

Innovation at the Waist

musings

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Who am I

~~OLAF~~

Once I said

Why did I say
that

DNSSEC
will be done in
6 months

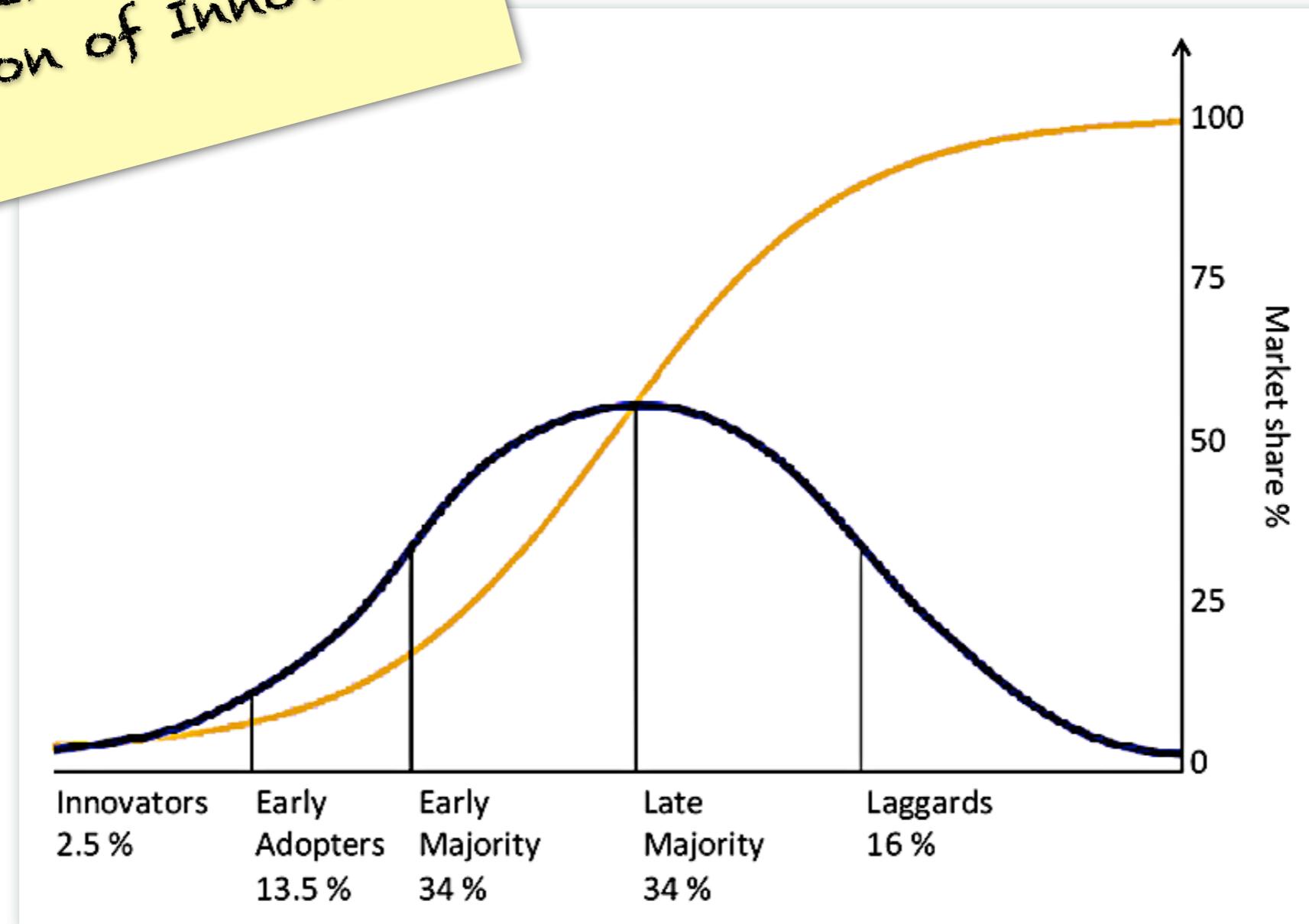
Open
Global Trustworthy Innovation

We (technical internet community) introduced a number of technologies such as IPv6 and DNSSEC that have a difficult time being deployed.

Is it possible to innovate at the waist?

Innovation?

Everett Rogers
Diffusion of Innovation



5 Decision Stages

Knowledge

Persuasion

Decision

Implementation

Confirmation

5 Decision Stages

Knowledge

Individual is exposed but doesn't know much about the innovation.

You might have seen an IPv6 configuration option

A IPv6 task force may be active in your industry

You've heard about IPv6 at a conference

5 Decision Stages

Individual seeks more information

Persuasion

Talk to colleagues

Read the IPv6 Wikipedia article

Take a course or workshop

5 Decision Stages

Individual weighs risks and benefits and takes the decision to adapt or reject

Decision

Often: Engineer decides to persuade the Management

Management then is at stage 1

Once decision is made it will take new persuasion to reconsider

5 Decision Stages

Individual implements the innovation
and may seek further information

This is where the
engineers do a lot of
work and find out they
lack information or
skills

Implementation

5 Decision Stages

Individual confirms the decision that implementation useful and deploy to full potential

Typically this is the stage where the pilot is moved to production.

Confirmation

New questions to ask

Knowledge

Persuasion

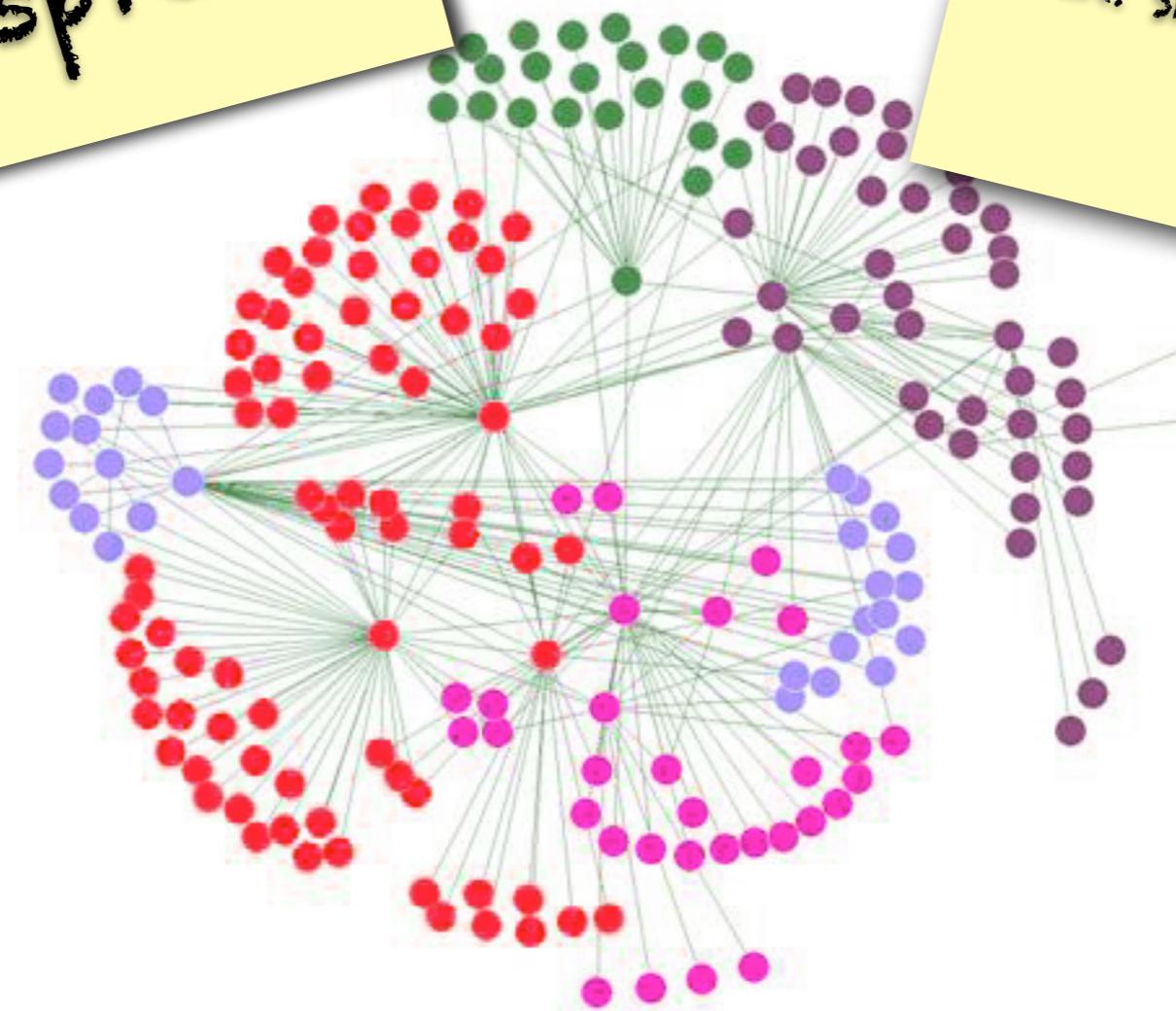
Decision

How does knowledge spread?

How are decisions made?

**Social network
drives spread**

Spread works most effective
when: Shared values, but lack of
awareness



Source: http://en.wikipedia.org/wiki/File:Social_Red.jpg

Decision types:
optional,
collective, or
authoritative

On Internet scale
the decision to
deploy IPv6 is
optional

- Optional Innovation-Decision: This decision is made by an individual who is in some way distinguished from others in a social system.
- Collective Innovation-Decision: This decision is made collectively by all individuals of a social system.
- Authority Innovation-Decision: This decision is made for the entire social system by few individuals in positions of influence or power.

We talked about Individuals making decisions about innovation

What are the properties of the innovation that inform the decisions of that individual?

Relative
Advantage

Complexity/
Simplicity

Compatibility

Trialability

Observability

Complexity/
Simplicity

Relative
Advantage

Compatibility

Trialability

Observability

- Is the innovation difficult to use, if so the individual that needs to make the decision is less likely to adopt it
- Does the innovation bring relative improvement?
- Is the innovation compatible with what the individual already has deployed
- Can the individual try the innovation?
Is it testable?
- Does the innovation have some cool?
Can you talk about the innovation at the bar?

Relative advantage



Value

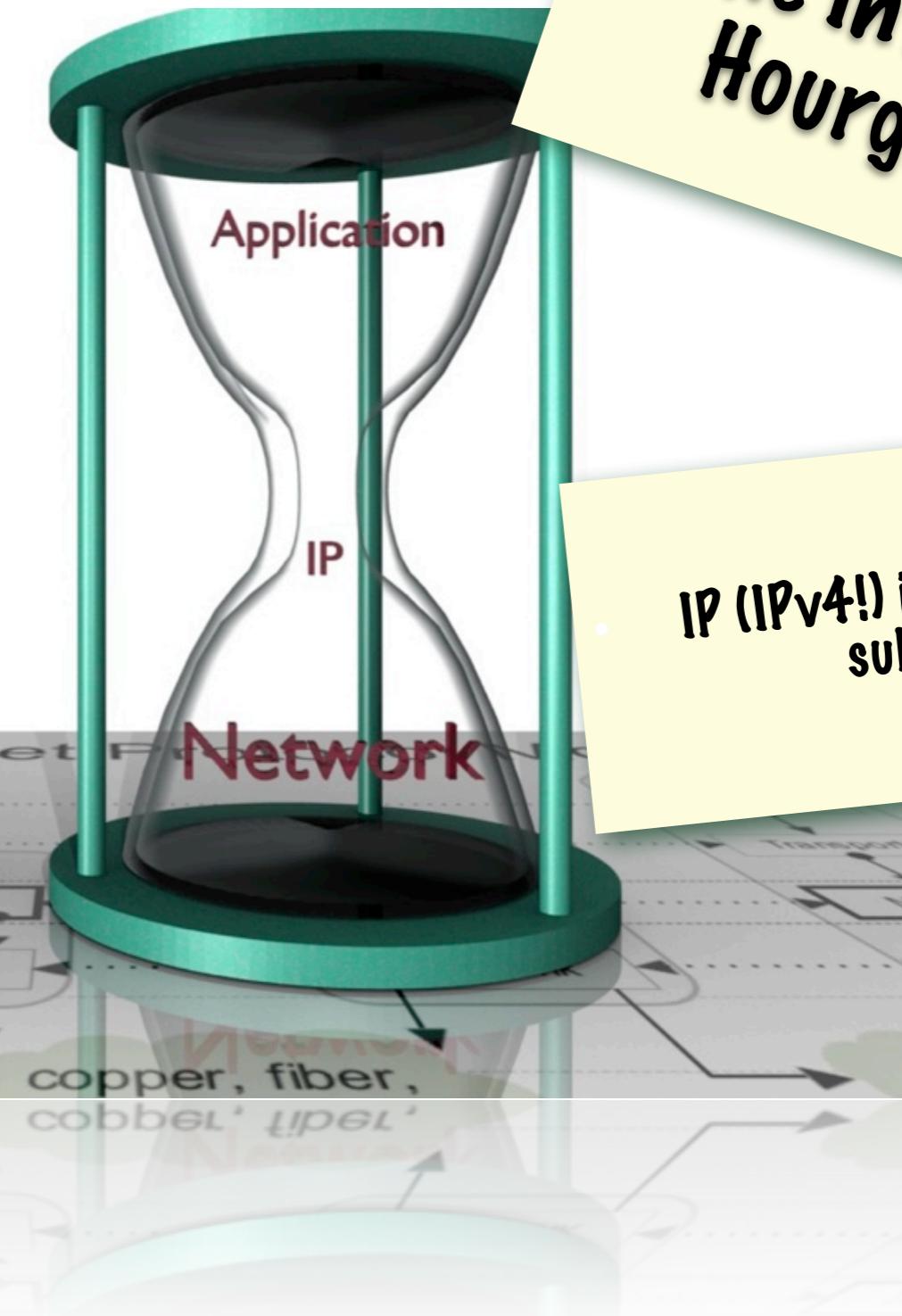
Malogia

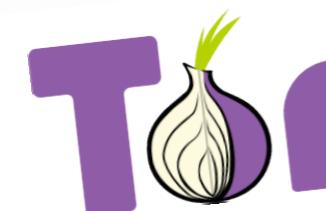
Metcalf's law

Application Layer:
Applications use IP for connectivity



The Network Access Layer: Components in the Network Access Layer deliver IP connectivity



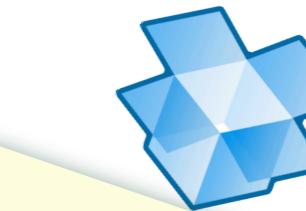


The IP API as the common open interface to the network

Asterisk®



Mini note: HTTP is more and more the de-facto substrate



Permissionless Innovation

• Imagination is the limit

Proprietary

Open Source

• New applications are
conceived and deployed
almost daily

No Imposed Business
Model

Freeware

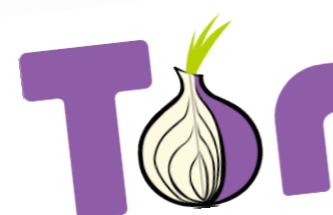
Payware

Privacyware

Adware



Compatibility



Relative
Advantage

Observability



Complexity/
Simplicity

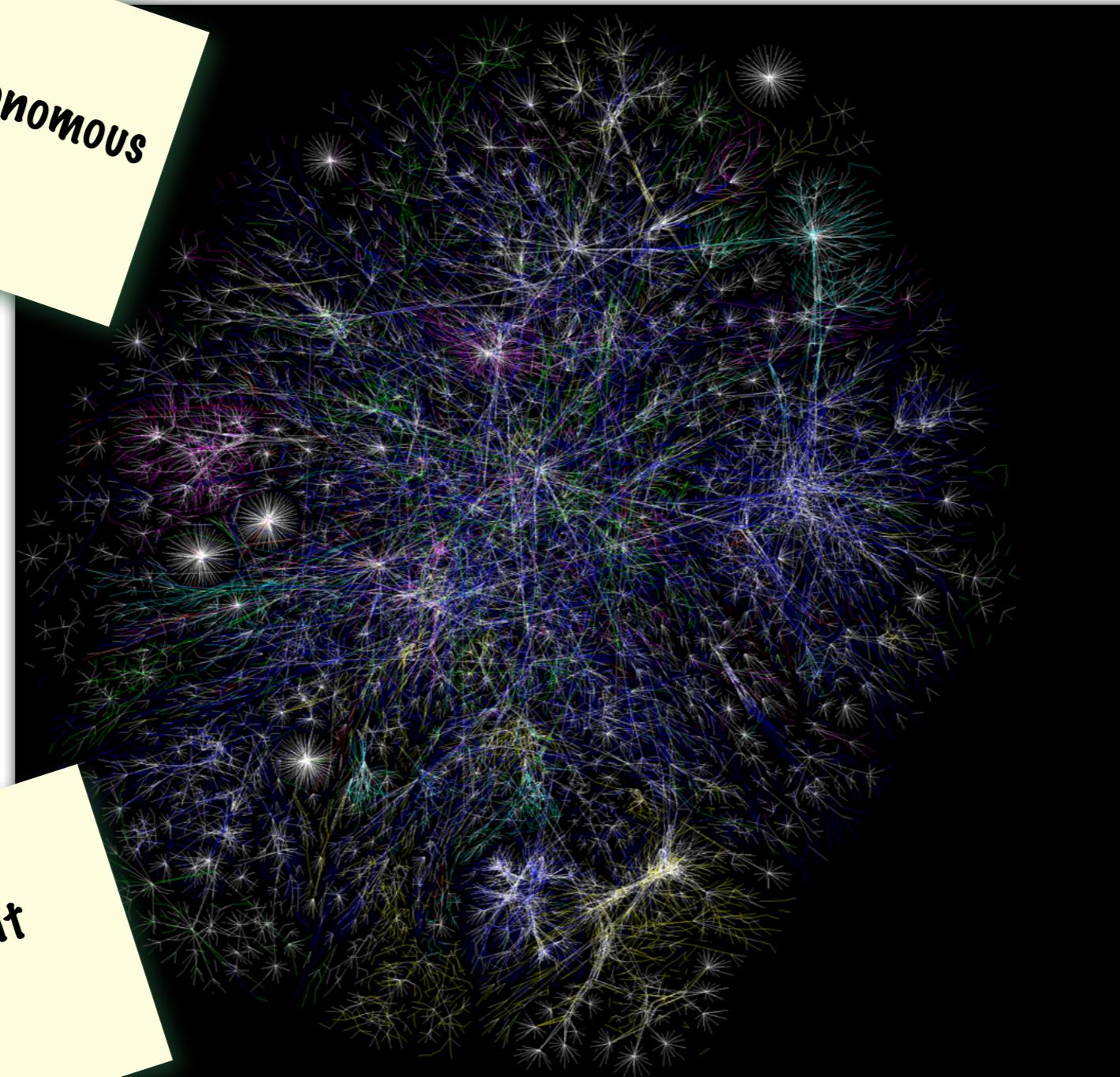


Trialability



Independent Autonomous Networks

Serving different markets



Highly competitive

Commodity

The Price of Bandwidth, in bulk, per Mbps

A EUR80 fiber cross connect:	\$0.01
Internet Exchange traffic:	\$0.25*
Backbone traffic Western Europe:	\$0.50
Transatlantic traffic, wholesale:	\$1
Internet Transit, wholesale:	\$2
Internet Transit, retail:	\$15
Broadband Internet, consumer:	\$50
National Ethernet service:	\$180
3G mobile data, national:	\$11,400
GSM voice call, national:	\$483,840
3G mobile data, roaming low:	\$834,000
3G mobile data, roaming high:	\$3,127,500
GSM voice call, roaming:	\$3,338,496
SMS Text Messages:	\$210,000,000
SMS Text Messages, roaming:	\$1,166,400,000

Western Europe, early-mid 2011 (based on 10Gbps or 300GB)

Table courtesy of Remco van Mook, Equinix

SDN

MPLS

SONET

IEEE 802.11

ADSL

VDSL

Docsis

Deliver IP to the edge and
route with your peers

Innovating the fabric is an
internal decision

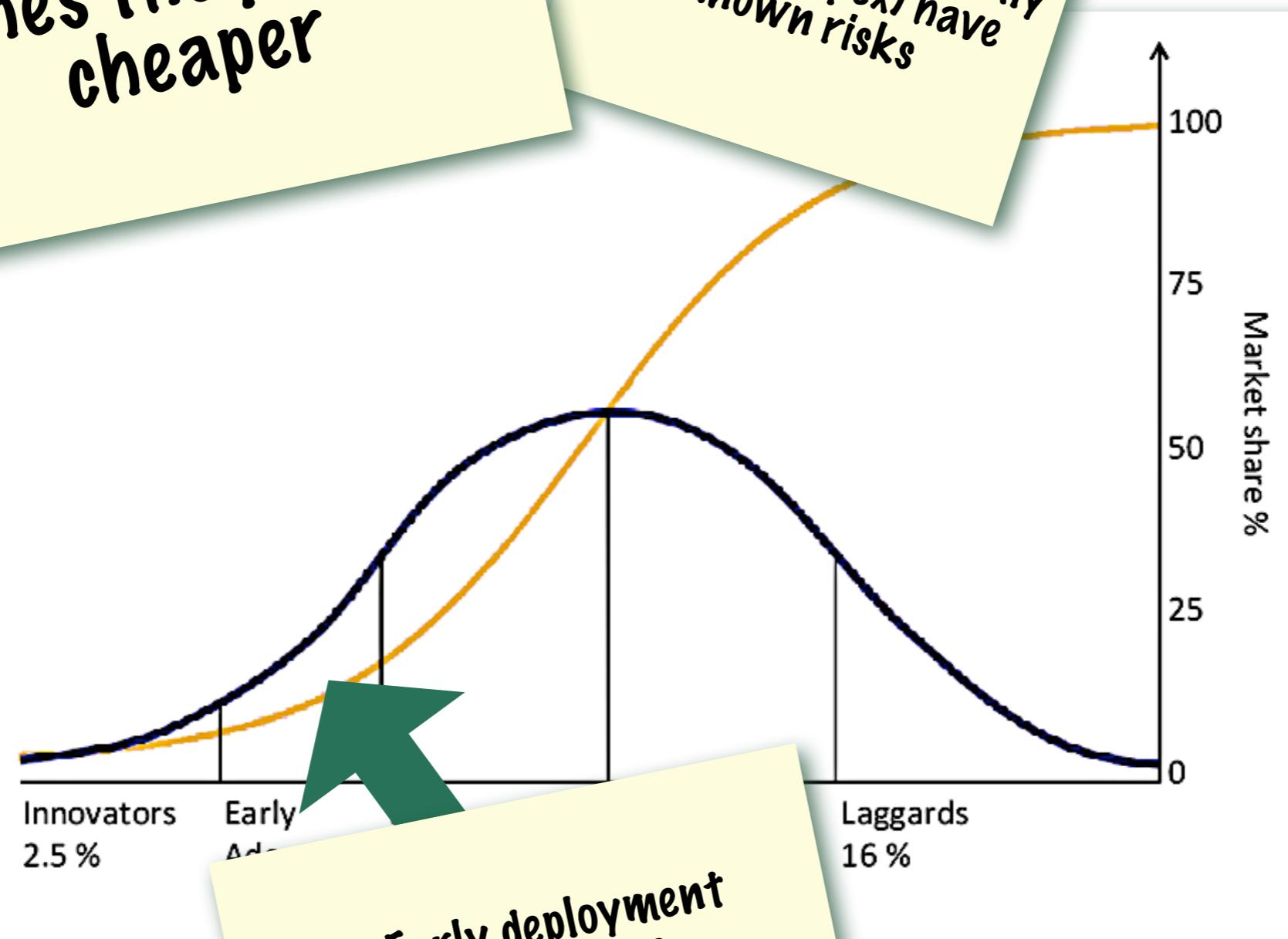
Compatibility

Observability

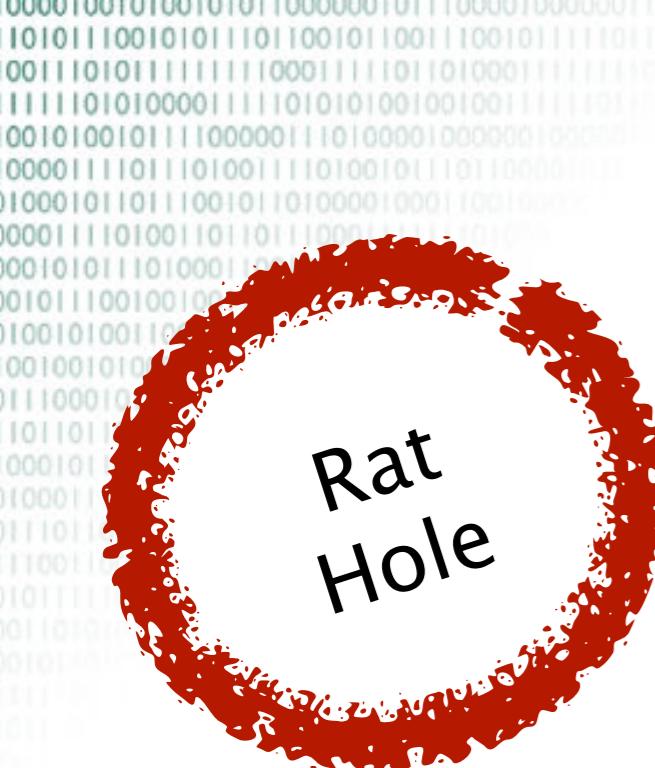
Triability

Innovative gear
pushes the packets
cheaper

capex and (temporarily
increased opex) have
known risks



Early deployment
advantage



Earnings don't make it through the waist

Network Providers seek to monetize the network to fund their investments

Most value creation in the top half is by different players than the investment on the bottom half

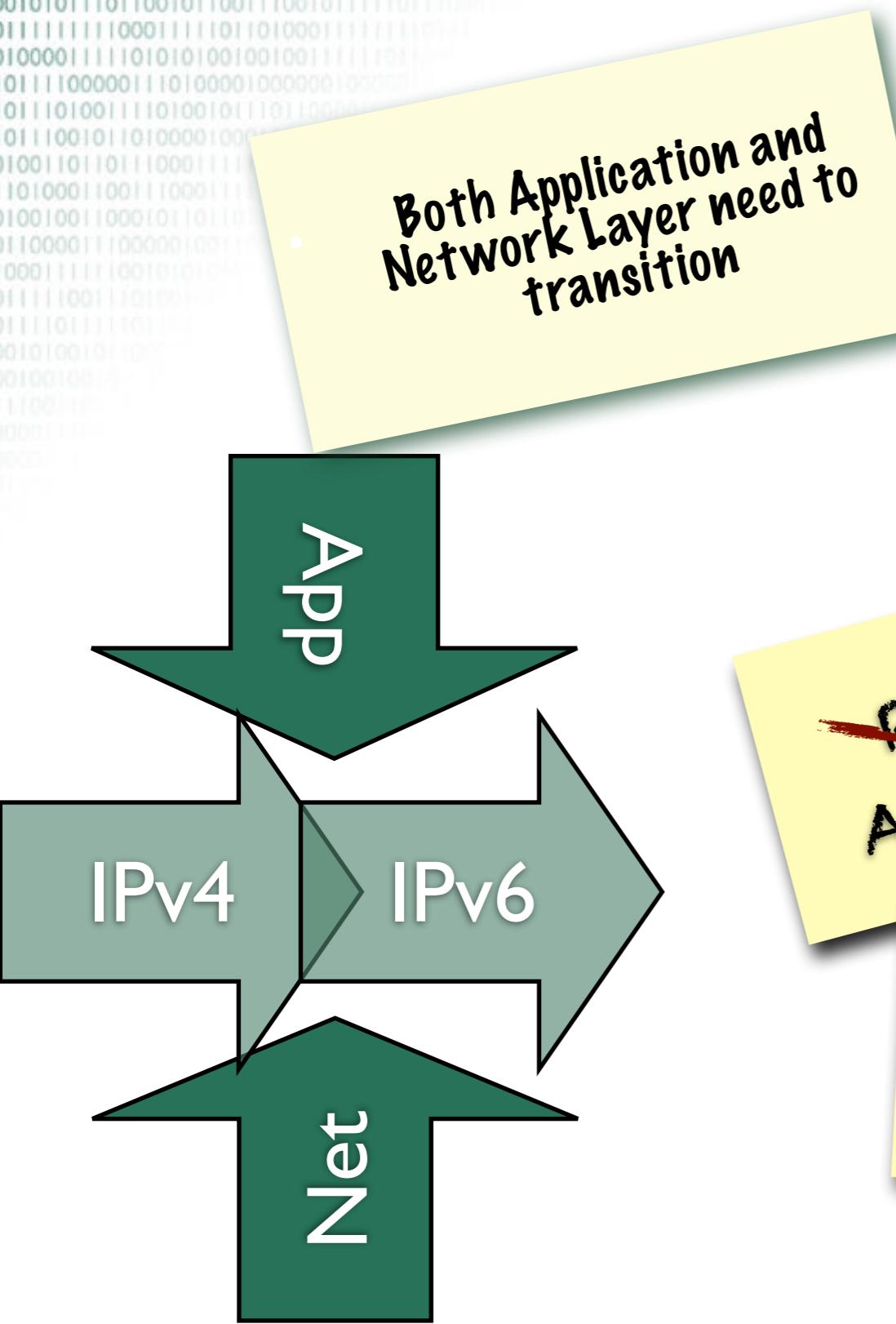




DNSSEC

• Innovation around
the waist

ROUTING SECURITY



From the individual innovators perspective

~~Complexity/
Simplicity~~

~~Relative
Advantage~~

~~Triatability~~

~~Compatibility~~

~~Observability~~

n Log(n)

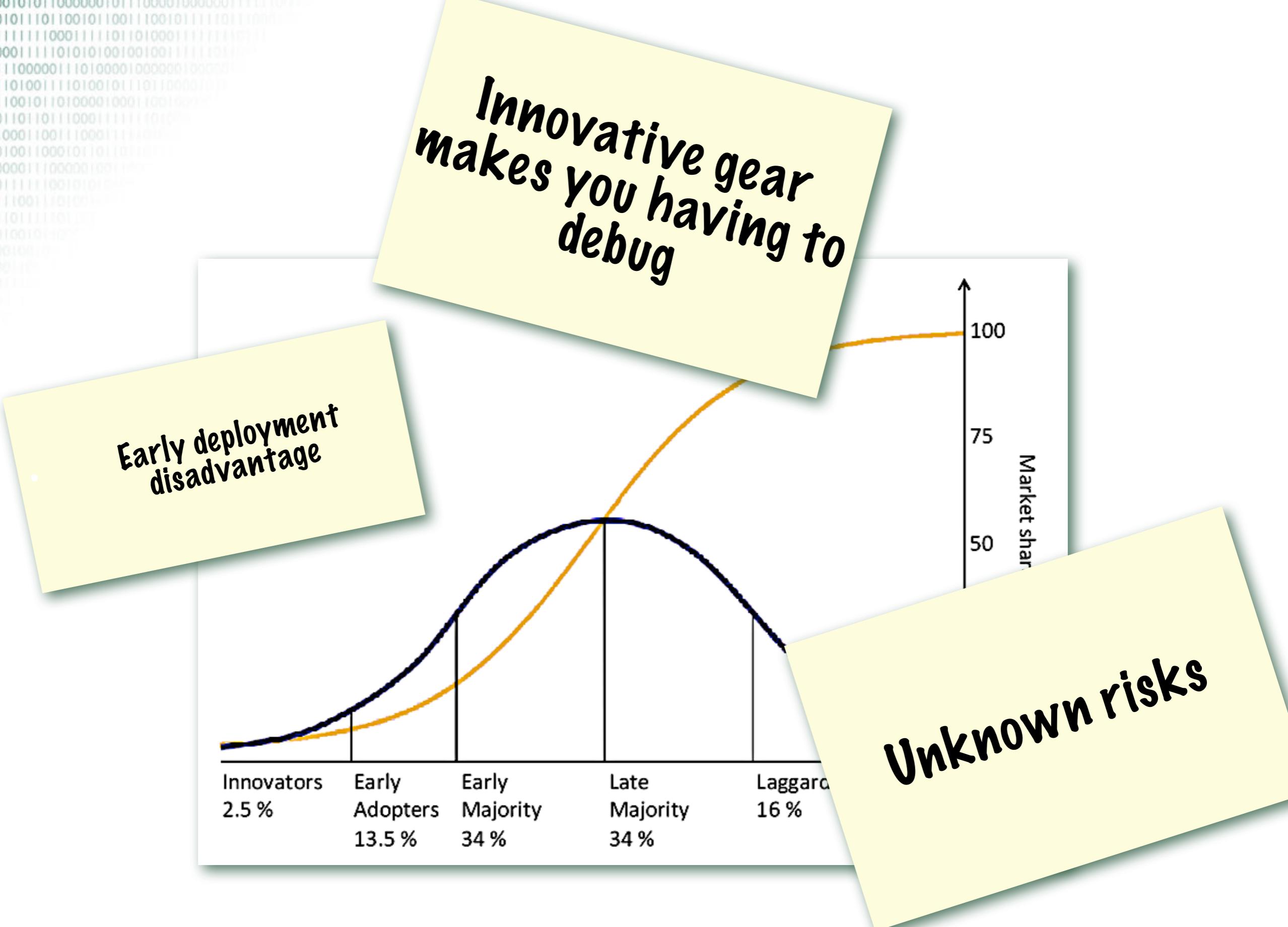
IPv4: $n=2 \times 10^9$

IPv6: $n=0(10^6)$

The new kid on the block
should not spoil the fun
for the others

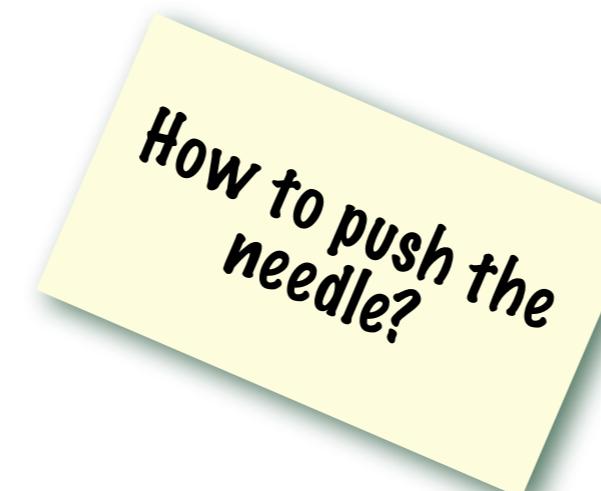
Any reduction to the
value of the network is
unacceptable

These numbers are estimates for argument sake



Dark Picture





*How to push the
needle?*

Group

Credible large N in the future:

Identify attractors

Share the sense of direction/vision

Reduce costs

Individual

Reduce complexity

Increase relative advantage

Maintain compatibility

Enable trialability

Make Observable

Group

Credible large N in the future:

Identify attractors

Share the sense of direction/vision

Reduce costs

Regulation

Subsidy

Market Creation

Standardisation

Availability in Products

Open Source

Individual

Reduce complexity

Increase relative advantage

Maintain compatibility

Enable trialability

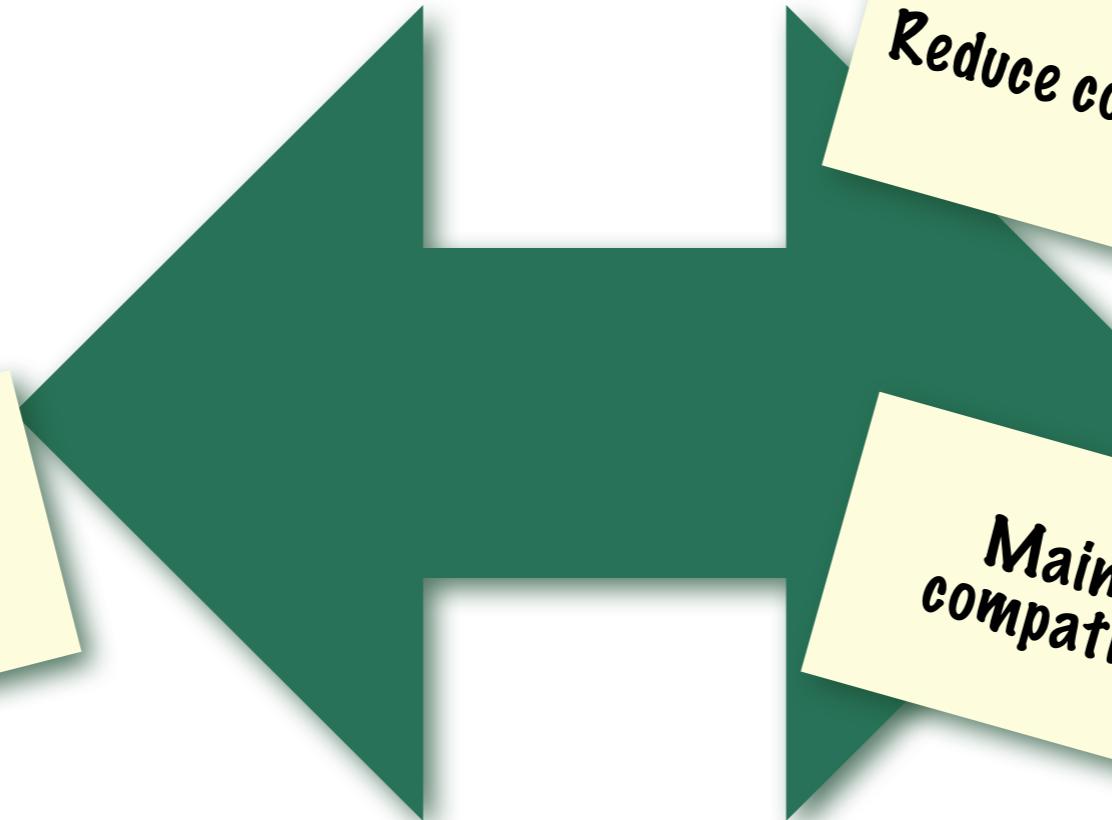
Make Observable

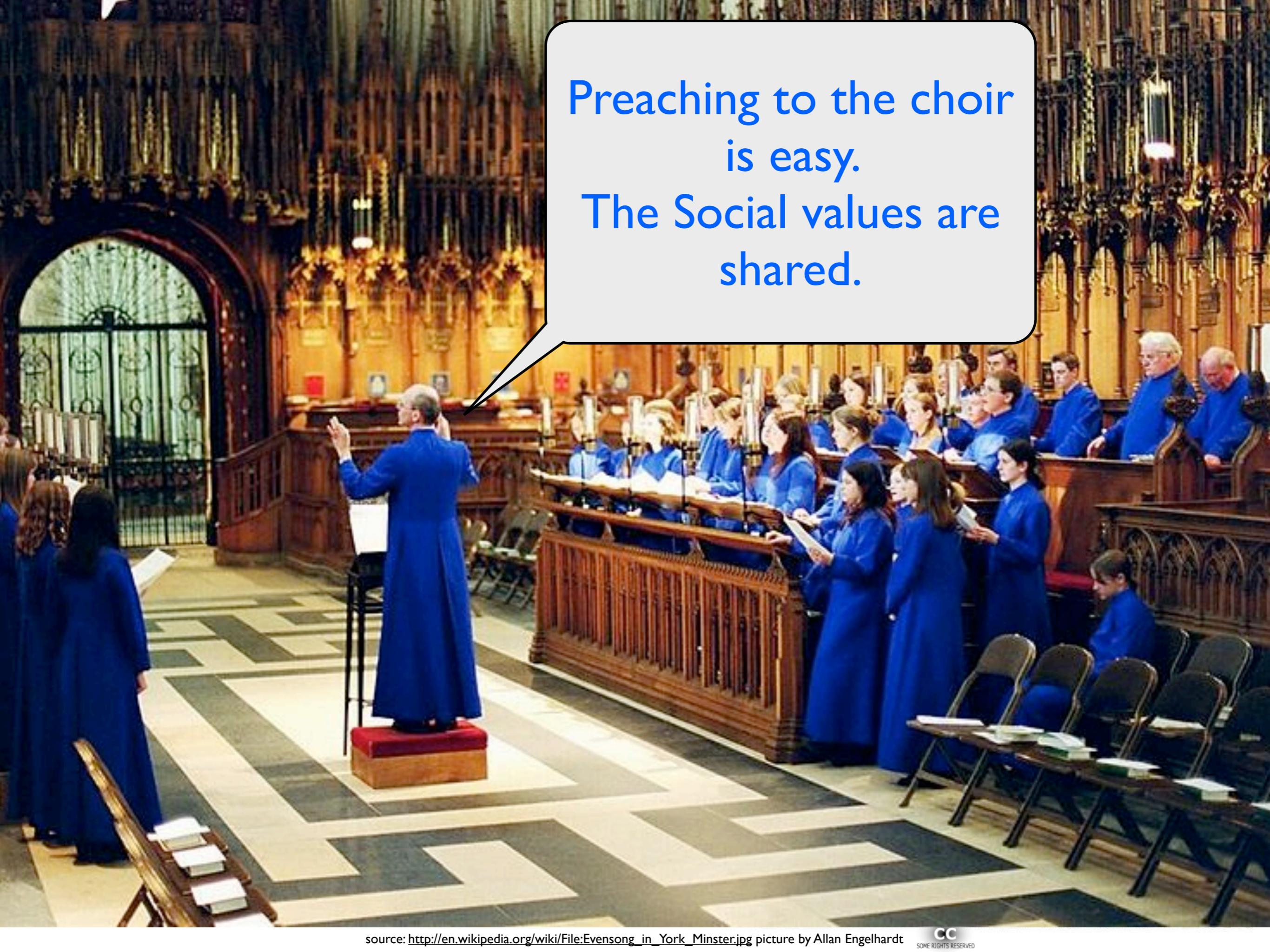
Good Tools

Free Software

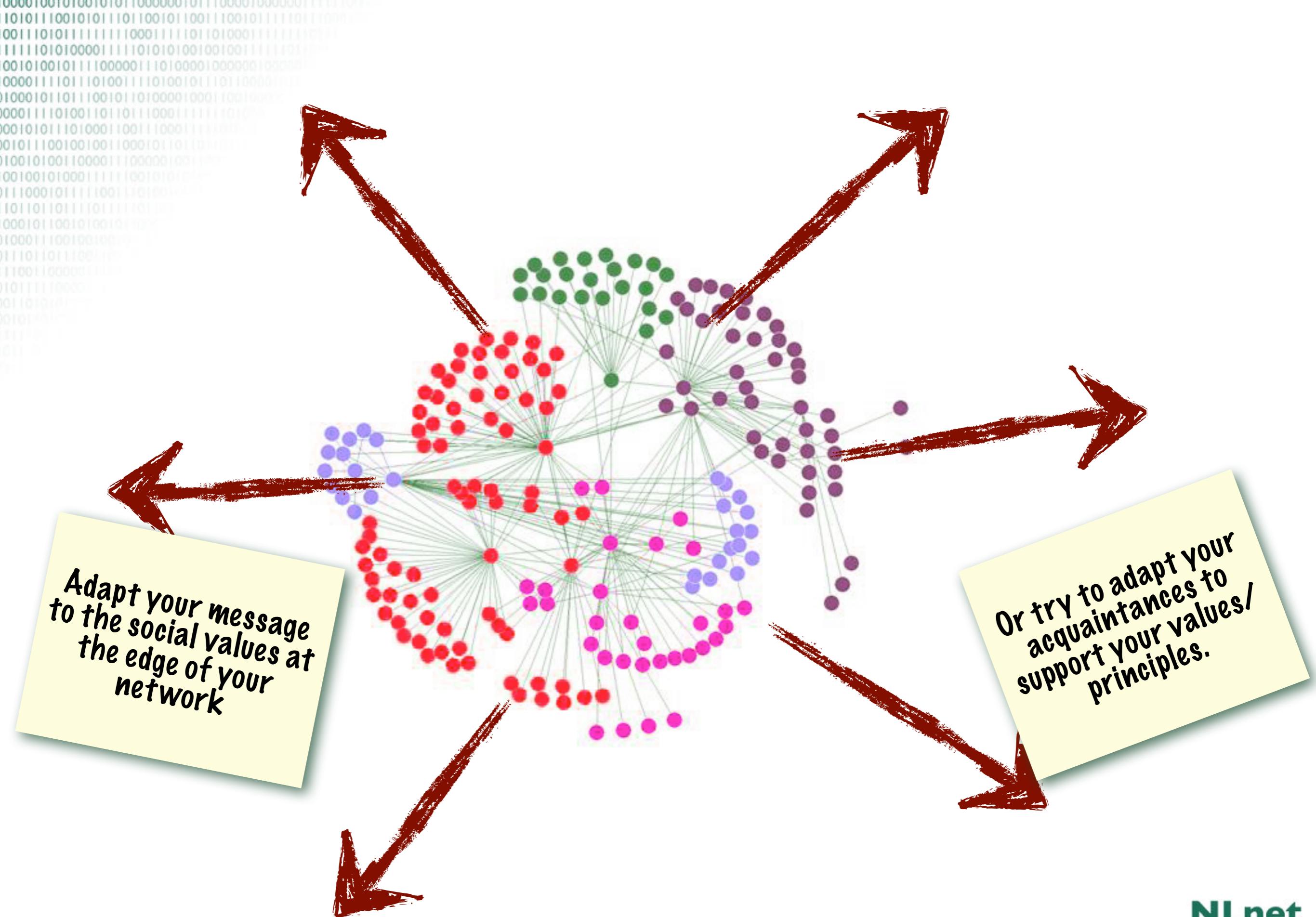
Subsidy

As add-on'

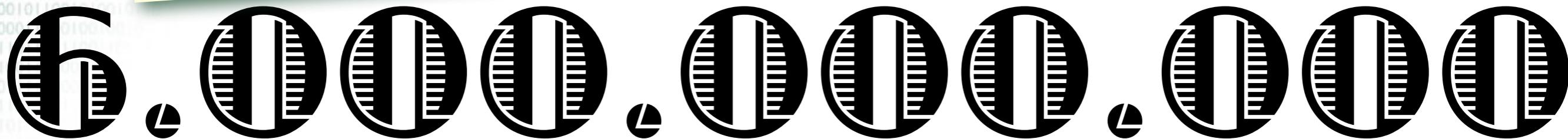


A photograph of a cathedral interior showing a choir singing. A man in a blue robe stands on a red stool at the front, conducting. The choir members, also in blue robes, are seated in wooden stalls. The architecture is highly detailed with intricate carvings and stained glass windows.

Preaching to the choir
is easy.
The Social values are
shared.



Why go through the effort
in the first place?



(100 devices per user)

Open Global Innovation Trustworthy

We have to make
the impossible
possible

to keep the
impossible possible

Question, ideas, feedback?

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