

# Our vision



Vrije  
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University of Perugia

- o Internet victim of its own success: ossification
  - o Technological innovation meets natural resistance
  - o e.g. no deployment of IPv6, no inter-domain multicast, etc.
- o No more dumb (or pretending to be dumb) network, please.
- o We need in-network services
- o We need an easy way to dynamically install services to routers and end systems alike

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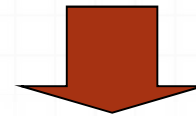


# Future Internet architecture?

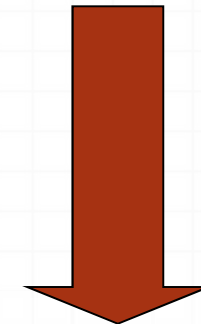
- o Long-term constant: service model
  - o equivalent of railroad track & road width
- o Identify core functions we need
  - o routing
  - o congestion control
  - o name lookup
  - o path state establishment
  - o ...
- o Learn from history
  - o why didn't these get done "right"?



1 interface  
TB disk  
1-32 multi-core processors



10+ interfaces  
0 GB disk  
1 low-end processor



.. can now be regarded as one



# Our Starting Point: NetServ

<http://www.cs.columbia.edu/irt/project/netserv/>

- In-network service container
- Java-programmable, signal-driven router
- “GENI Lite” – deploy modules, not VMs
- Active networking 2.0 – why can it work now?
  - Discrete approach: signaling driven, not packet driven
  - Advanced virtualization and isolation technology
  - Advanced hardware & software performance

**The big question: security** We are currently working on it!

- Resource control and isolation, Module authentication
- IP address ownership - Anonymous modules

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