
- ✂ The requirements **TODAY** (maybe tomorrow they change) are far away from a connectivity and reliability problem
- ✂ The FMBC is a process to reckon with, requiring networks and not technologies.
- ✂ A network is not only a place to push packets
- ✂ Everything is involved – next IP need to be a **network turn-key solution**, not a network technology

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Our challenge: two hourglasses?

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So, what should we do:

Refocus the IP protocol

Drop everything that can be done below

... and things that need to be done above

The original routing paradigm to control should have been kept for everything:

Internal to the Network

External to the Internet

Create clear boundaries on interfacing.

Remove IP from the Internal side, as much as possible!

or the optic and wireless guys will do that for you....

Testing and future development:

Solve the puzzle: exploit our current IP based infrastructure (architecture, equipment, development tools) to provide a more flexible environment where non-IP approaches can be also trialled.

Technically, how to do it?

The seeds of this are already in place:

“domains” separated in multiple aspects:

- QoS

Intserv/NSIS/Diffserv association

- Mobility

NETLMM, pushing localized mobility

- security work

Everybody understands realms

- multicast....

Well, something must still be done ☺

▪ but the RVP are a promising help...

So – **BREAK the network** into pieces.

Concluding

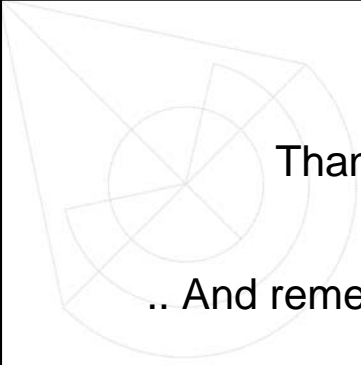
The requirements are now very different from what was the early development of datagrama developments.

the **I of IP is for Internet**
– across nets

note.... when developing this, I found some slides from Steve Deering in IETF, London 2001, about the complexity of IP stack... still valid ☺
(<http://www.cs.virginia.edu/~cs757/slidespdf/deering-hourglass-london-ietf.pdf>)


...and as farewell from the IP protocol

When I was younger, so much younger than today,
I never needed anybody's help in any way.
But now these days are gone, I'm not so self
assured,
Now I find I've changed my mind and opened up
the doors.
Help me if you can, I'm feeling down
And I do appreciate you being round.
Help me, get my feet back on the ground,
Won't you please, please help me.



Thanks for your attention!

.. And remember: only friendly shooting
is allowed 😊

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