

# Information-Centric Networking

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Internet2

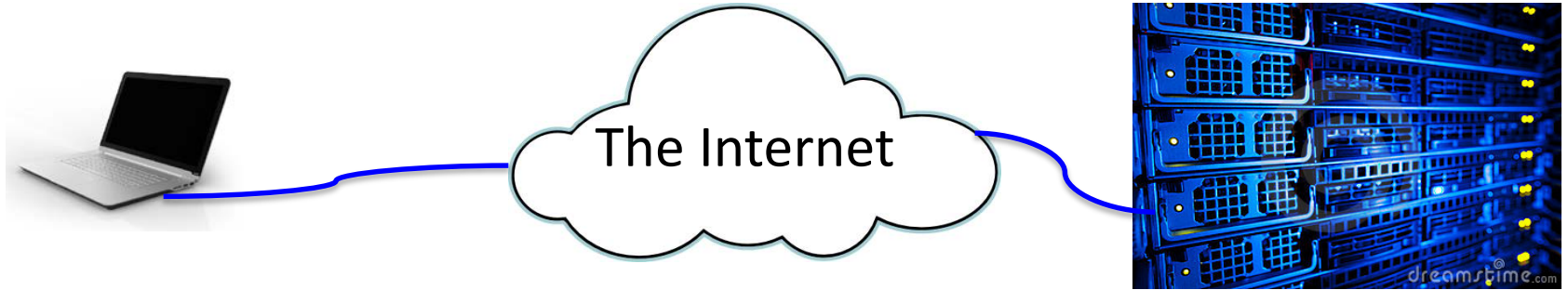
# Outline

- A little history
- Introduction to the technology
- Testbeds
- Next steps

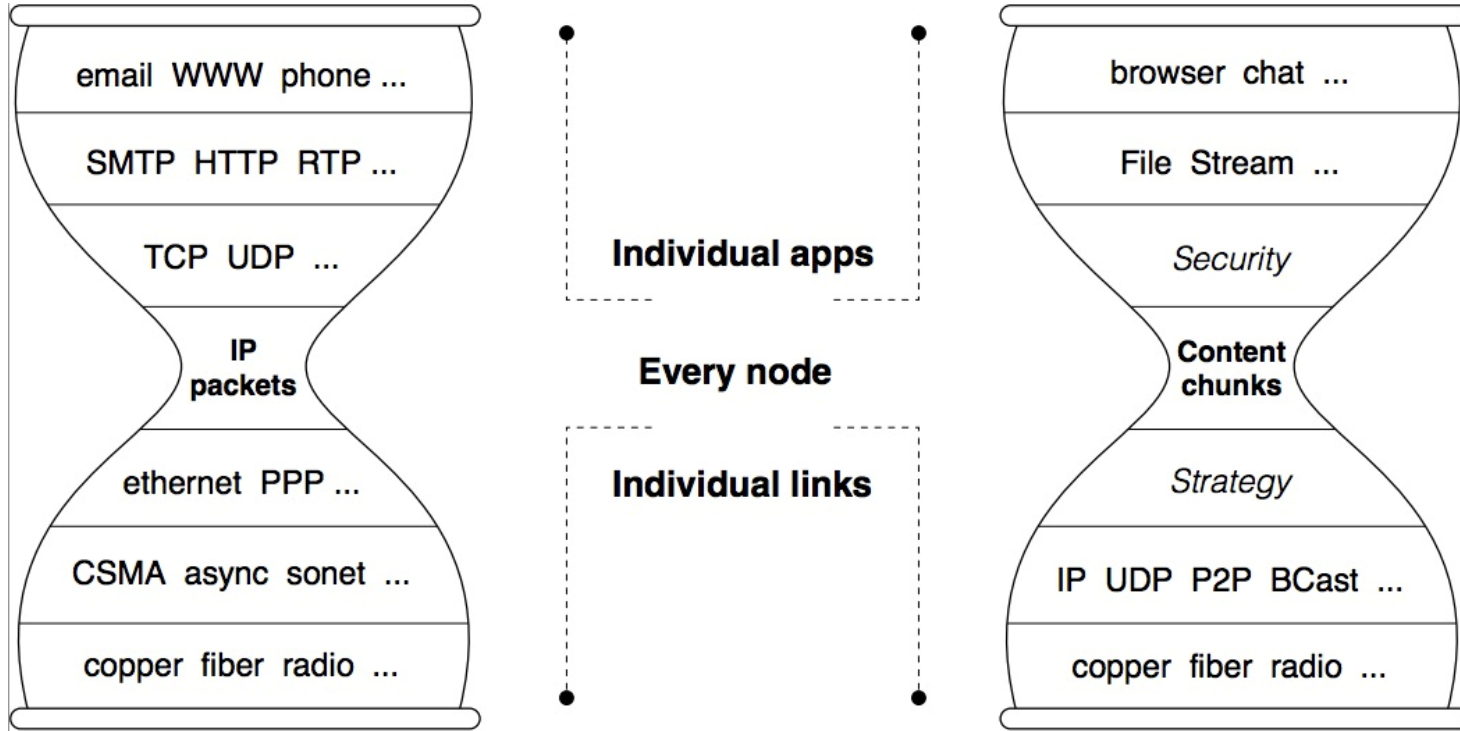
# A little history

- Jacobson et al, Networking Named Content CoNEXT '09
  - Authors at PARC
- NSF FIA grants to PARC & 12 universities for NDN, 2010
- ICNRG 2012
- 2013 fork
  - PARC & ICNRG continue with CCNx
  - University collaboration develops NDN
- NSF grants to universities for NDN - 2014, 2015, 2016
- NIST workshop 2016
- Harmonization initiative, IRTF 2016

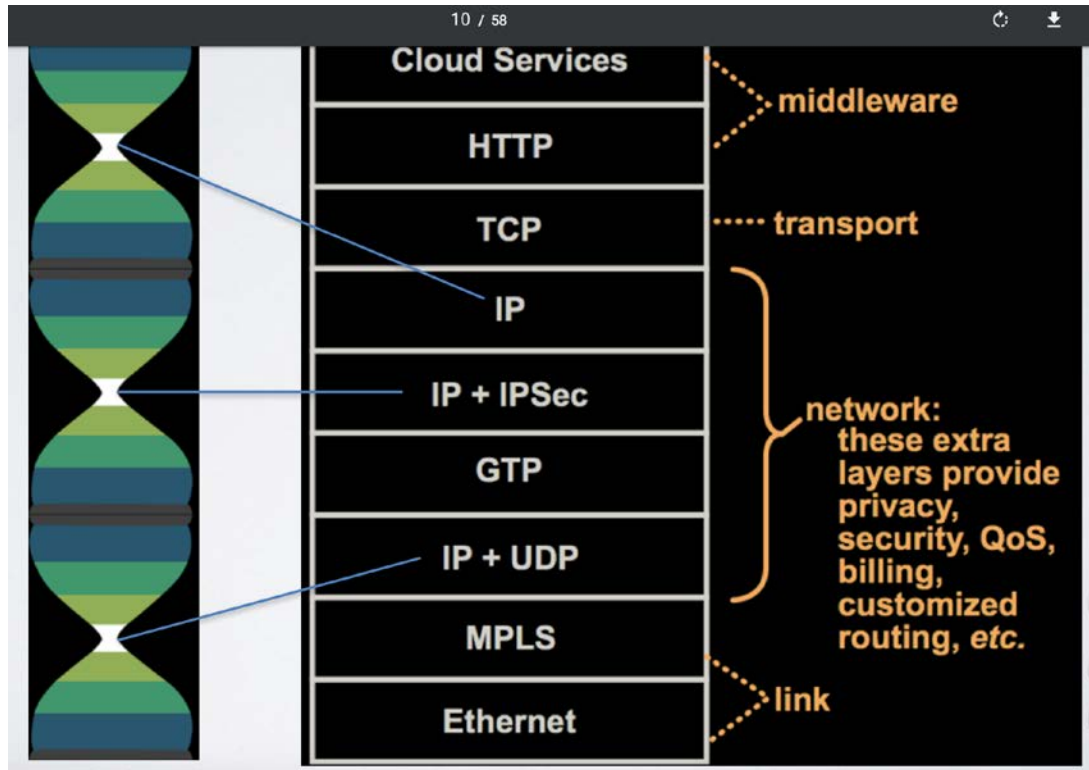
# The model hasn't changed



# A new hourglass

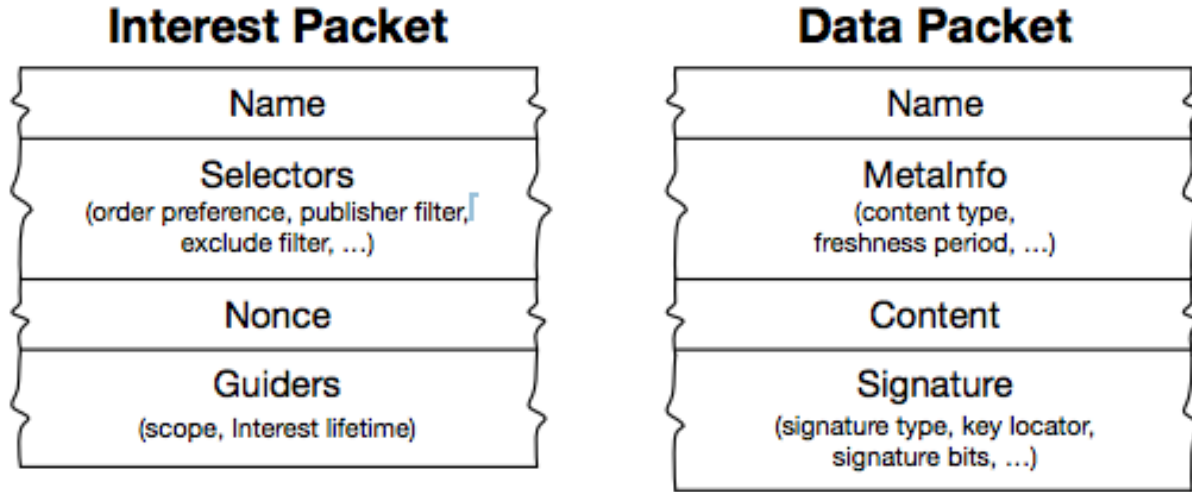


# “A typical IP packet (simplified)”



Thanks to Pamela Zave, ATT Research, 2012 – via kc

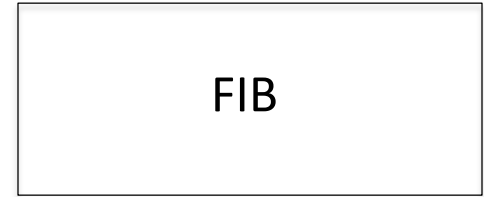
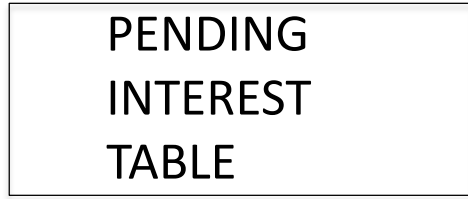
# NDN packets



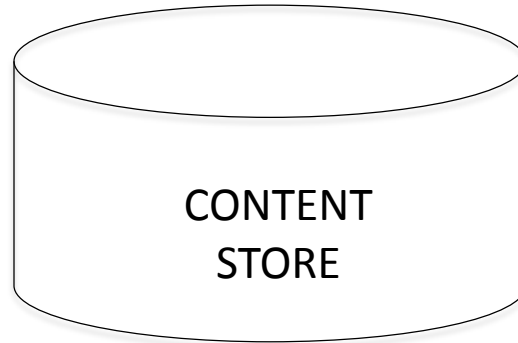
Note packets say “what” not “who” – no src or dst

See: [named-data.net/doc/ndn-tlv/name.html#ndn-name-format](http://named-data.net/doc/ndn-tlv/name.html#ndn-name-format)  
draft-ccn-packet-header-00 et seq

# Network node

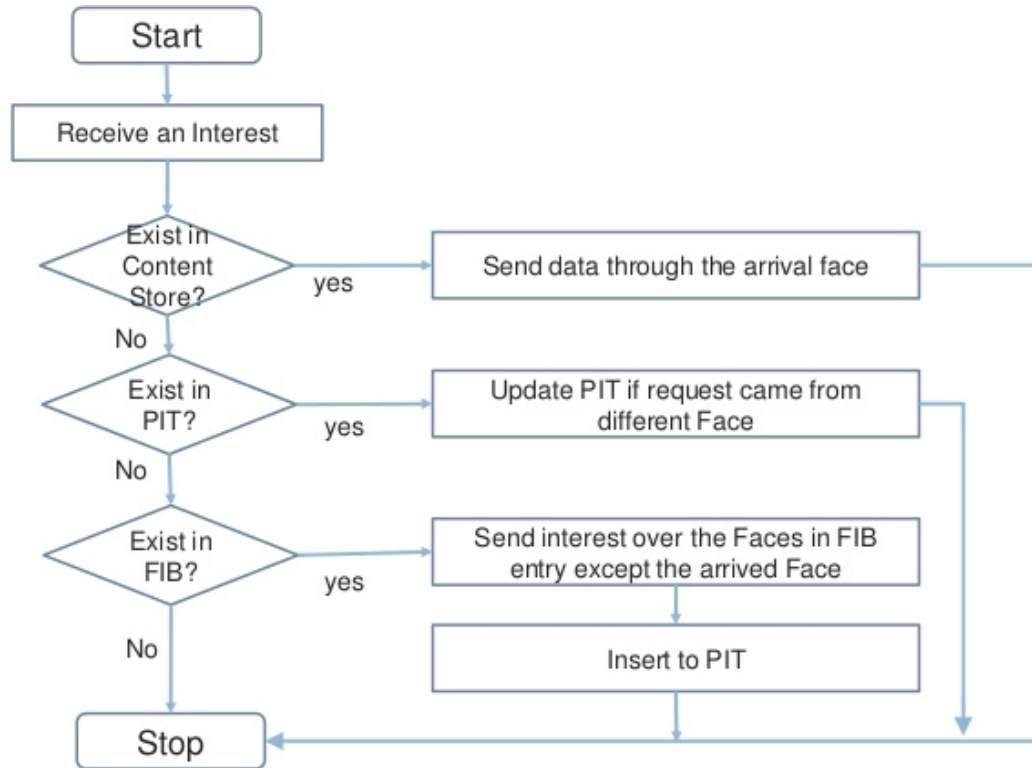


*State!*

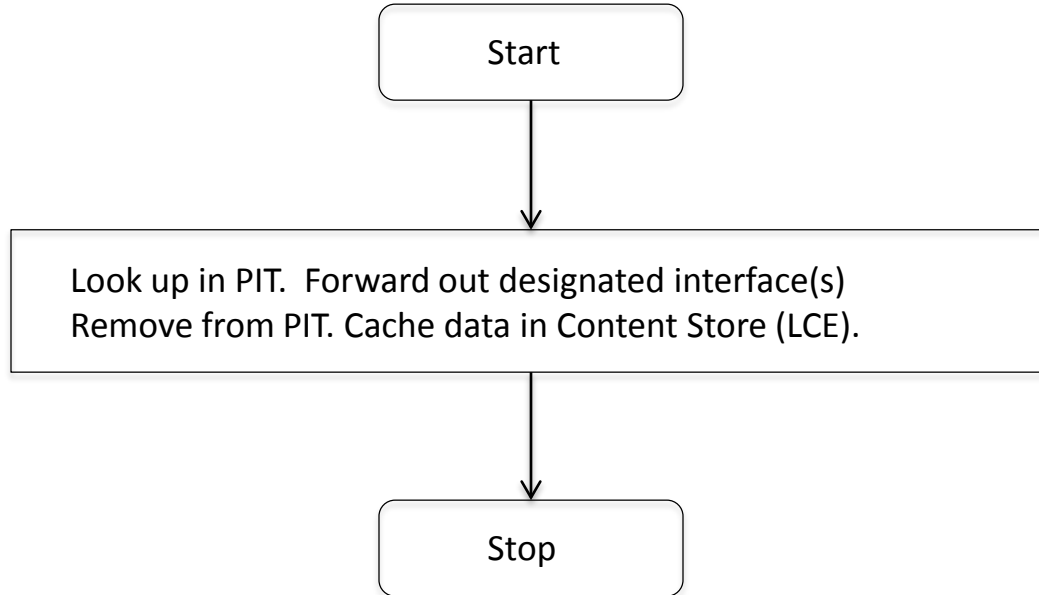




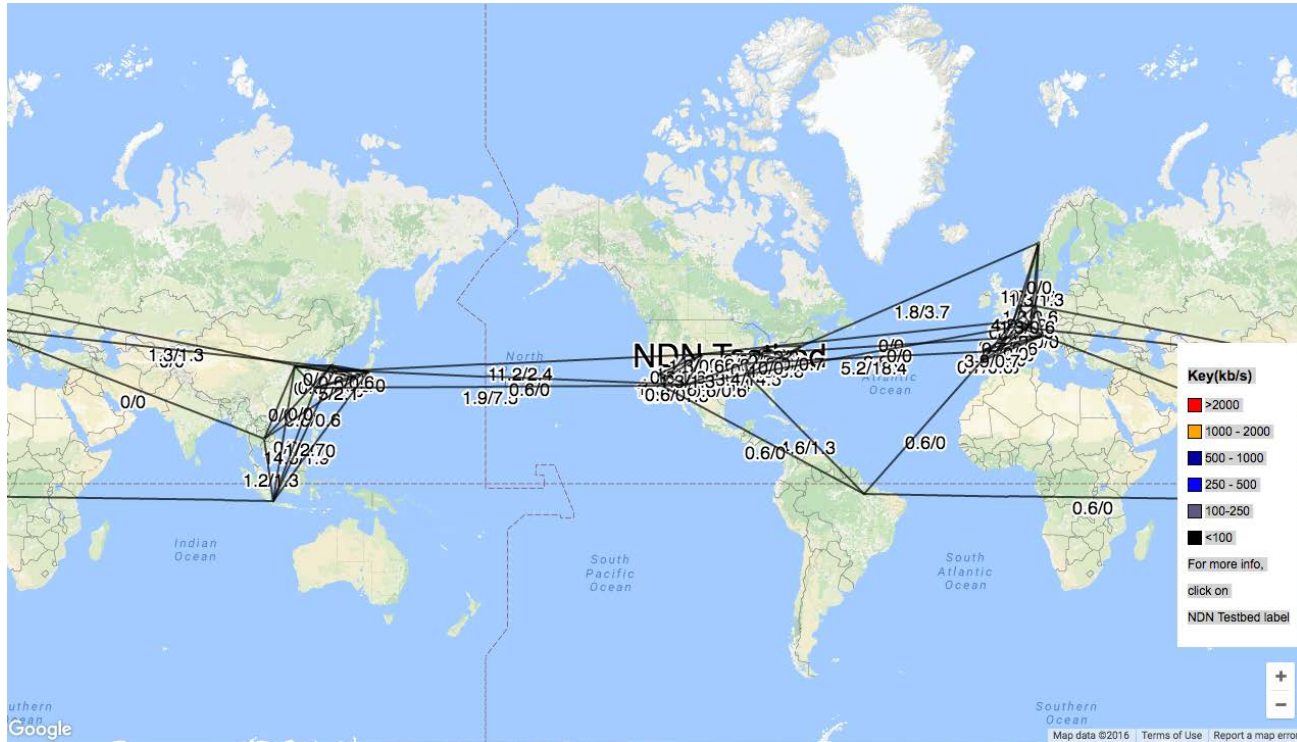
# Interest packet processing



# Content packet processing



# NDN testbed



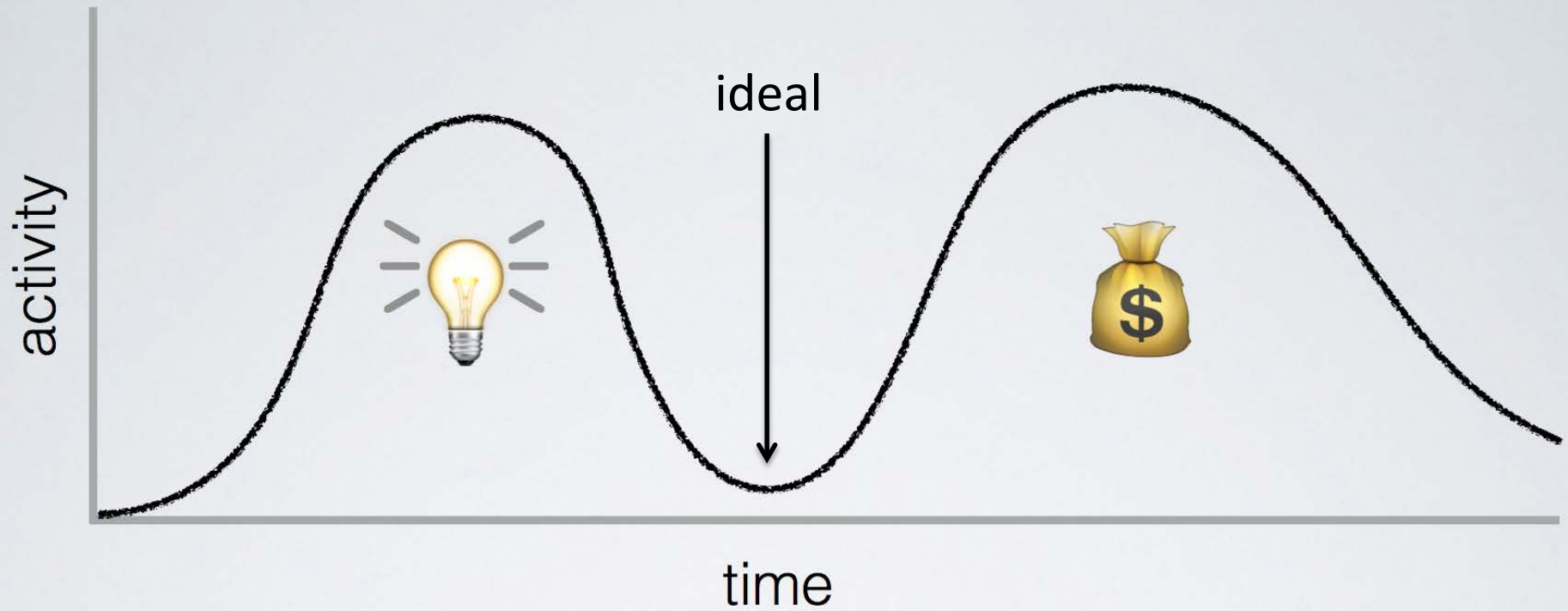
See <http://named-data.net/ndn-testbed/> for participants

# ICN/CCN testbed



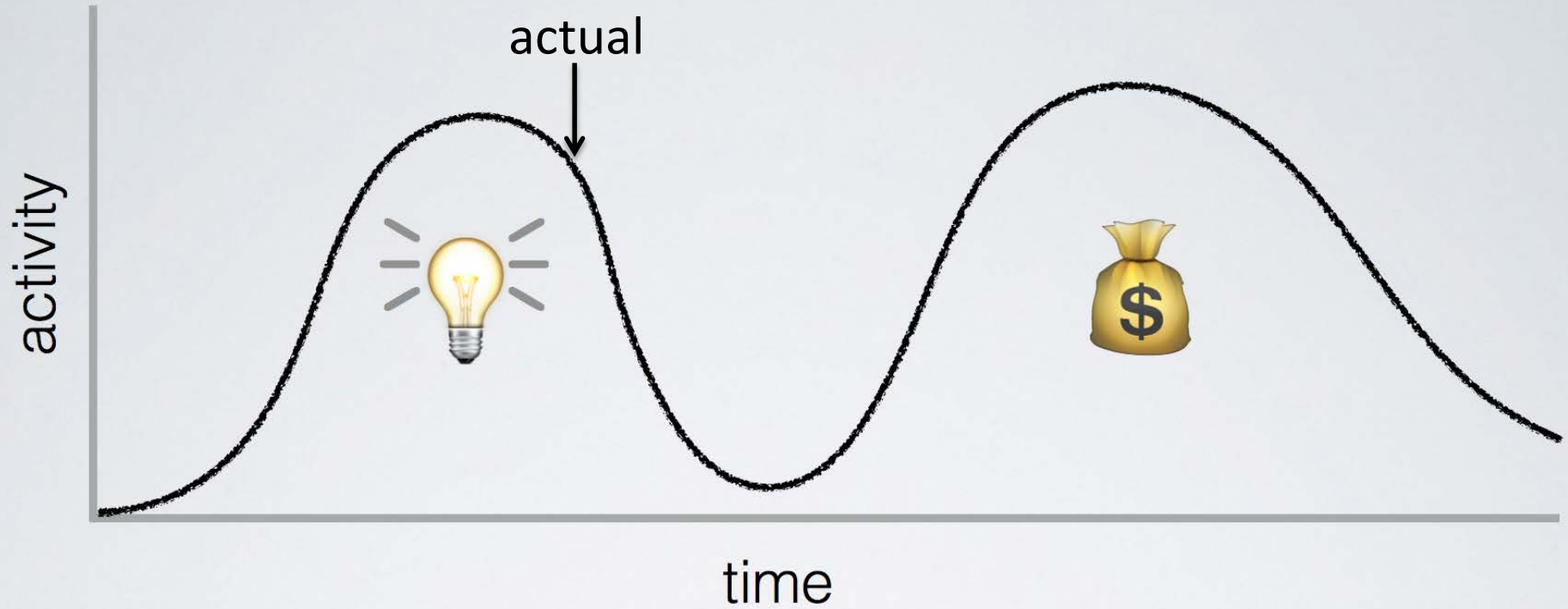
PARC  
Cisco  
Internet2  
Clemson  
Chicago  
UCSC  
Utah  
NORDUnet

# Standardization



Dave Clark, 1985, via kc

# Standardization



# ICN research

- Zhang et al., Named Data Networking, CCR July 2014
  - namespaces
  - trust models
  - in-network storage
  - data synchronization
  - rendezvous, discovery, and bootstrapping
- See also RFC 7927 Information-Centric Networking (ICN) Research Challenges July 2016
- draft-irtf-icnrg-ccnxsemantics-03 June 2016

# Useful references

- [named-data.net](http://named-data.net)
  - <http://www.ccnx.org>
  - [irtf.org/icnrg](http://irtf.org/icnrg)
- } Software is freely available from both sources
- [http://www.caida.org/publications/presentations/2015/brief\\_history\\_future\\_internet\\_lisa/](http://www.caida.org/publications/presentations/2015/brief_history_future_internet_lisa/)
  - [named-data.net/codebase/platform/support/mailing-lists/](http://named-data.net/codebase/platform/support/mailing-lists/)
  - [icnrg-request@irtf.org](mailto:icnrg-request@irtf.org)
  - [icnrg-harmonization-request@irtf.org](mailto:icnrg-harmonization-request@irtf.org)





Thank you