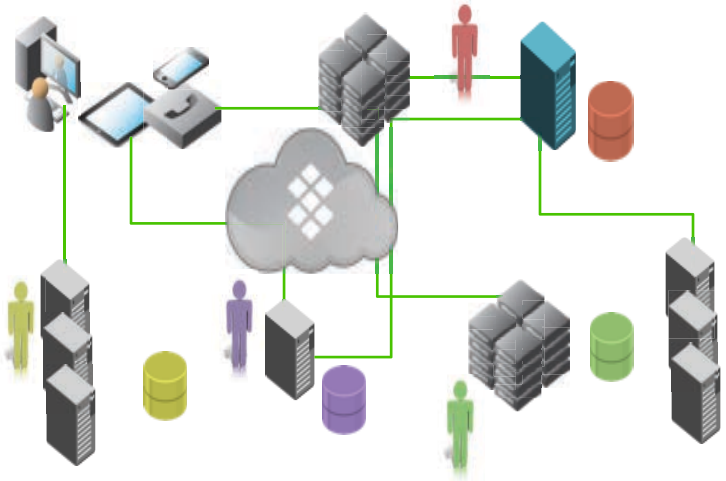
Infoblox
CONTROL YOUR NETWORK

Erlang, Open Networking, and the Future of Computing

Stu Bailey, Founder/CTO

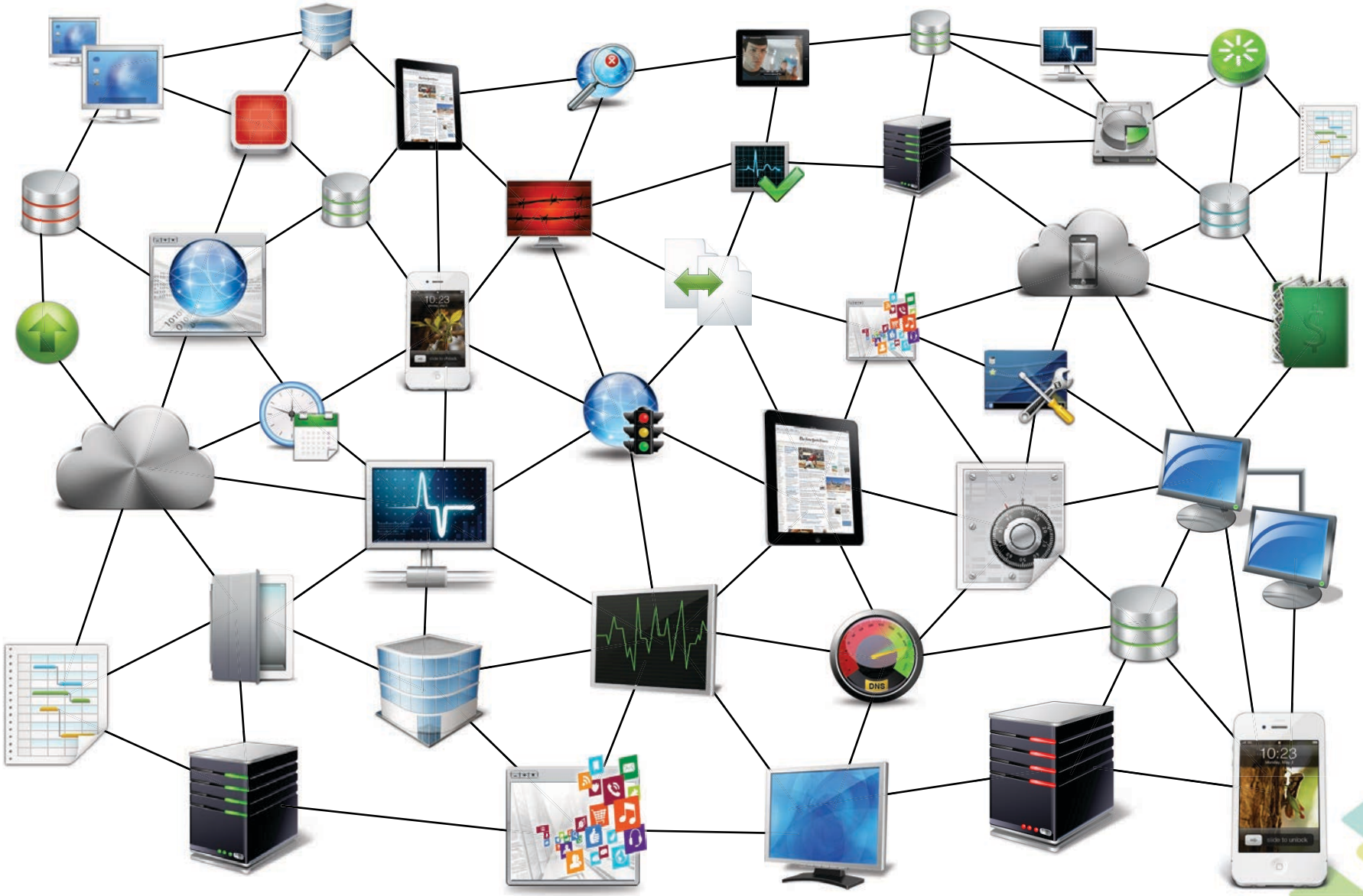
What is the Business View of the Network?

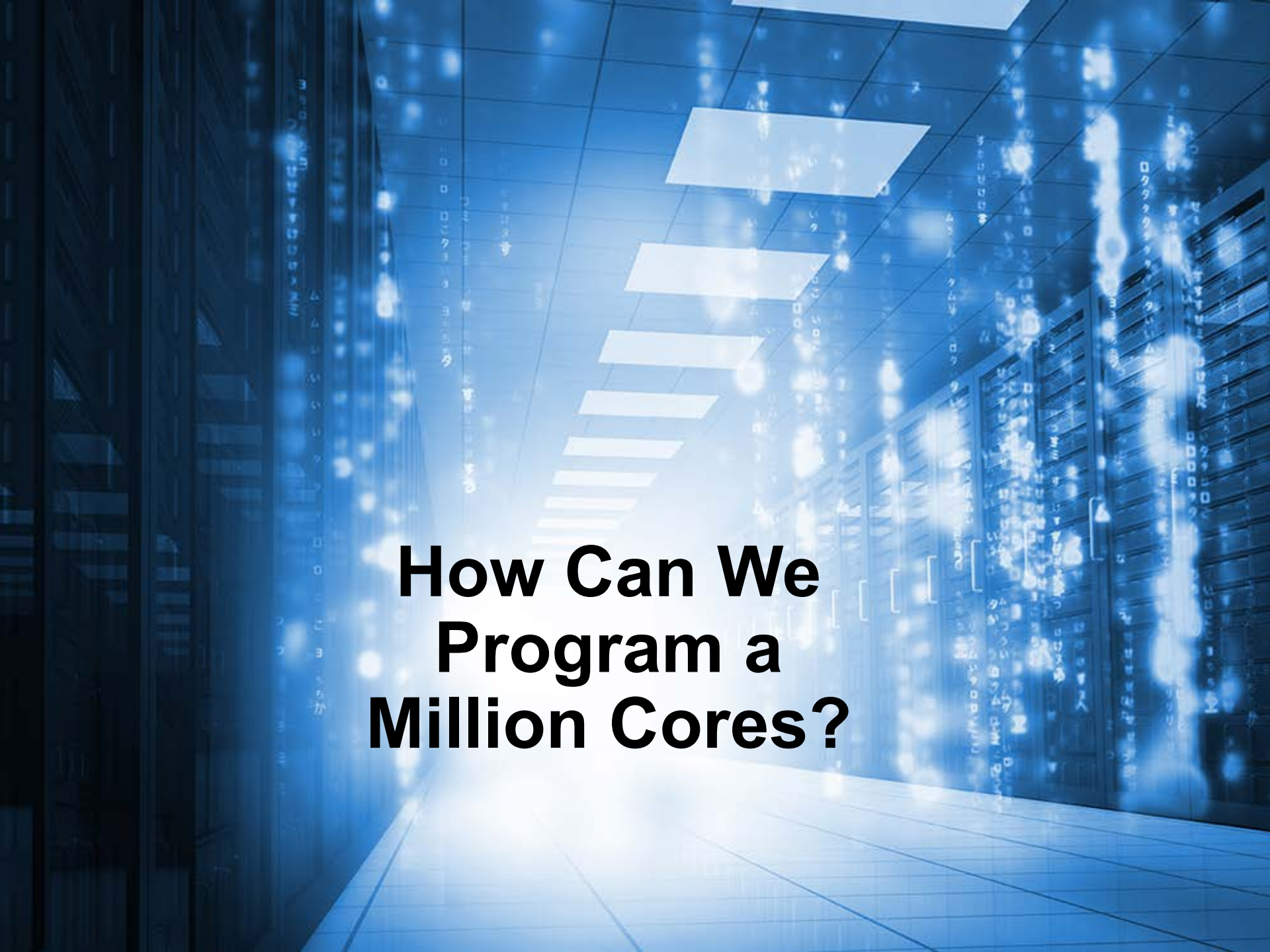


Traditional corporate network

Business accountable network

How Can We Program an Internet of Things?

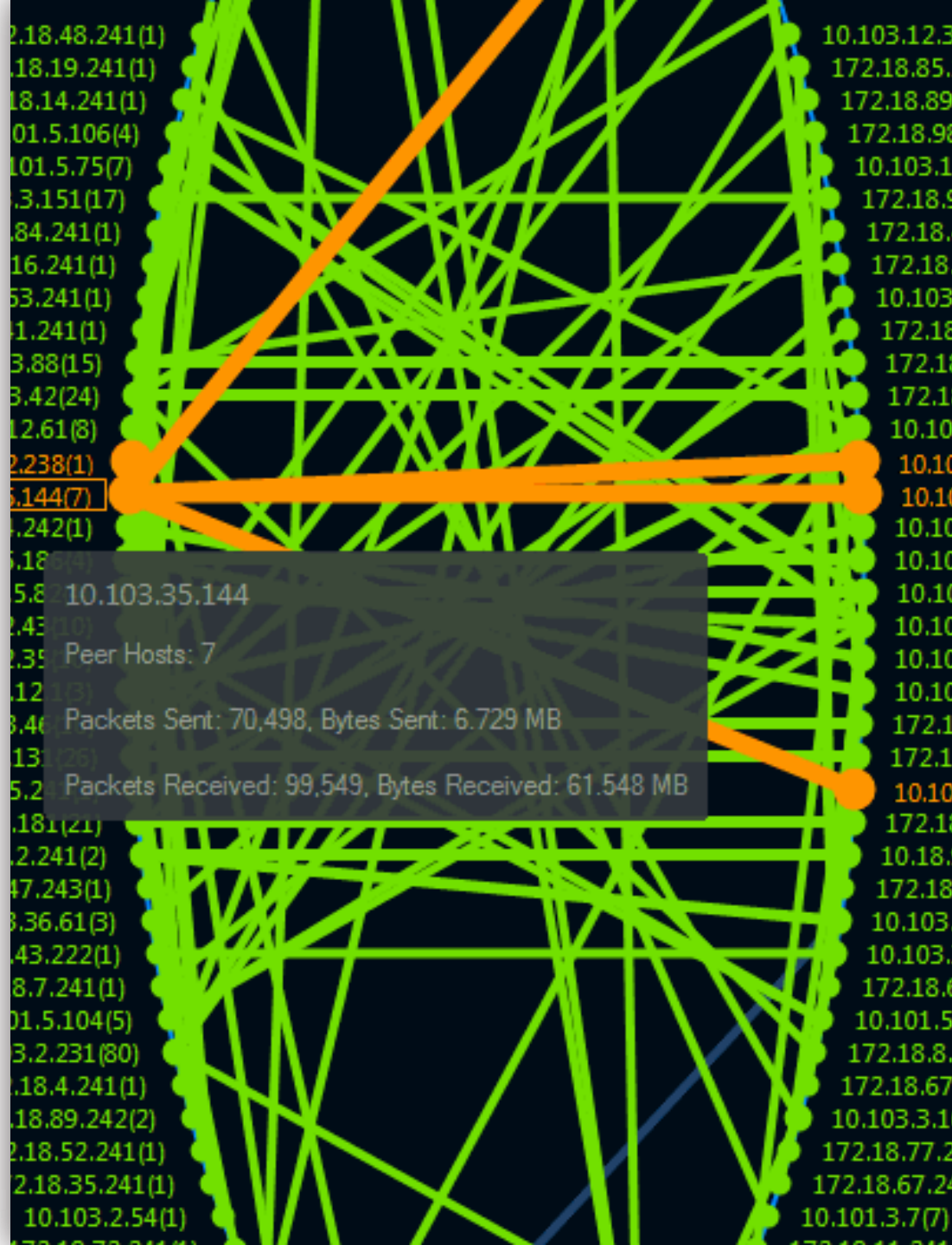


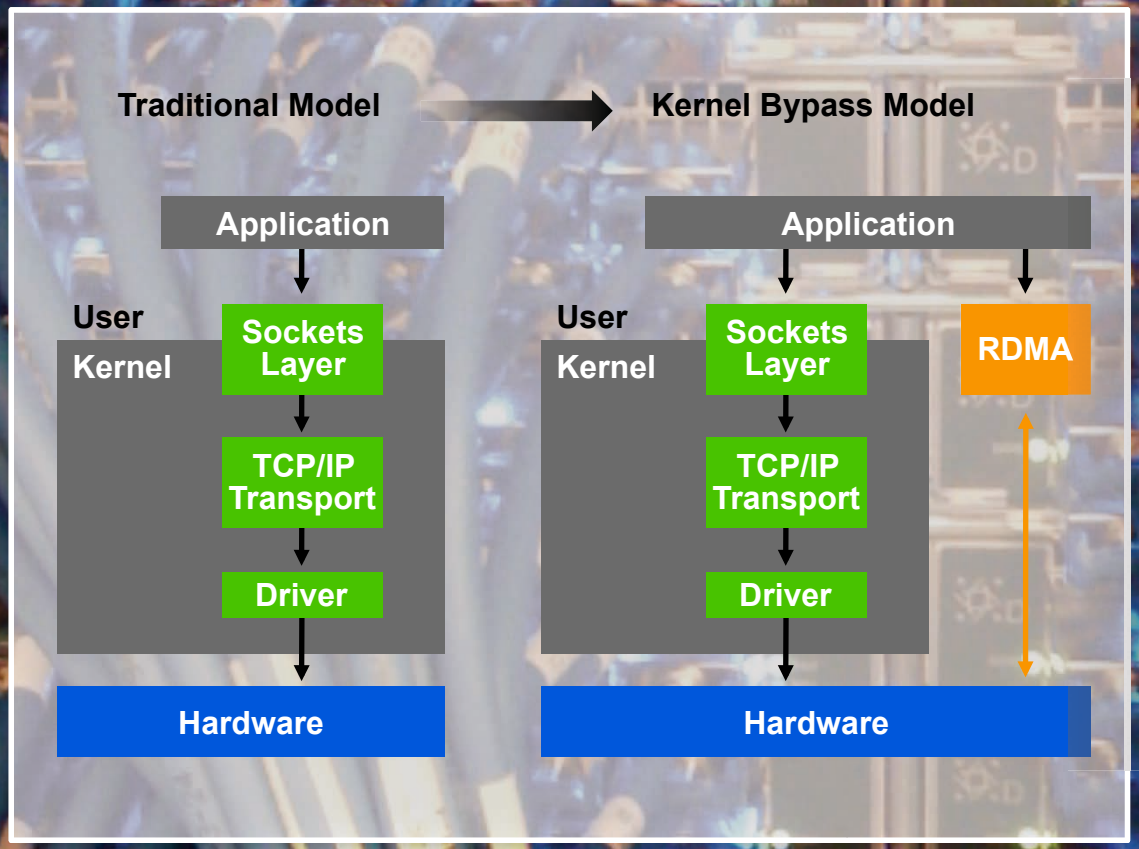

How Can We
Program a
Million Cores?

And We Must Assume Hardware is Failing (or changing) ALL the Time: “Write Once, Run Forever”

OF COURSE ERLANG

But Wait! What About the Network?!

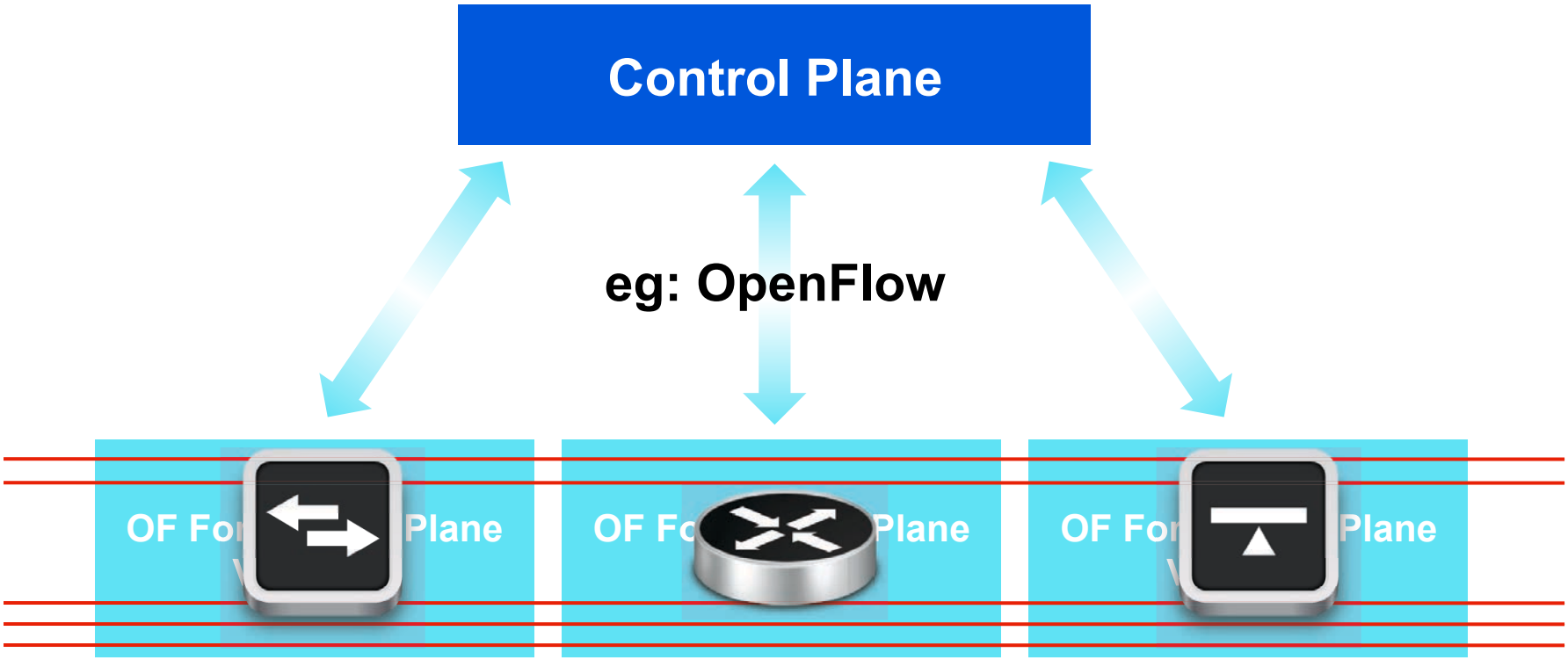




Of Course Infiniband! Except…

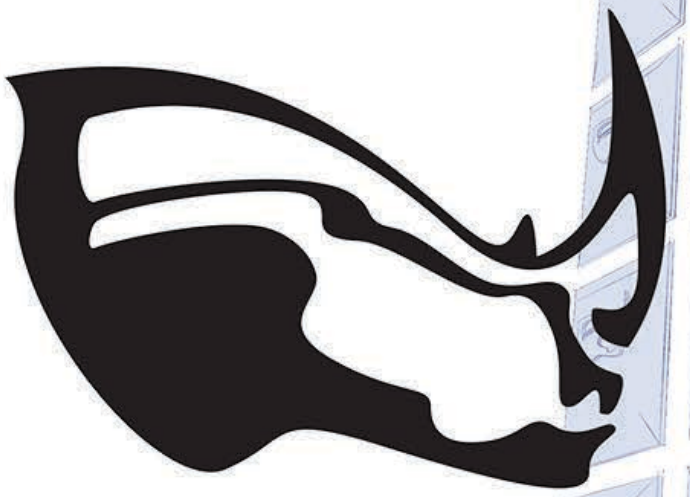
And the Winner Is…

A STANDARD Forwarding Plane and Logically Centralized Control Plane



Capabilities across forwarding plane vendors are fairly uniform
Performance and capacity are primary differentiators

FlowForwarding.org

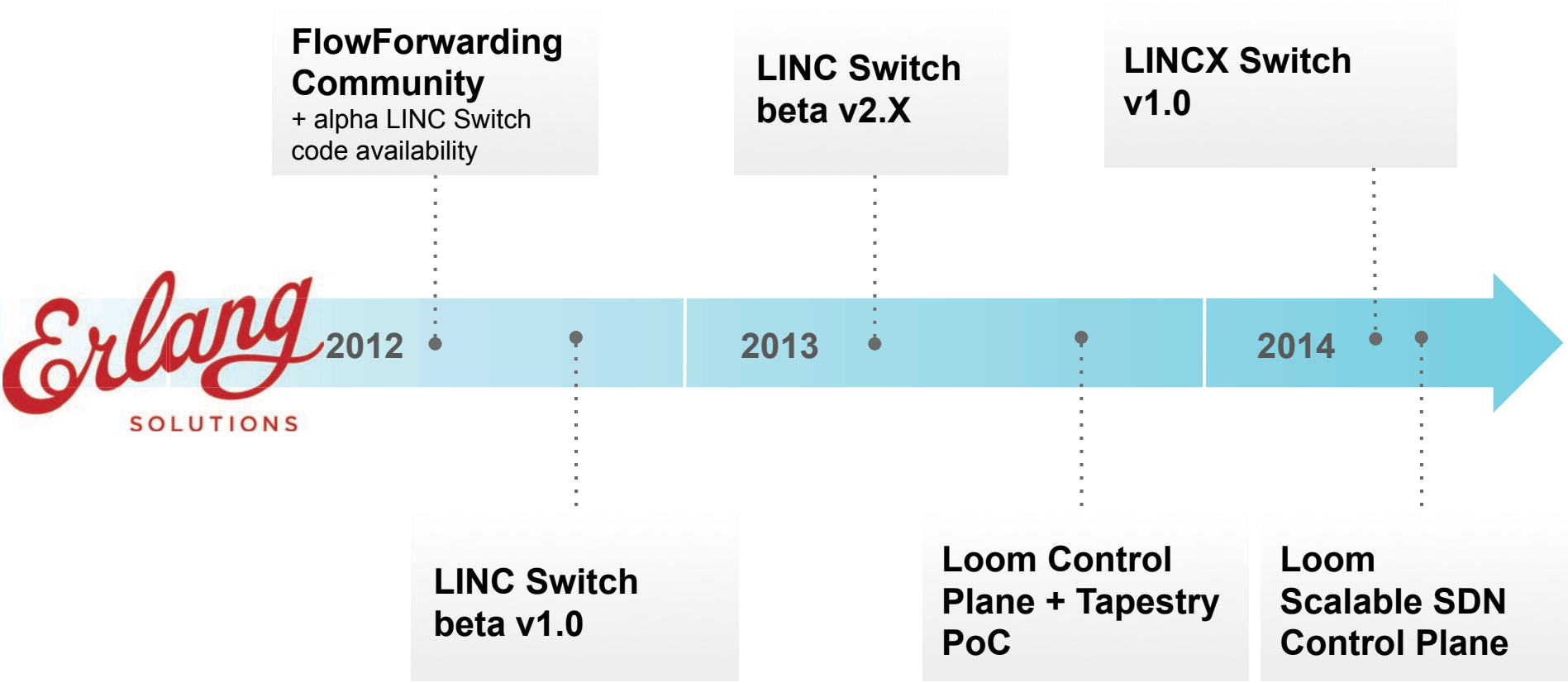


OPEN SOURCE SDN STACK

ENTERPRISE FOCUSED

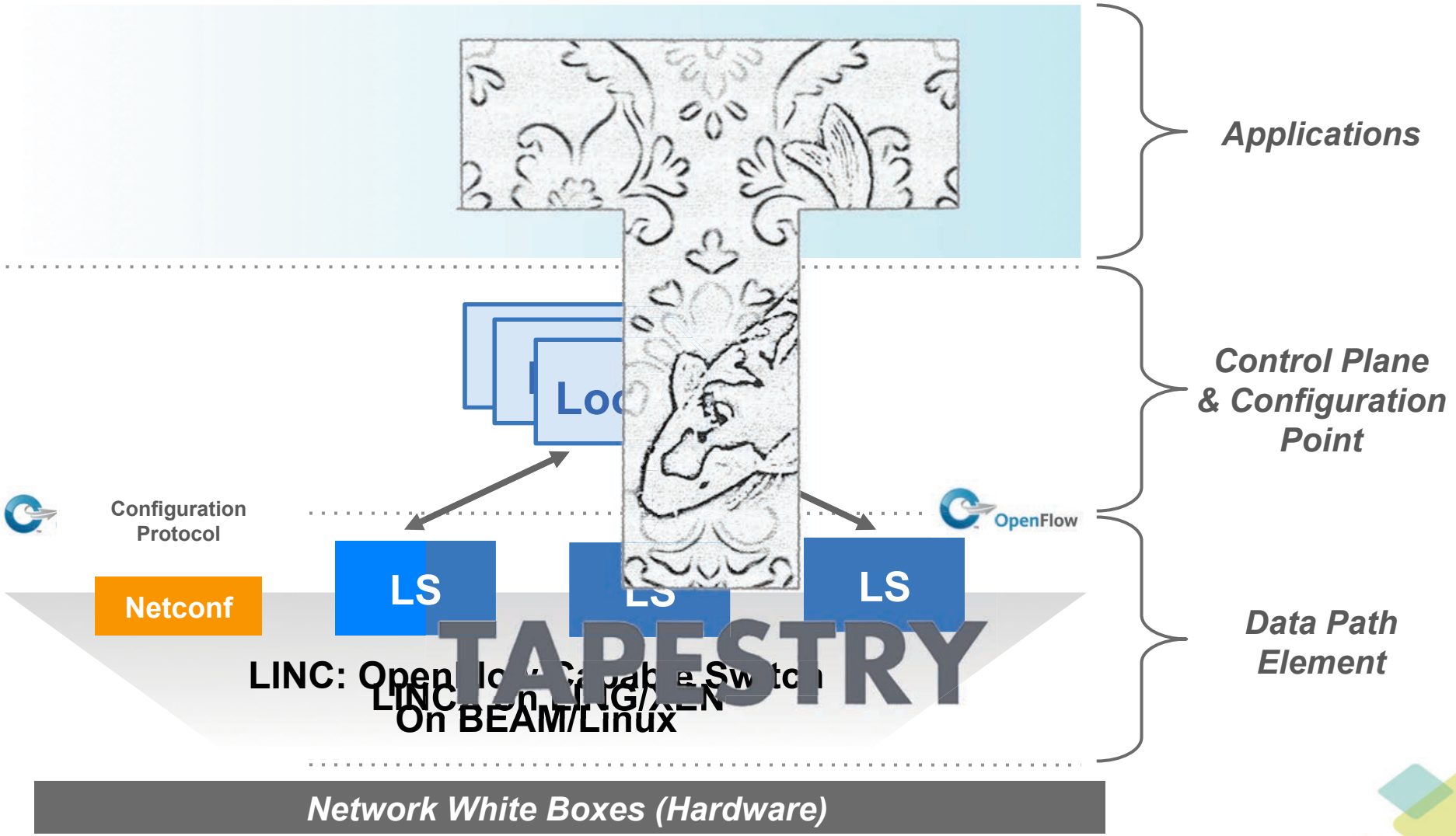
…and maybe more?

Full SDN Stack Timeline

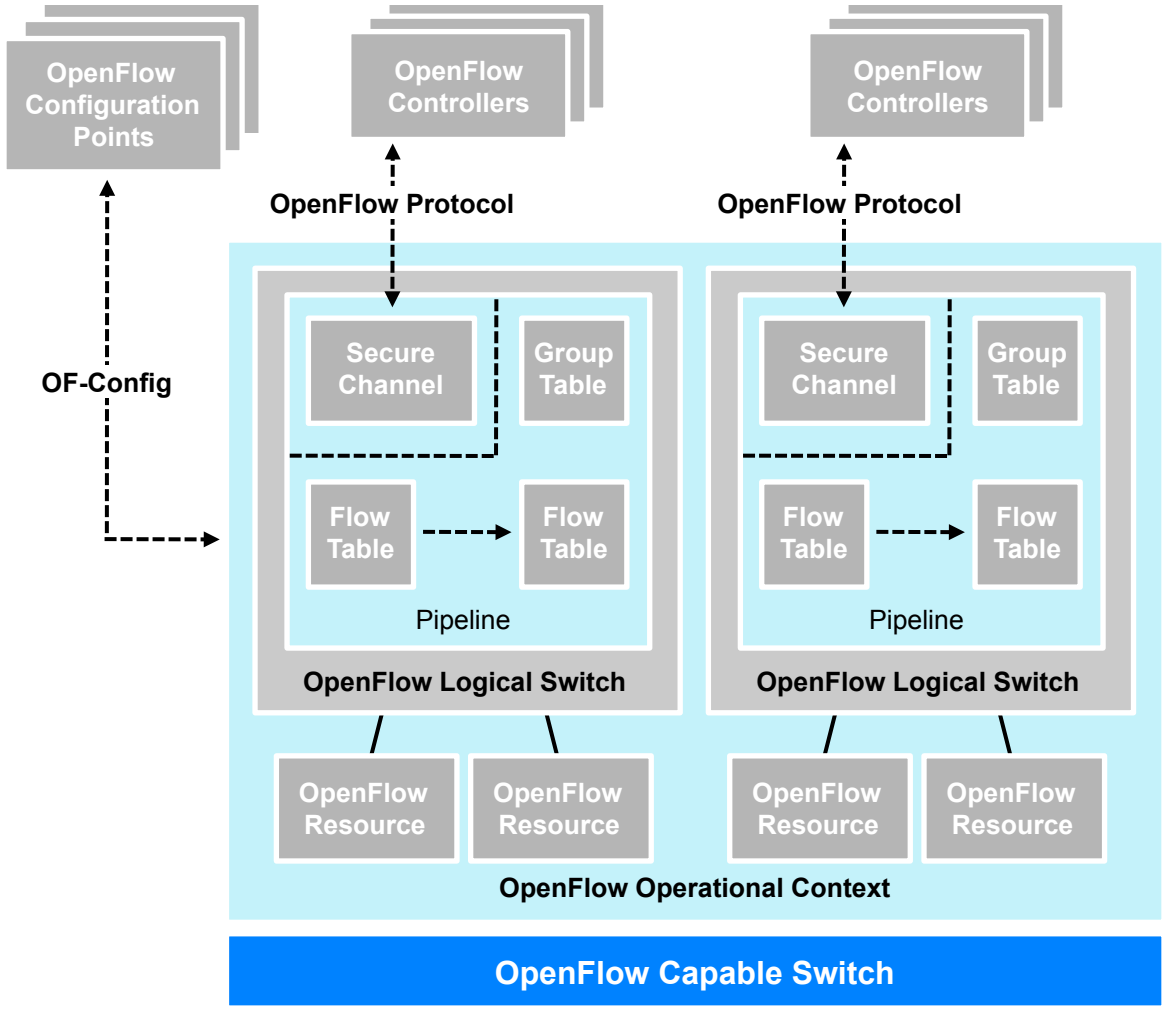


TAPESTRY

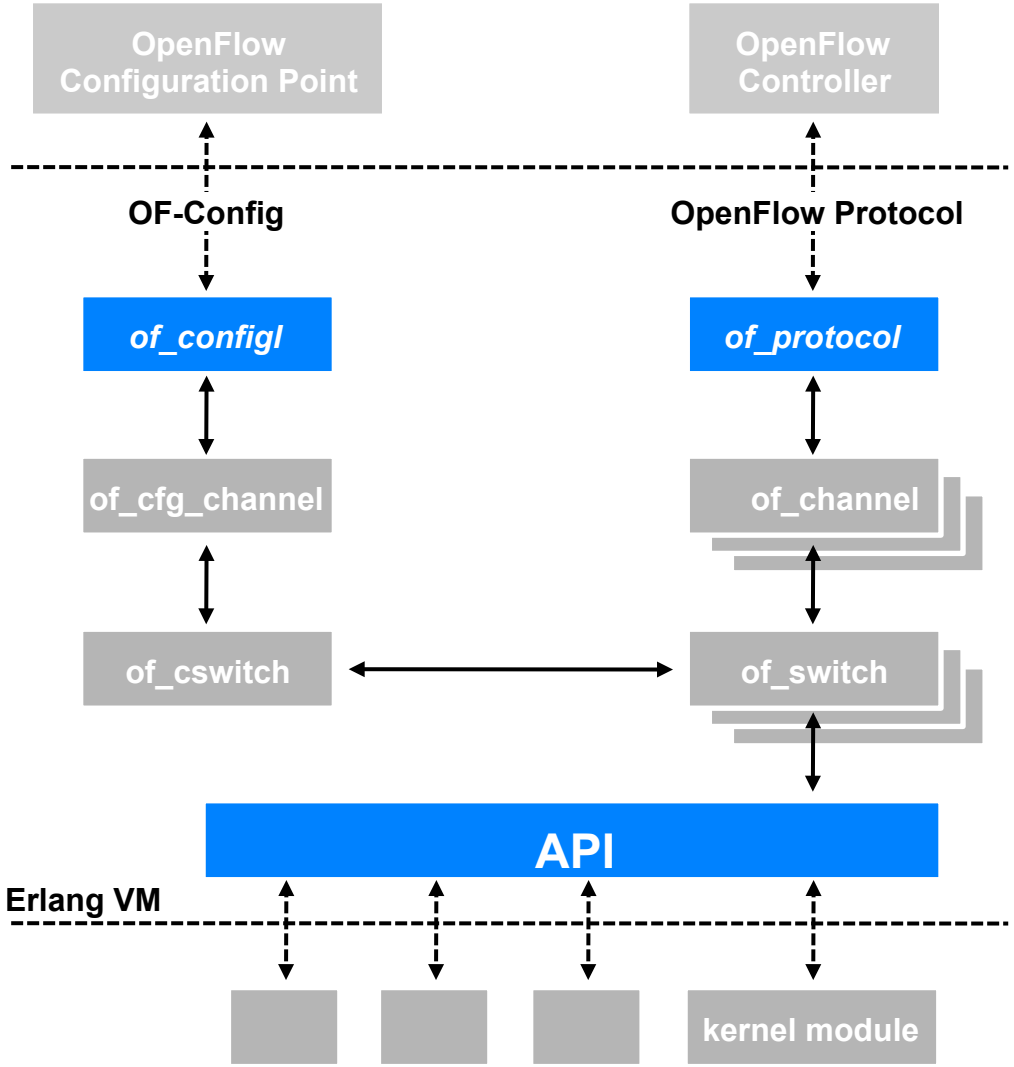
Erlang/OTP = SDN + Big Data + IoT



LINC Switch Architecture

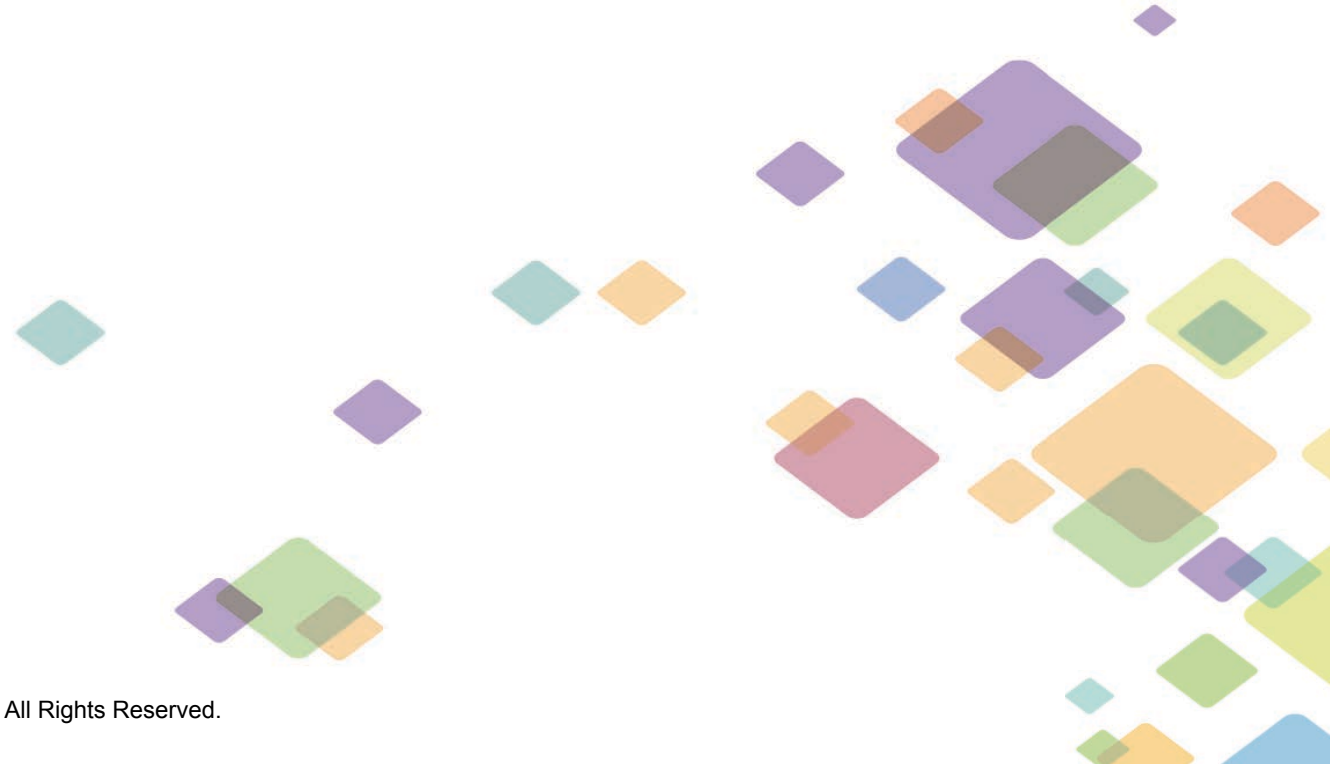


Erlang Implementation Architecture

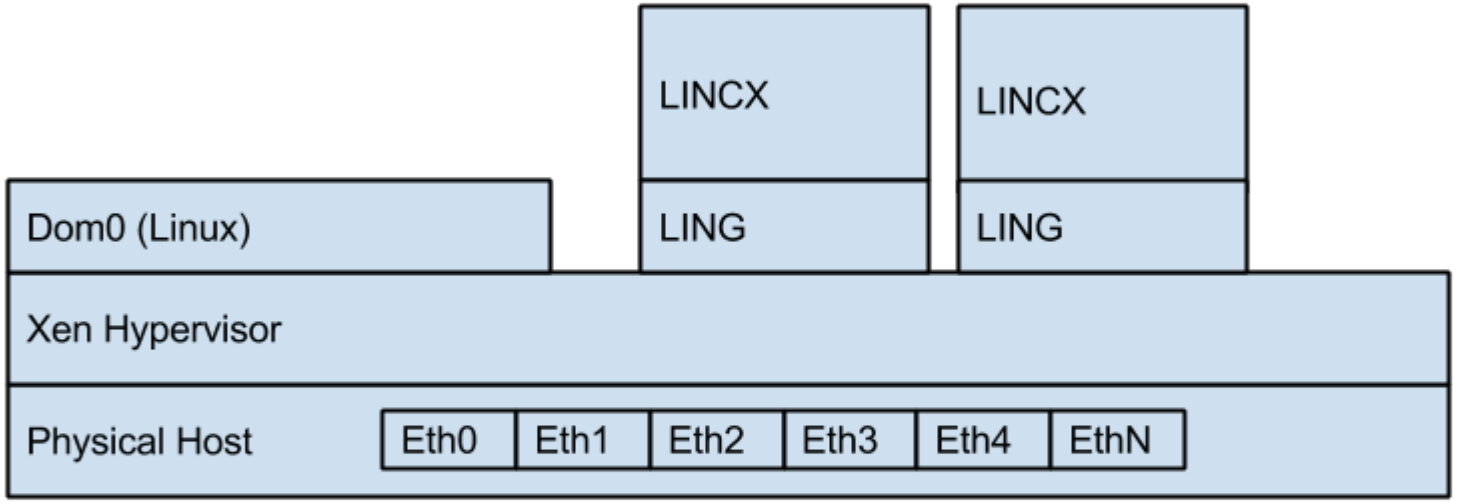


LINCX

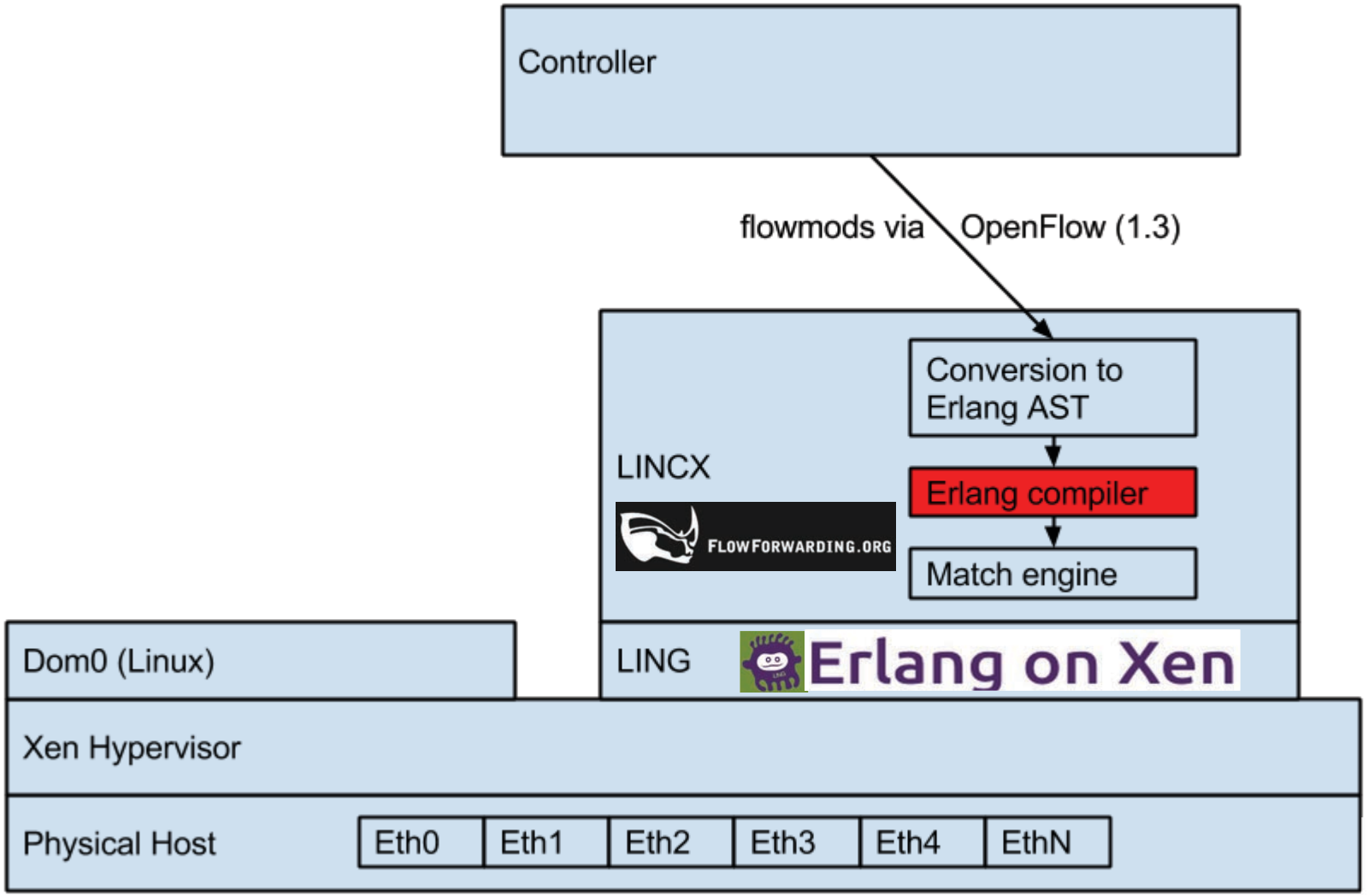
Maxim Kharchenko, Cloudozer LLP



LINCX Architecture



The Erlang Secret Sauce



Future

Multicore

- A switch per port? Per two ports?

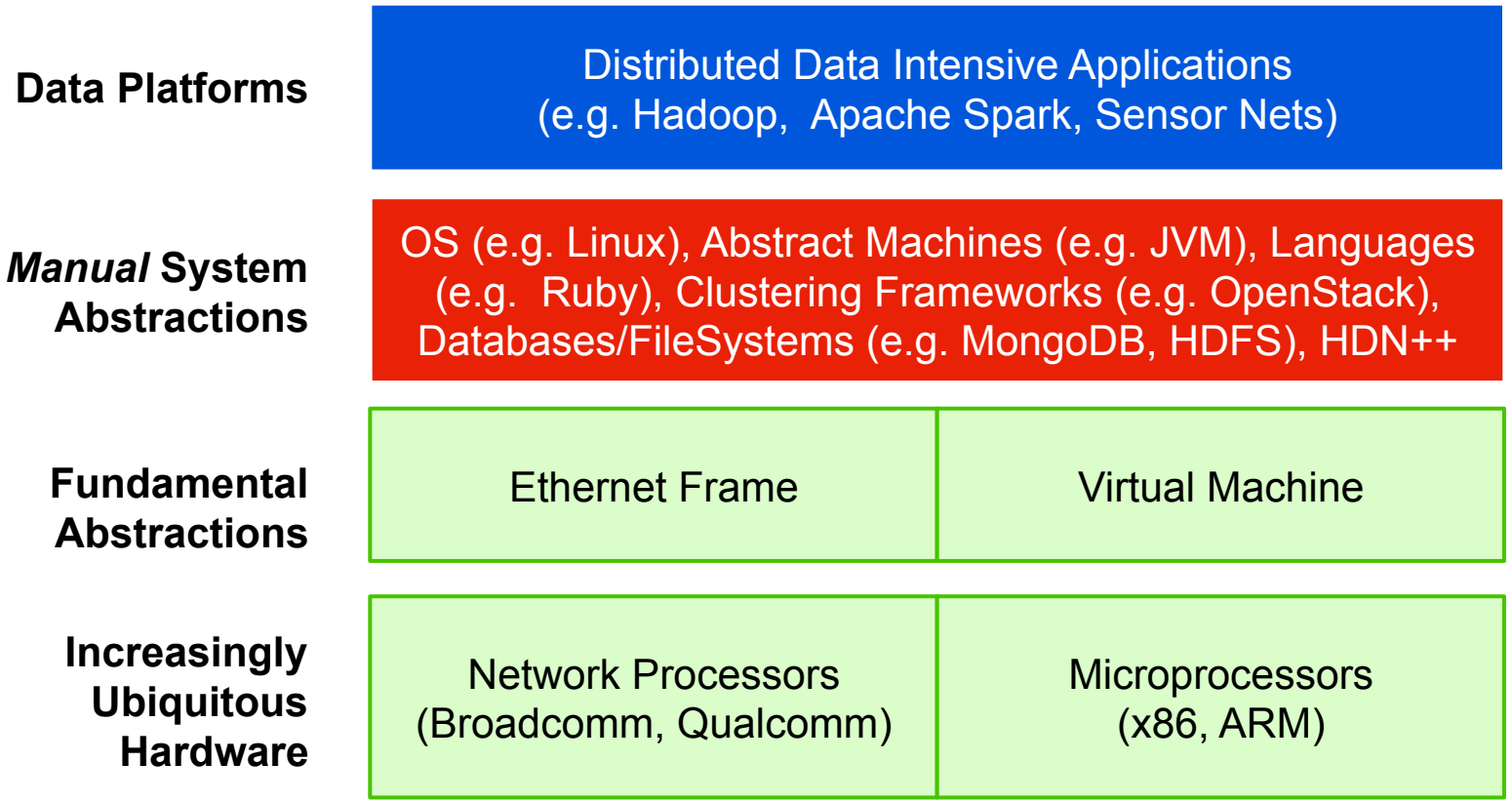
Faster software bridges

- Replace generic Linux bridges with faster alternative

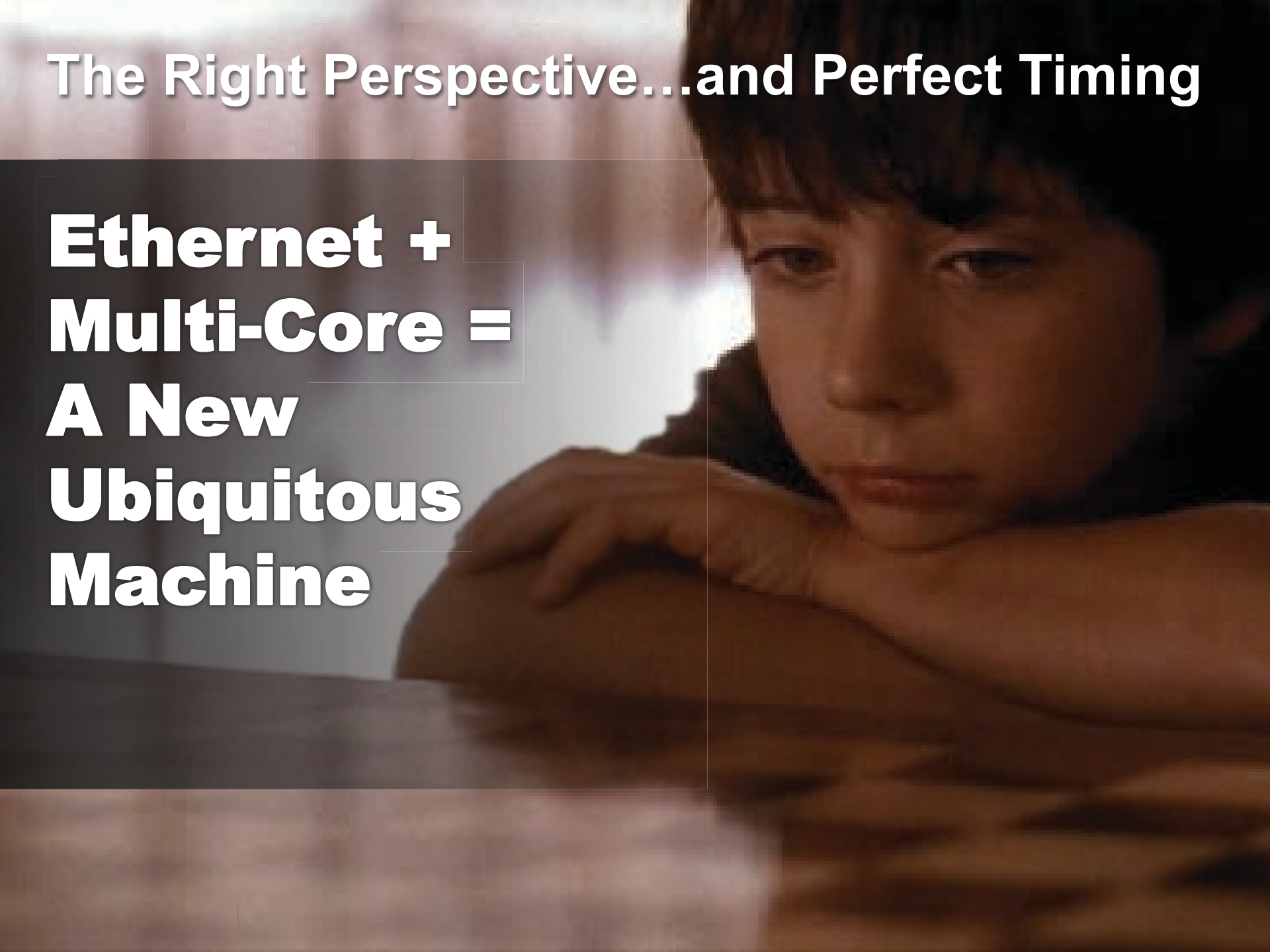
PCI passthrough

- Eliminate Linux completely from the packet path

The State of the Art…is Not

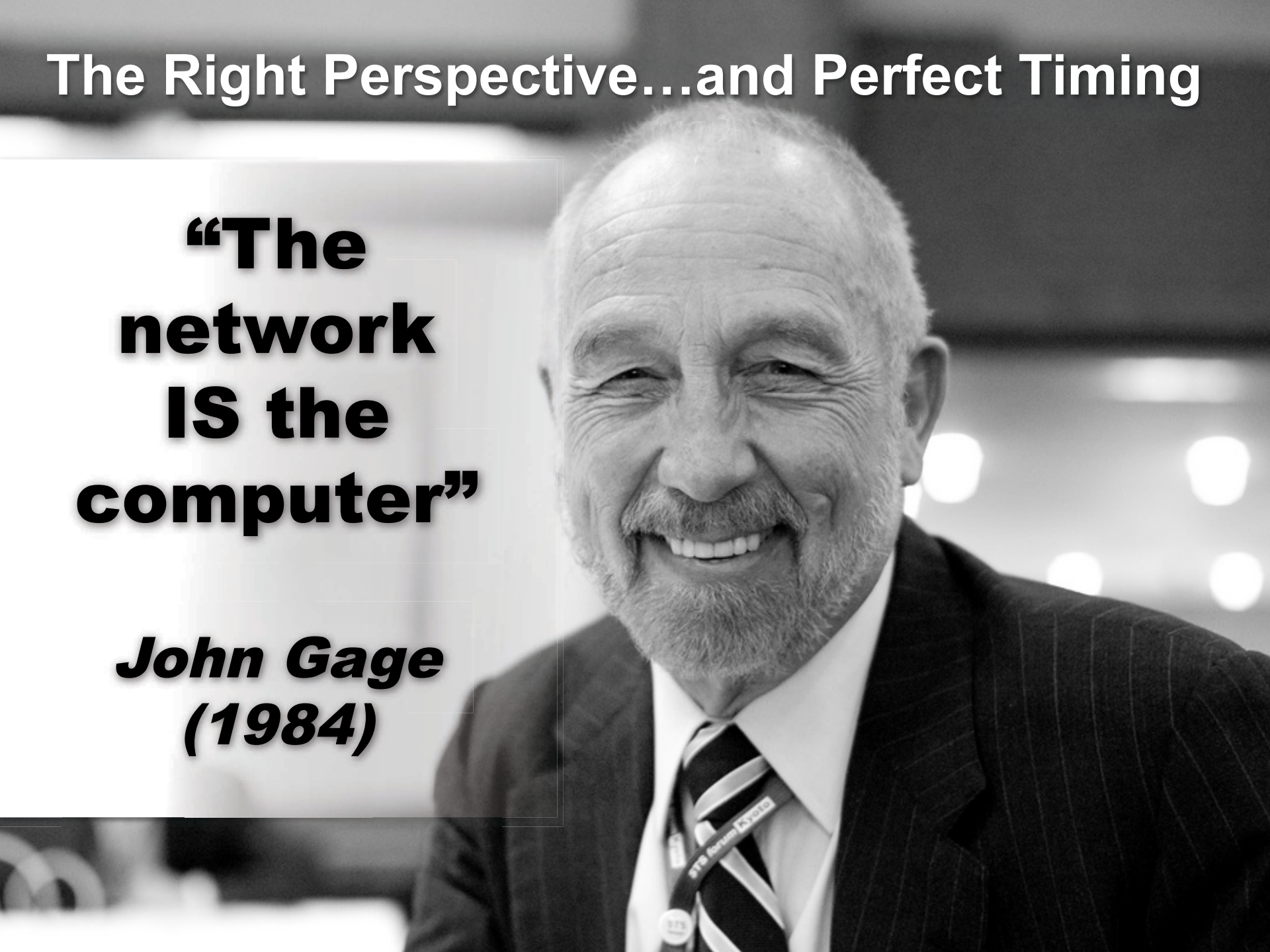


The Right Perspective…and Perfect Timing

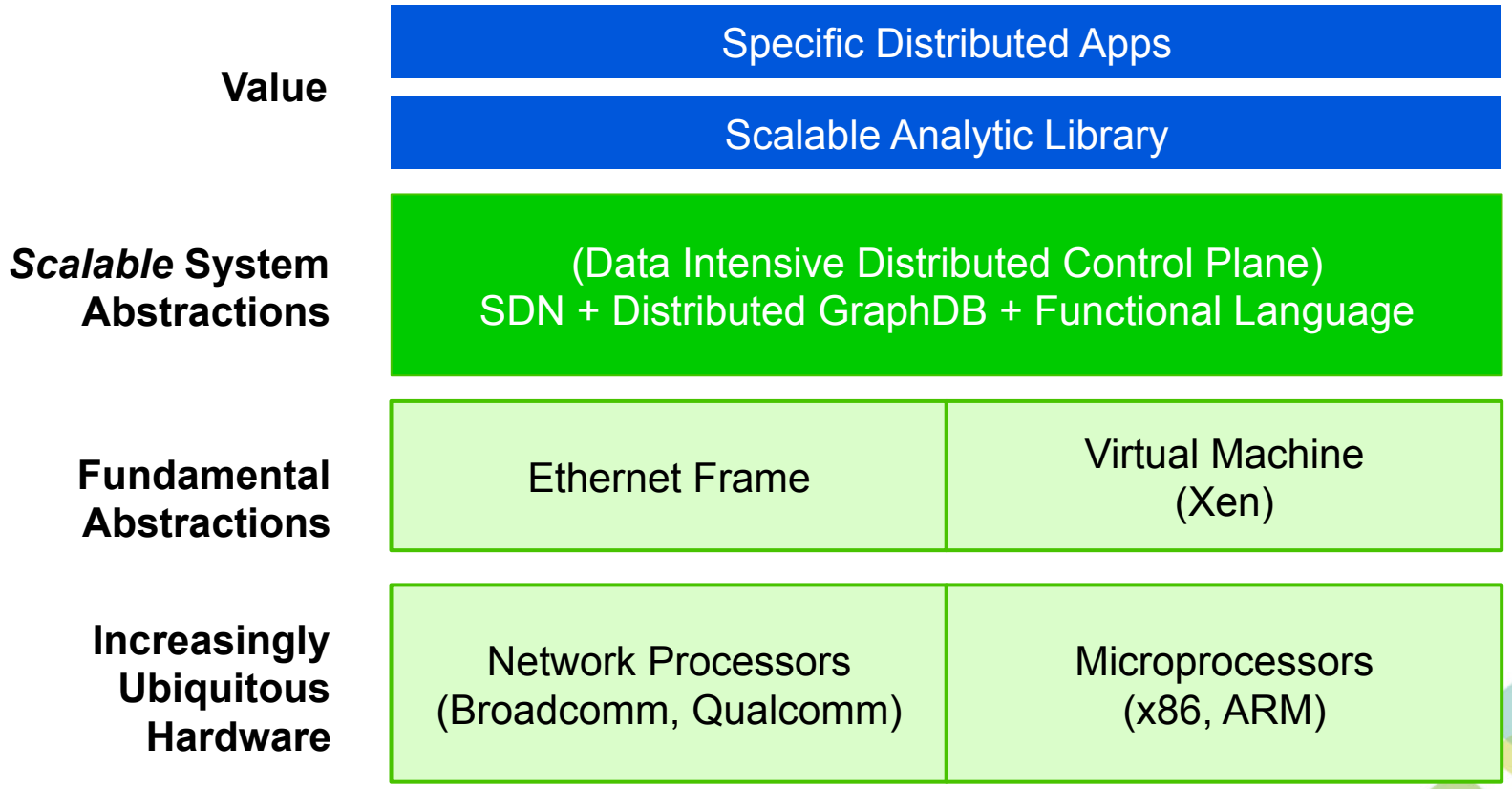


Ethernet + Multi-Core = A New Ubiquitous Machine

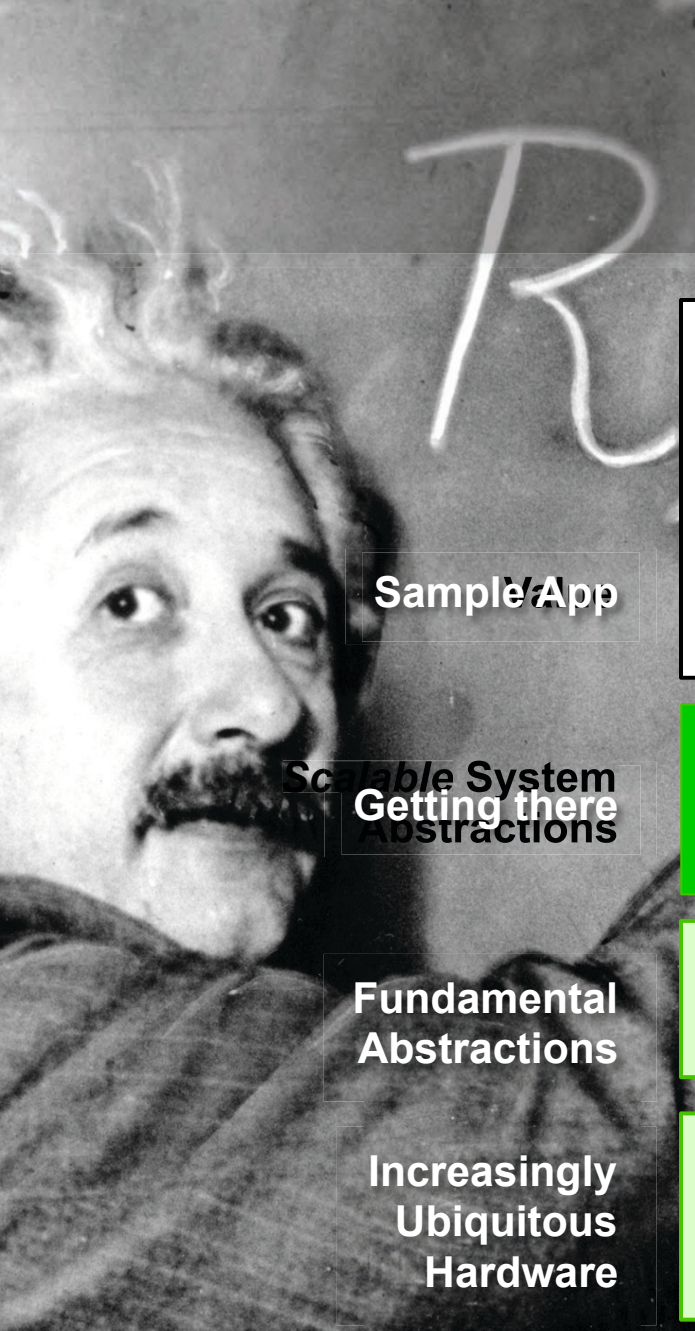
The Right Perspective…and Perfect Timing



We Need a Better Distributed System!



It is Not a Theory



Sample App

TAPESTRY

Scalable System Getting there Abstractions

Erlang/OTP + OpenFlow + Xen
(No Linux, No CloudStack, No Hadoop)

Fundamental Abstractions

Ethernet Frame	Virtual Machine

Increasingly Ubiquitous Hardware

Network Processors (Broadcomm, Qualcomm)	Microprocessors (x86, ARM)

Great But…

WhatsApp?

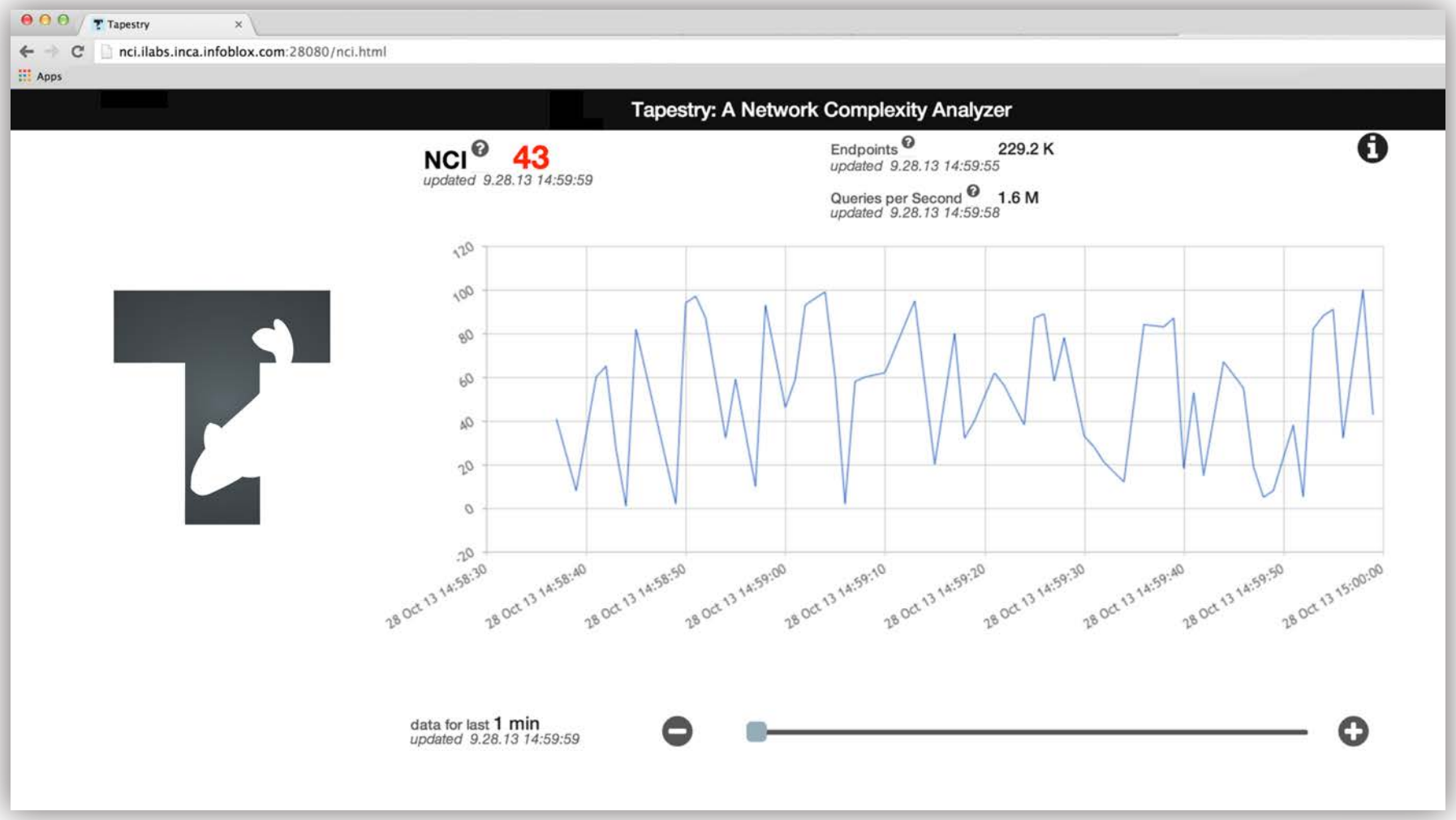
Is there
a SINGLE NUMBER that captures

NETWORK COMPLEXITY?

Easy to COMPUTE?

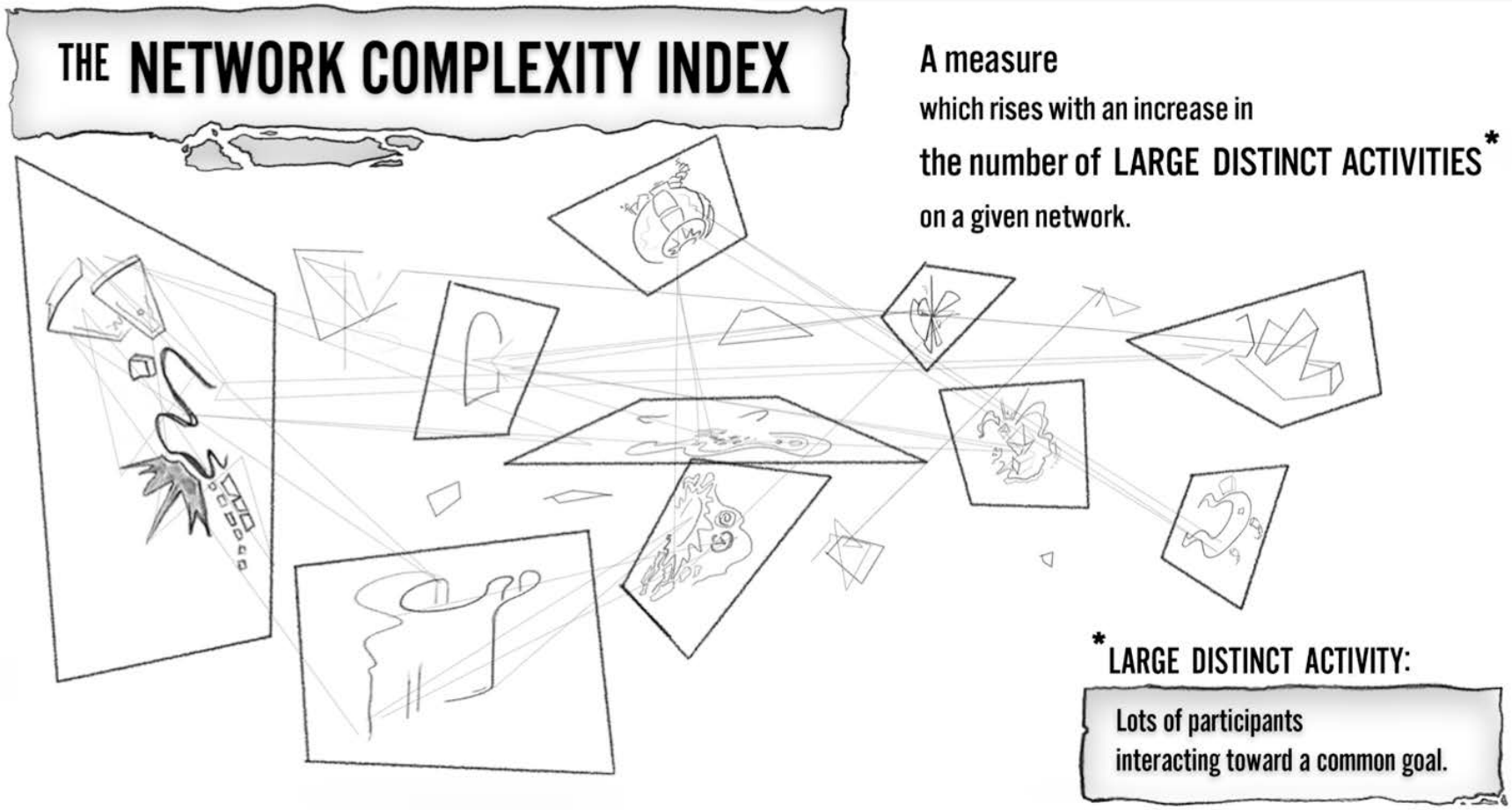
Easy to UNDERSTAND?

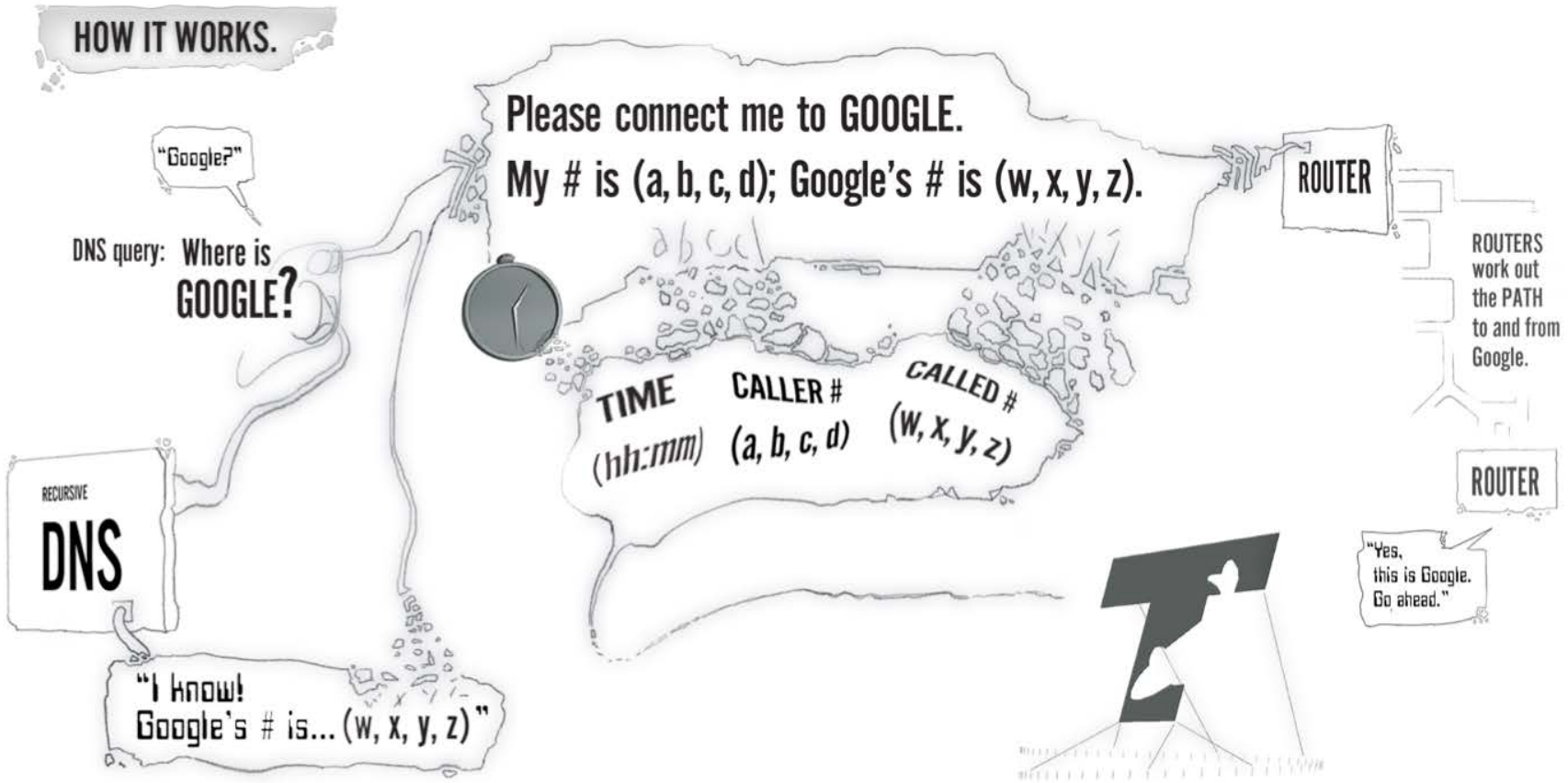
TAPESTRY



NETWORK COMPLEXITY ANALYZER

DETECT COMMUNITIES





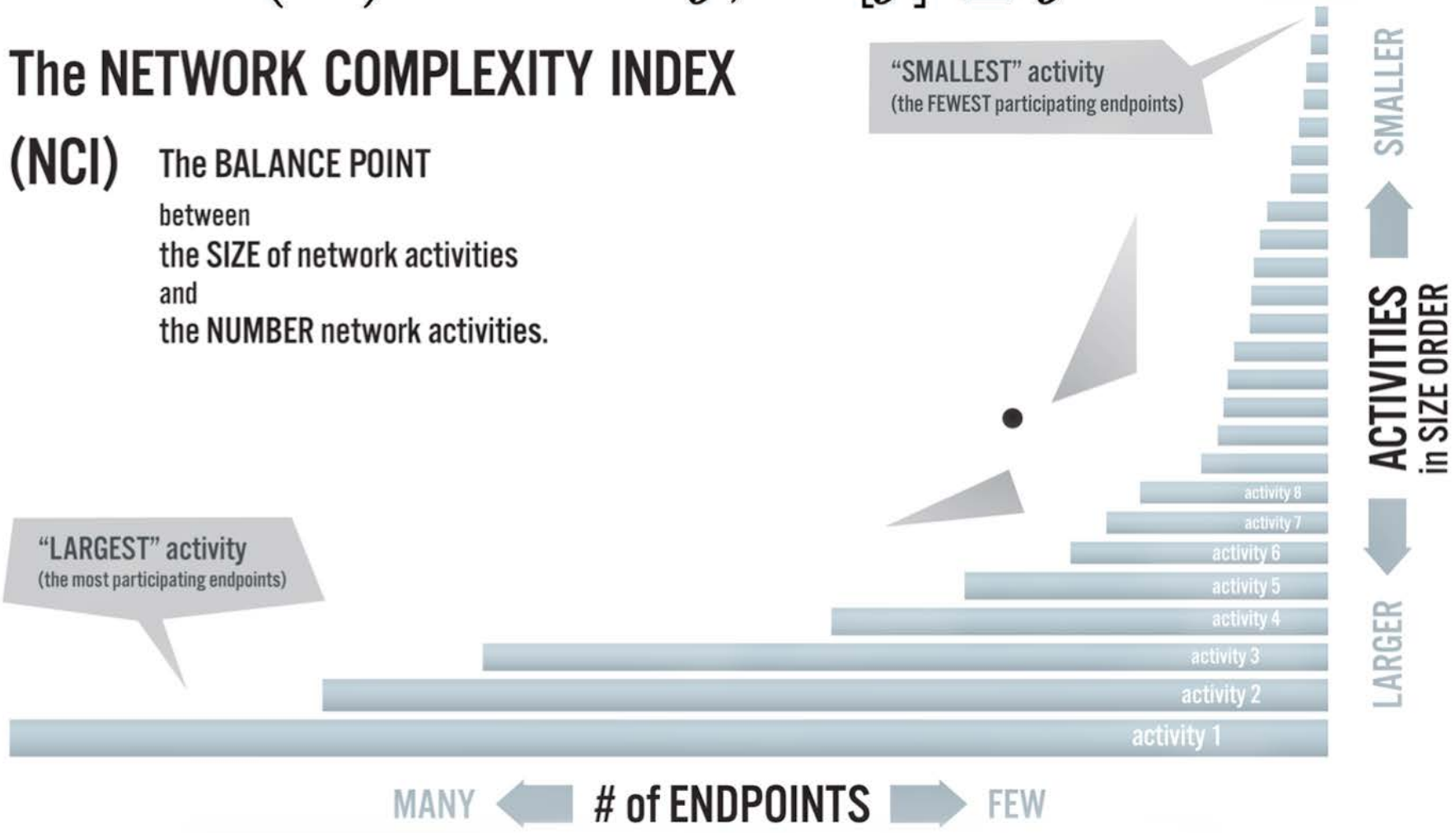
END POINT METADATA

FIND THE NCI

$$B(N) = Max\ j,\ X[j] \geq j$$

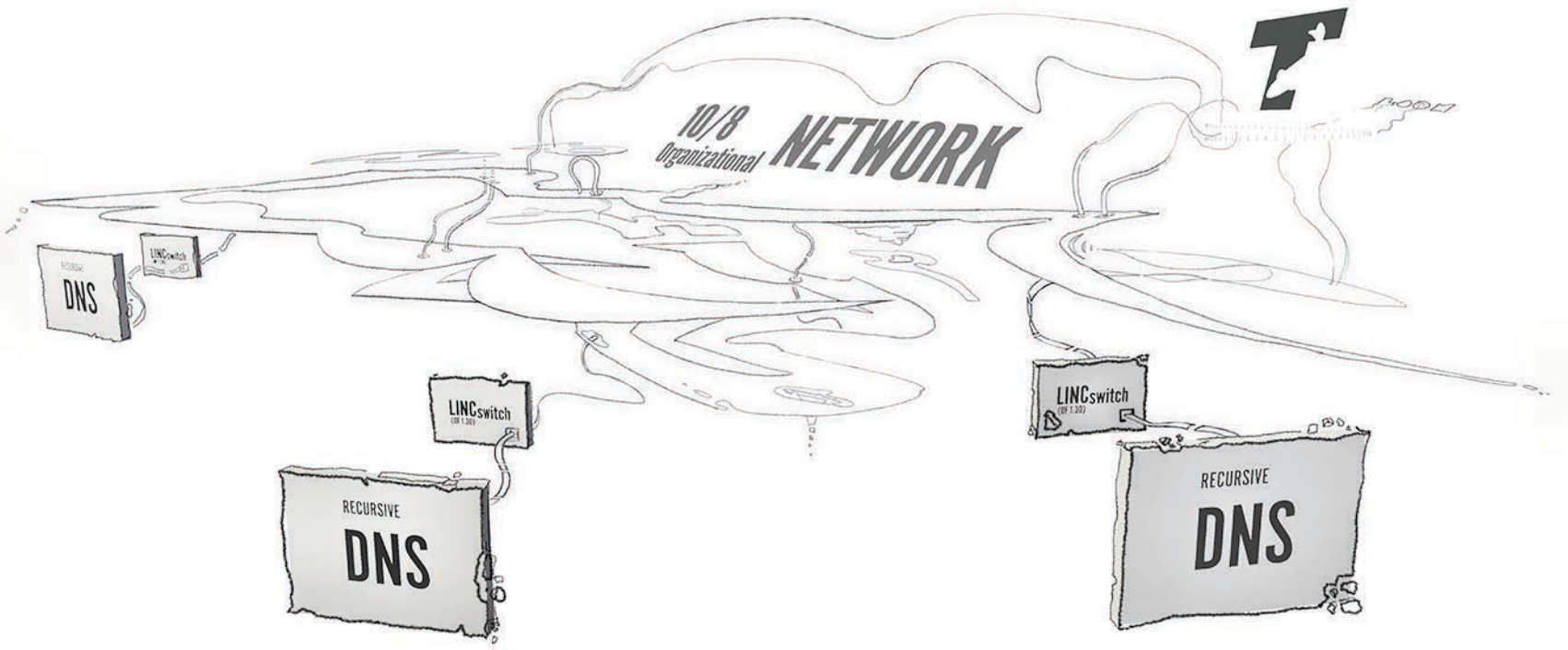
The NETWORK COMPLEXITY INDEX (NCI)

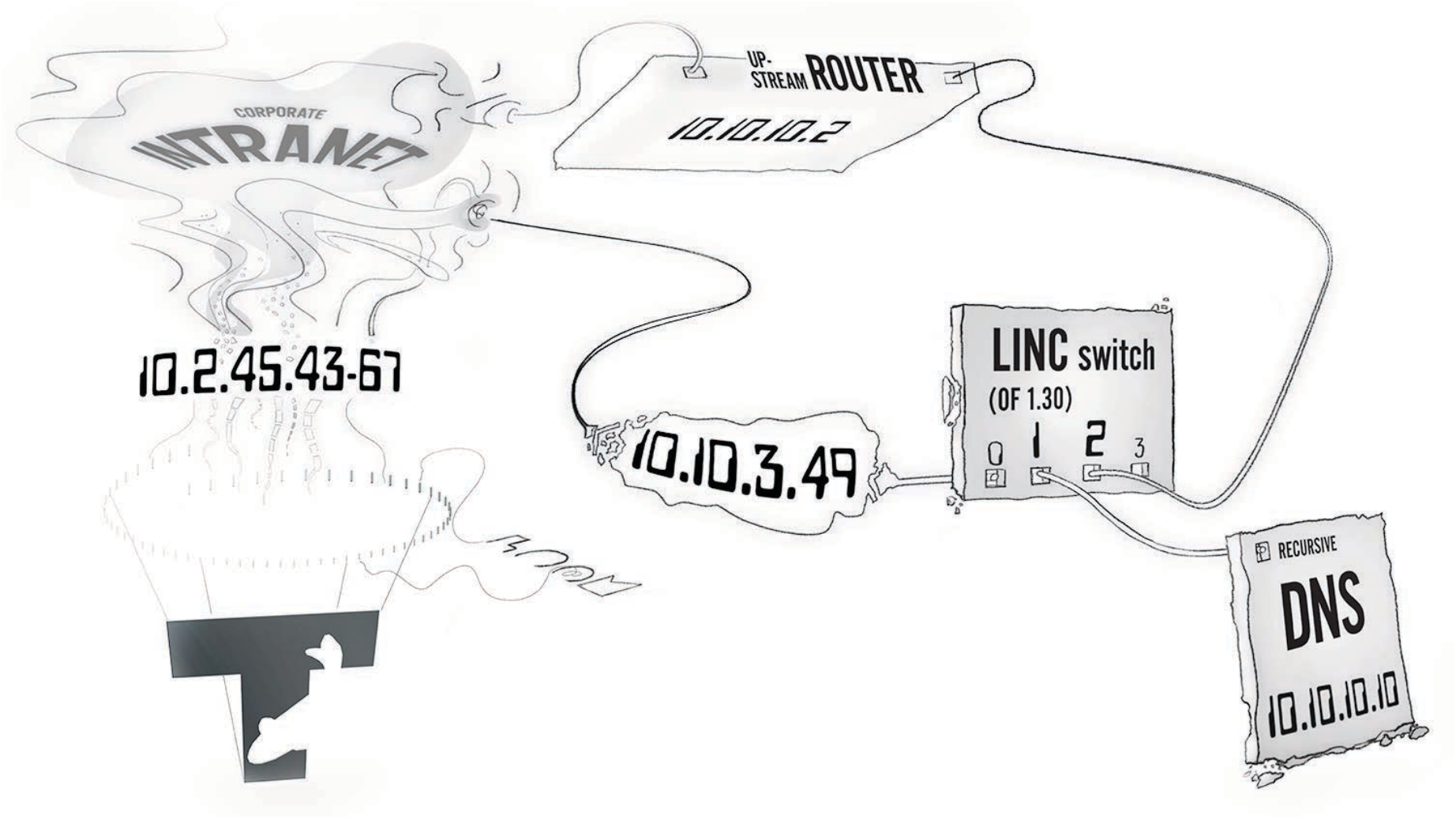
The BALANCE POINT
between
the SIZE of network activities
and
the NUMBER network activities.



DYNAMIC NETWORK WIDE PROPERTY

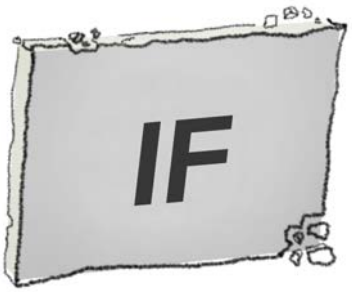
GLOBAL TELEMETRY AND ACTION





LOGICAL INSTEAD OF PHYSICAL

A NEW Machine?



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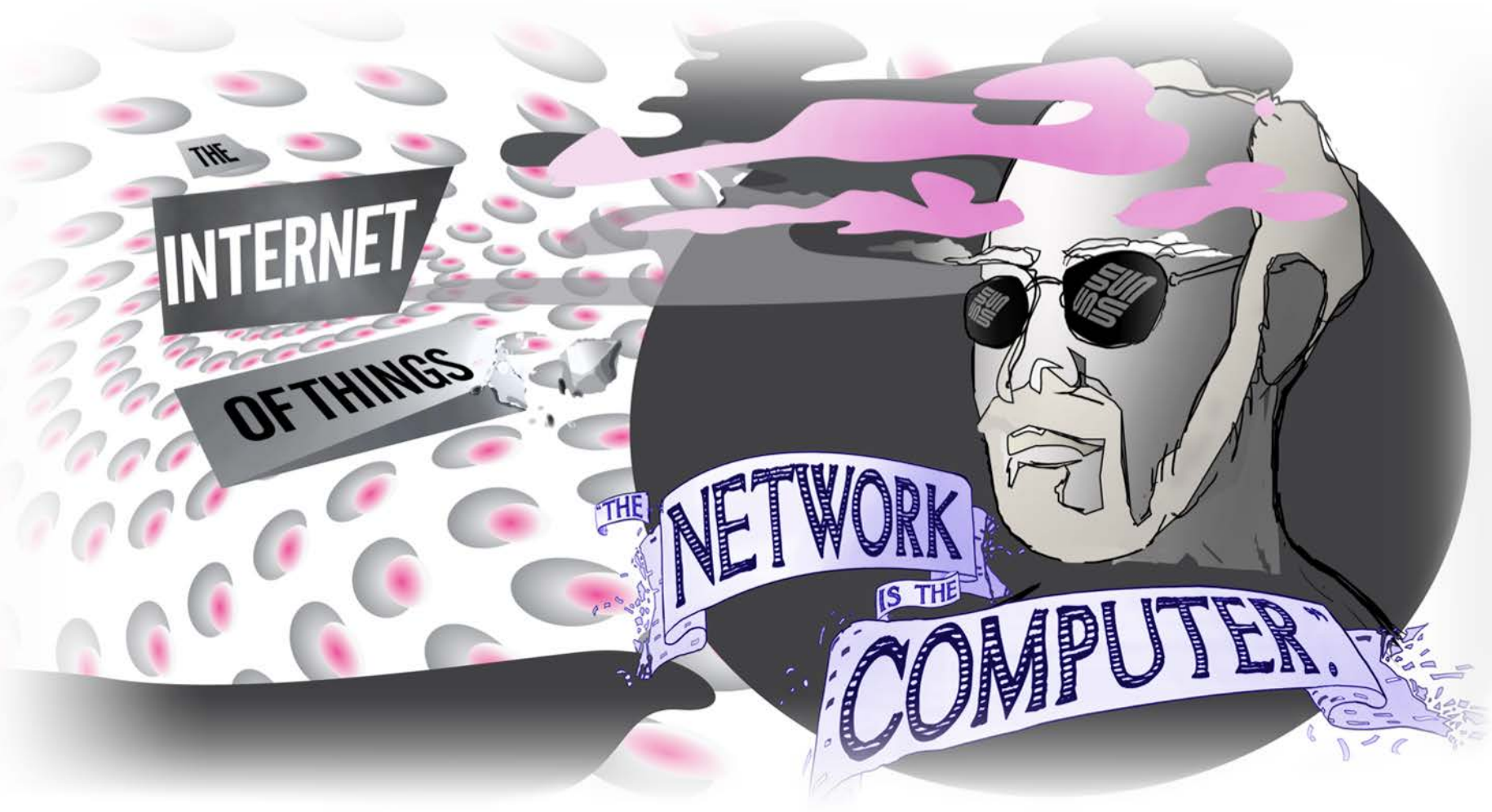
We Can Look Past the Cloud…



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How Can an Erlang/OTP Developer Program the Entire Network at Runtime?

What abstractions?

Mechanisms?

Language extensions?

ETC…

Is I/O really a side effect?
Is computation king?

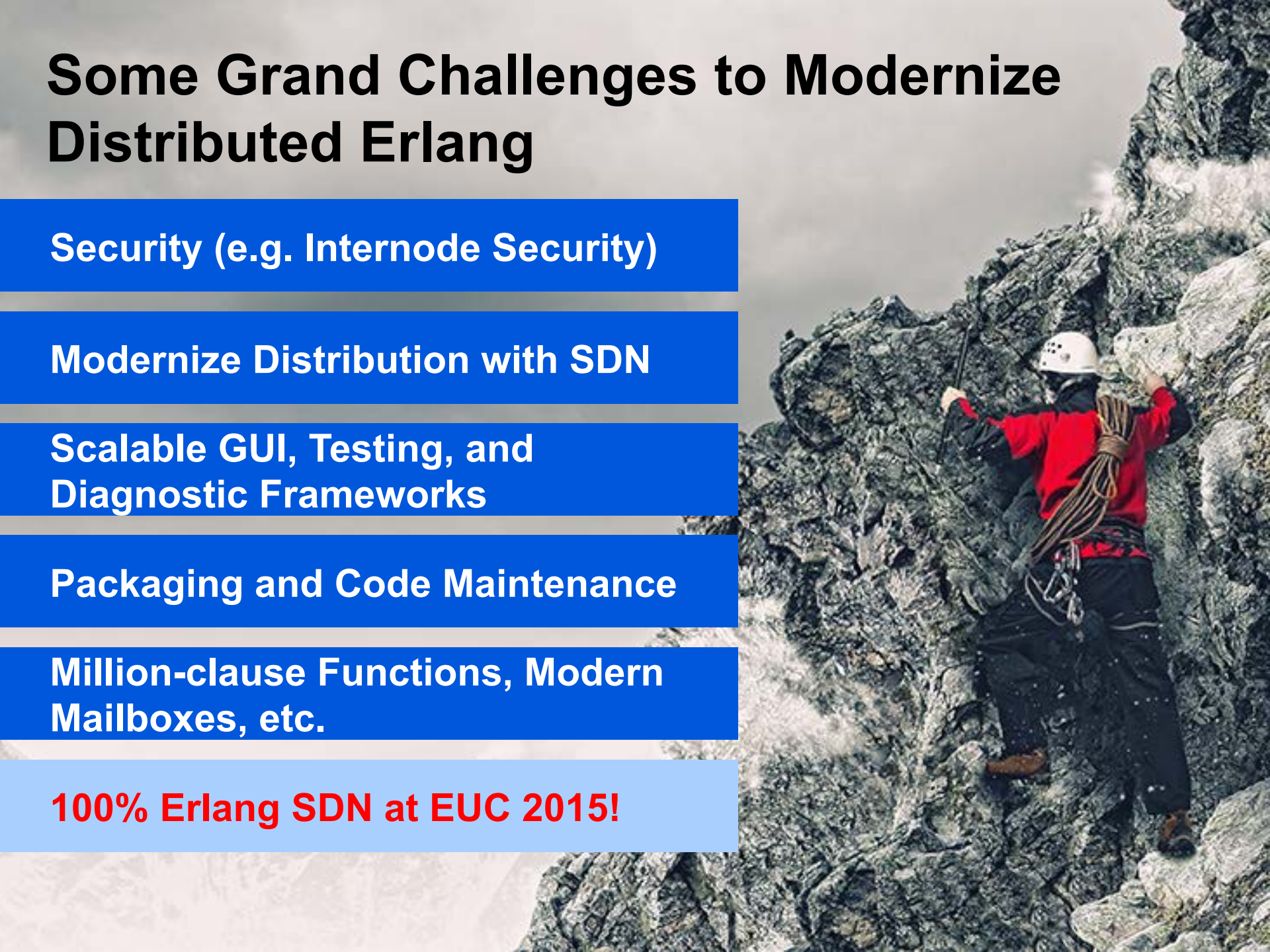
Or is Communication Just as Fundamental?

Where are Joe's Contract Checkers??

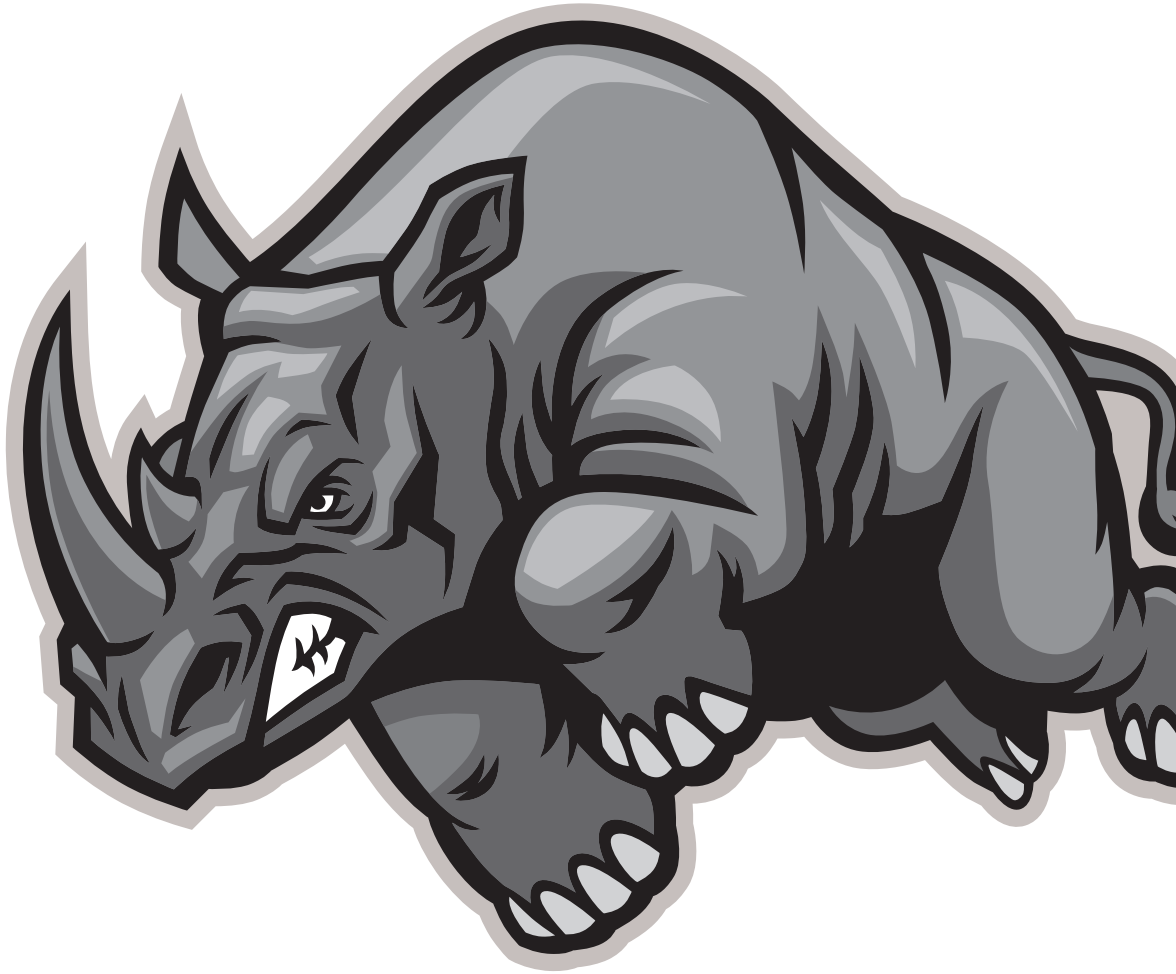
Some Grand Challenges to Modernize Distributed Erlang

- Security (e.g. Internode Security)
- Modernize Distribution with SDN
- Scalable GUI, Testing, and Diagnostic Frameworks
- Packaging and Code Maintenance
- Million-clause Functions, Modern Mailboxes, etc.

100% Erlang SDN at EUC 2015!



Help us make it happen!



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