

I PoverICN – the Better IP?

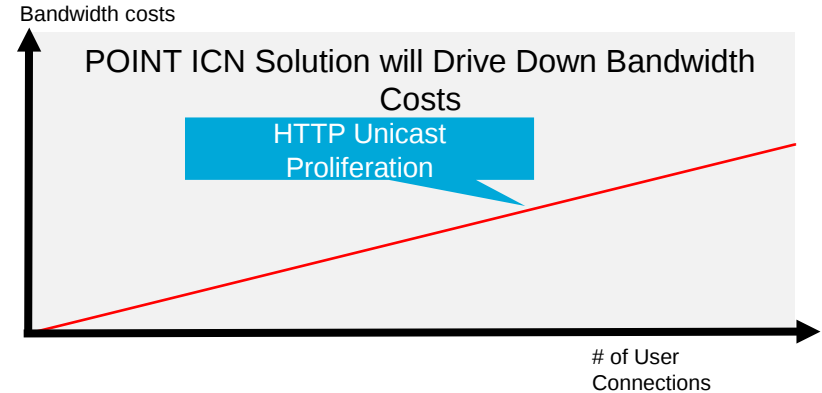
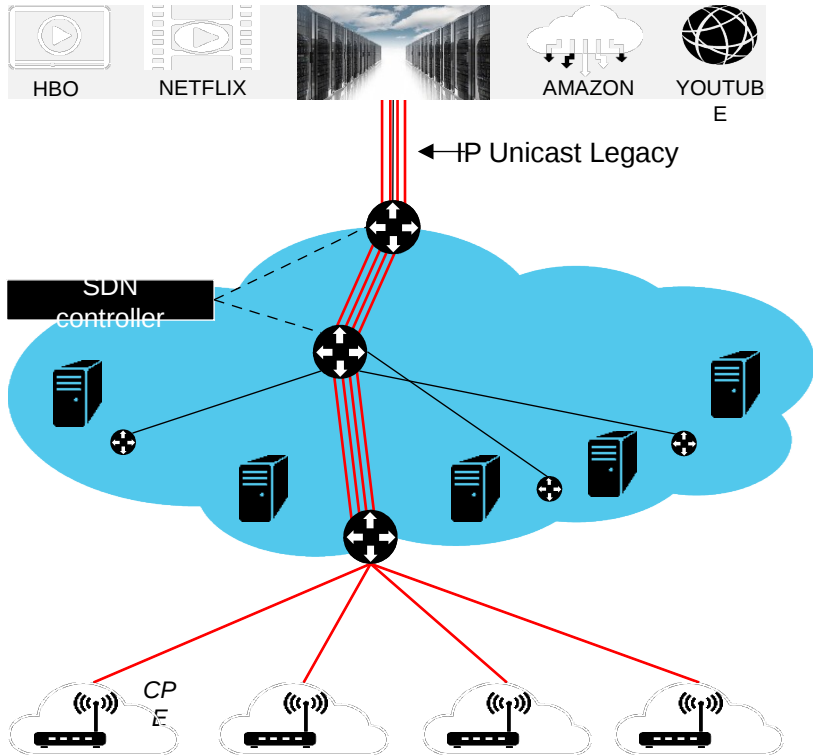
The Internet as our ICN use case

Dirk Trossen, InterDigital Europe
IRTF ICNRG Interim Meeting

A Hypothesis-Driven ICN Story

- **Our starting point:** The Internet is the killer app for ICN
 - Make this work and you have a strong starting point for ICN
- **Our hypothesis:** IOverICN has the potential to run IP services better than in standard IP networks
 - Show that this is true and you have a strong reason for deploy ICN!
 - **Expected benefits:** coincidental multicast, direct path mobility, fast surrogate support, fast node/link resilience, delay-constrained operations (towards 5G), ...
- **Our approach:** KPI-driven testing and trialing
 - Clear set of quantitative and qualitative statements regarding our

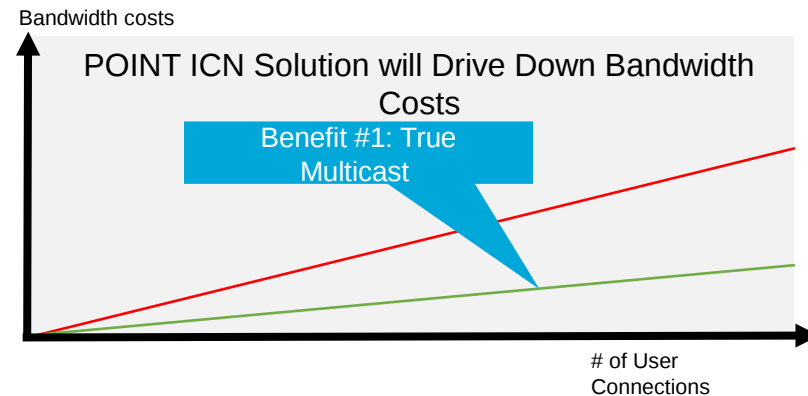
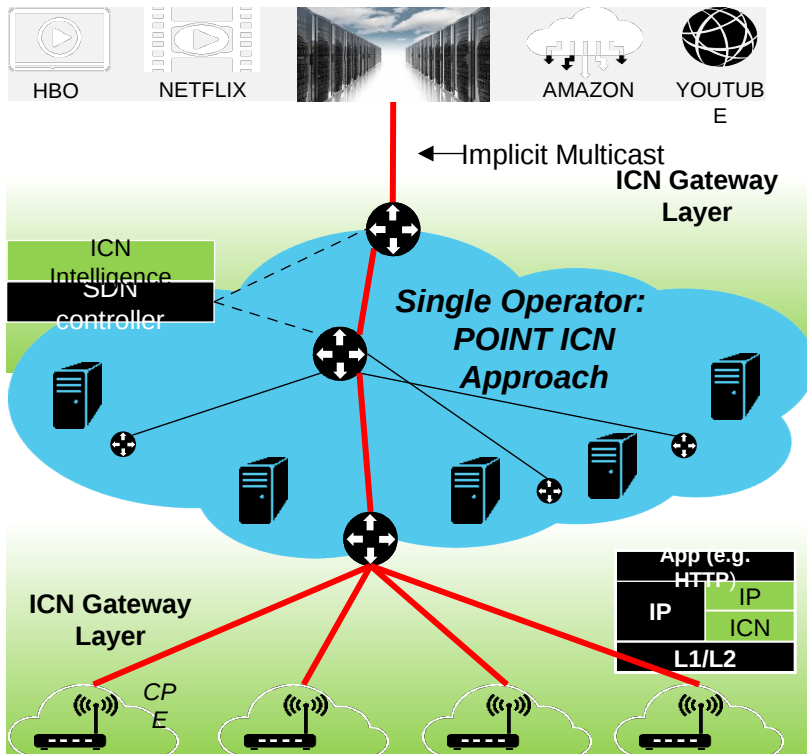
A Practical SDN Approach to the Enablement of ICN



Unicast explosion simply not an option

- Single client-single host communication is well recognized as an inefficient approach
- Subject of many workarounds through the years, mostly “caching & redirection”
 - *POINT supports native multicast*

A Practical SDN Approach to the Enablement of ICN



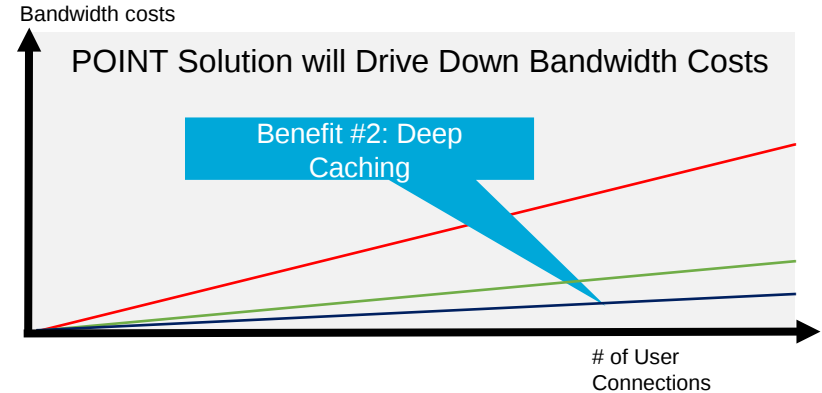
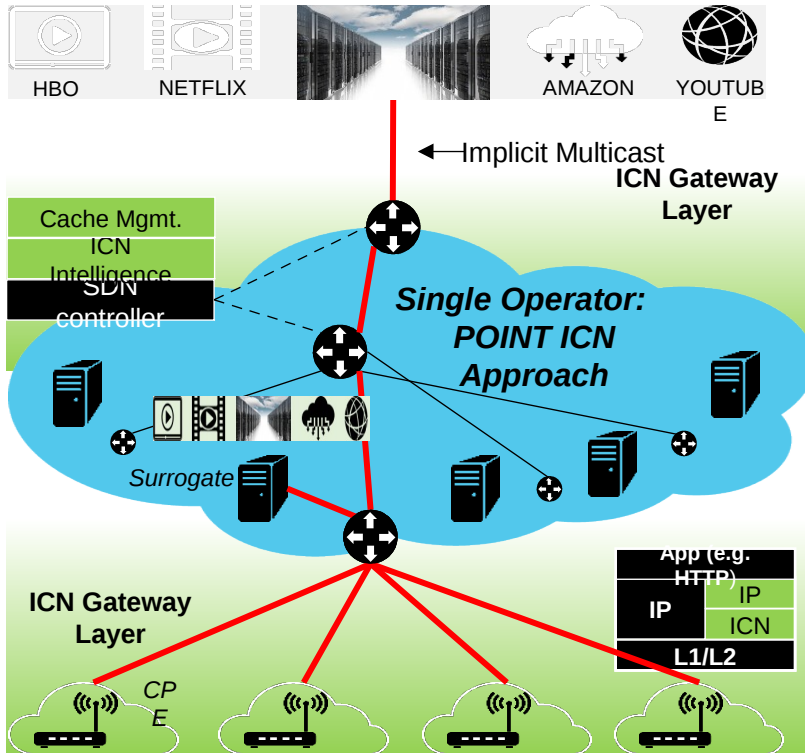
POINT: The Innovative ICN technology approach for competitive 5G (or before) operator networks

- Aligns introduction of ICN concepts with SDN/NFV proliferation and growing trend to programmable infrastructure models
- Combines seamlessly and complements emerging fog/edge computing thinking

POINT is a EUH2020 Research & Innovation Programme Funded Project under grant No. 643990

<http://www.point-h2020.eu/>

A Practical SDN Approach to the Enablement of ICN



POINT: The next logical step up for deep content caching in dynamic surrogates

- Surrogates are softwarized servers that bring content closer to mobile end users AND create new Caching-as-a-Service possibilities for Operators
- Surrogate instances are controlled by SDN/ICN core functions which utilize ICN knowledge about **what** information is requested **where** by

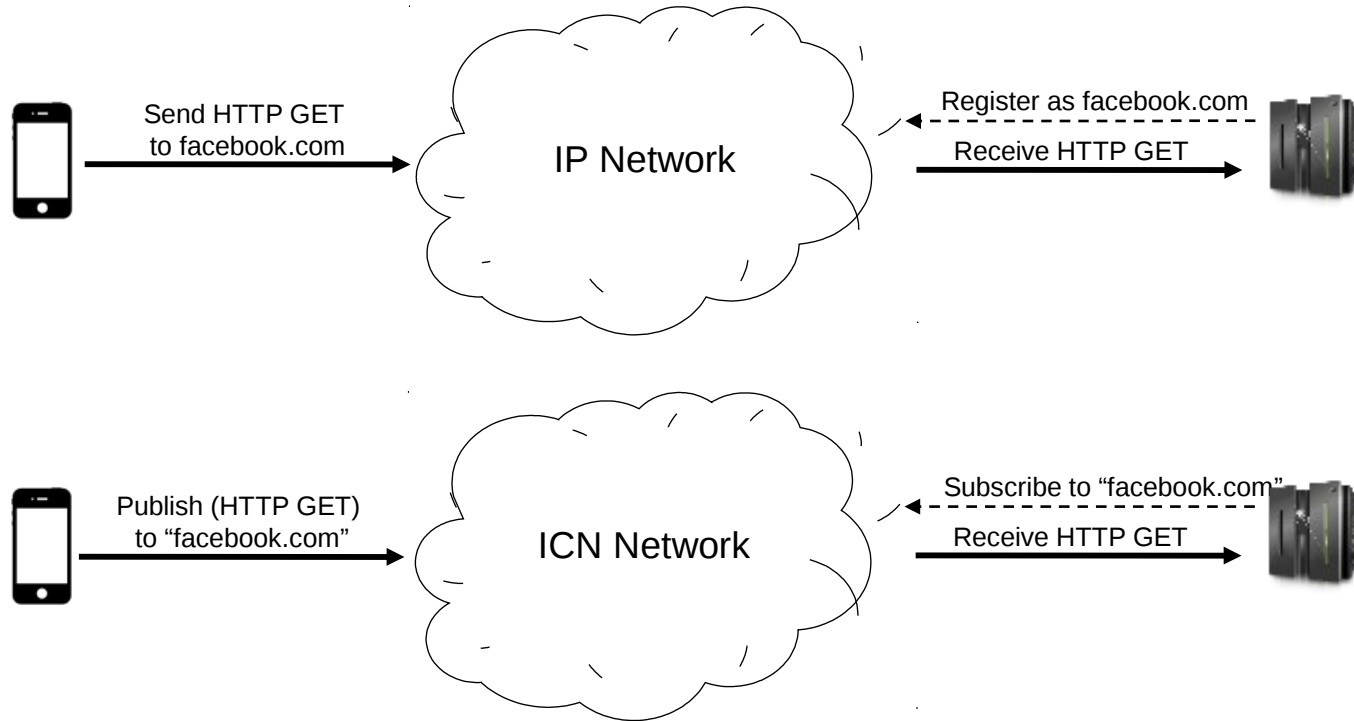
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how many users

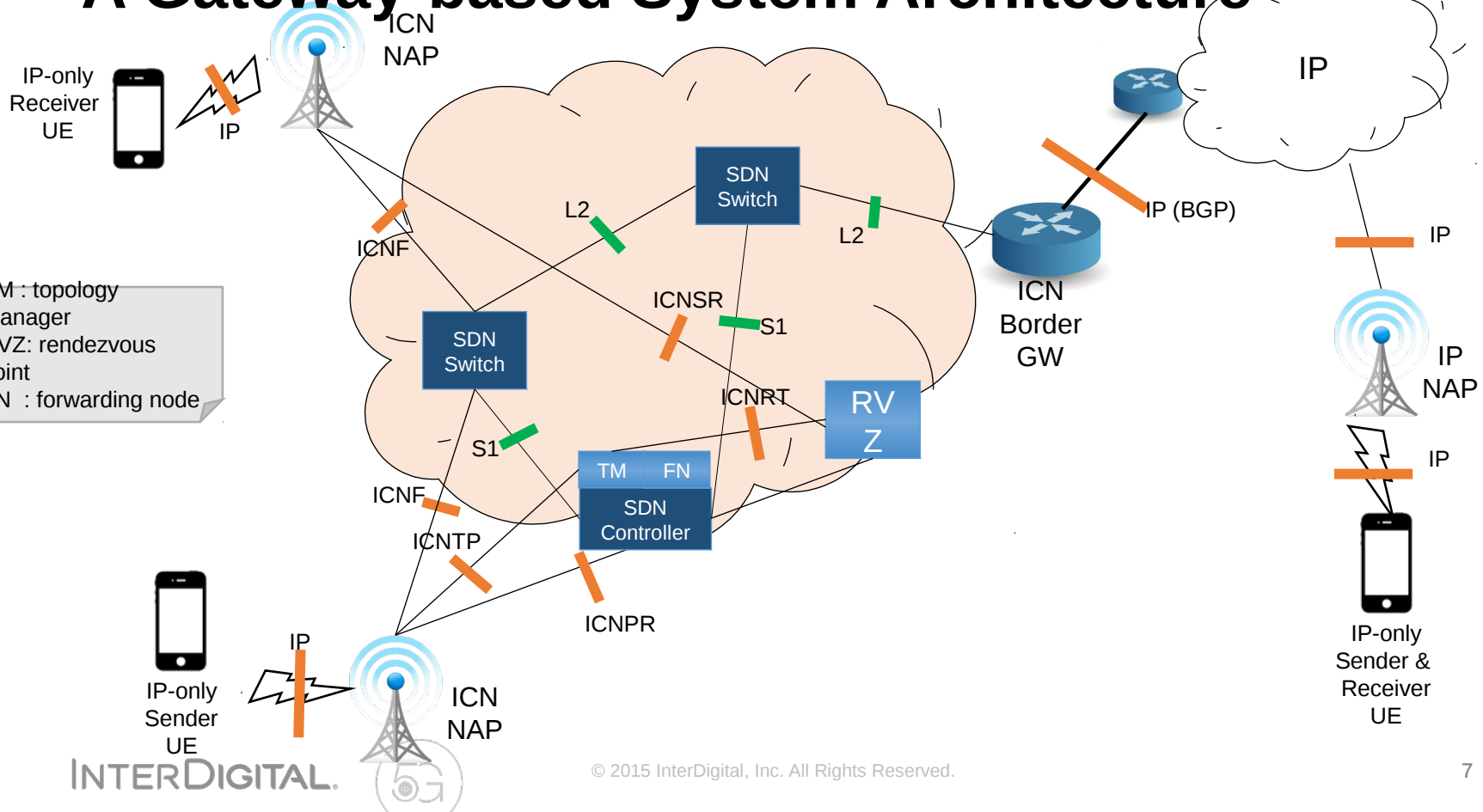
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Basic Idea

Interpret IP-based communication as Named Object Exchange

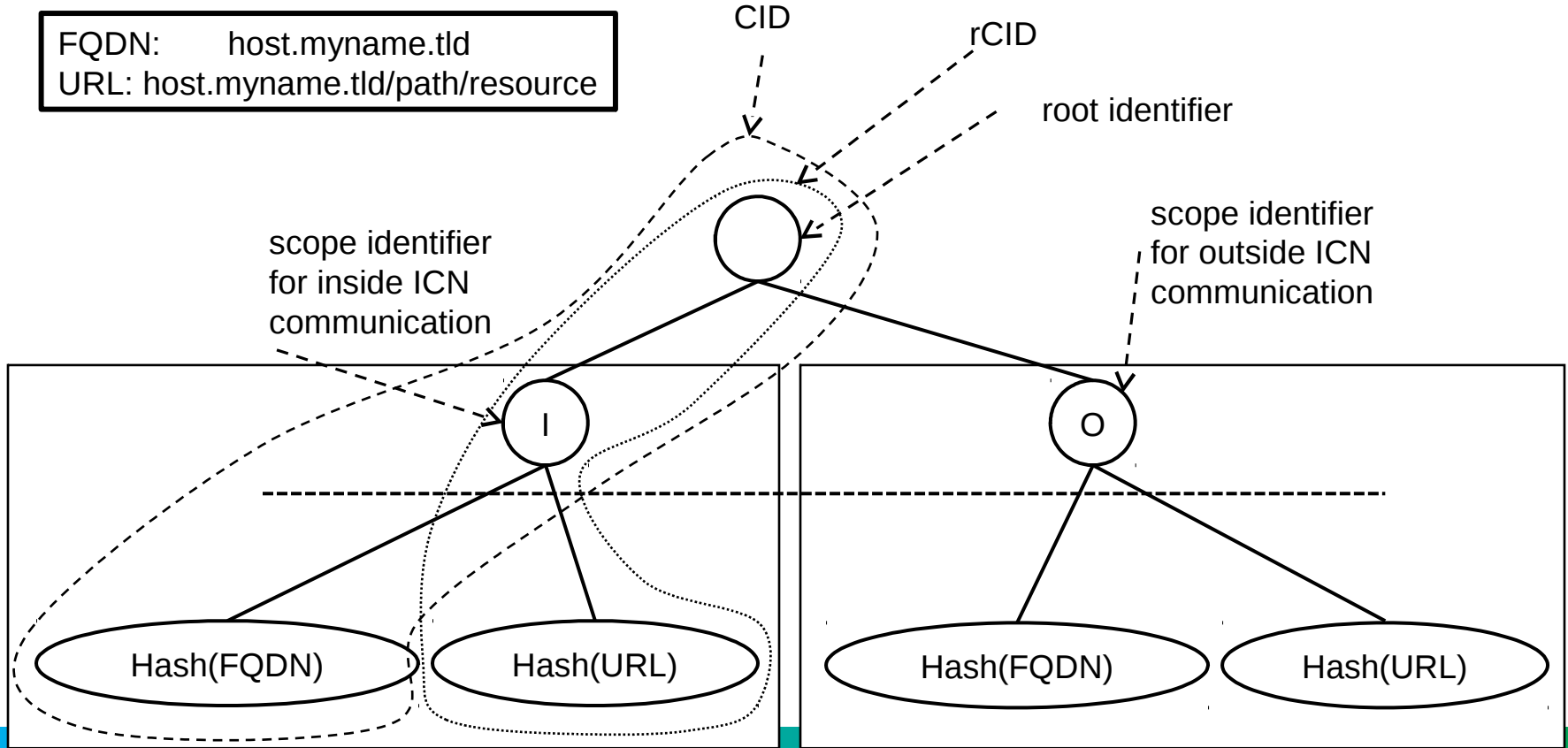


A Gateway-based System Architecture



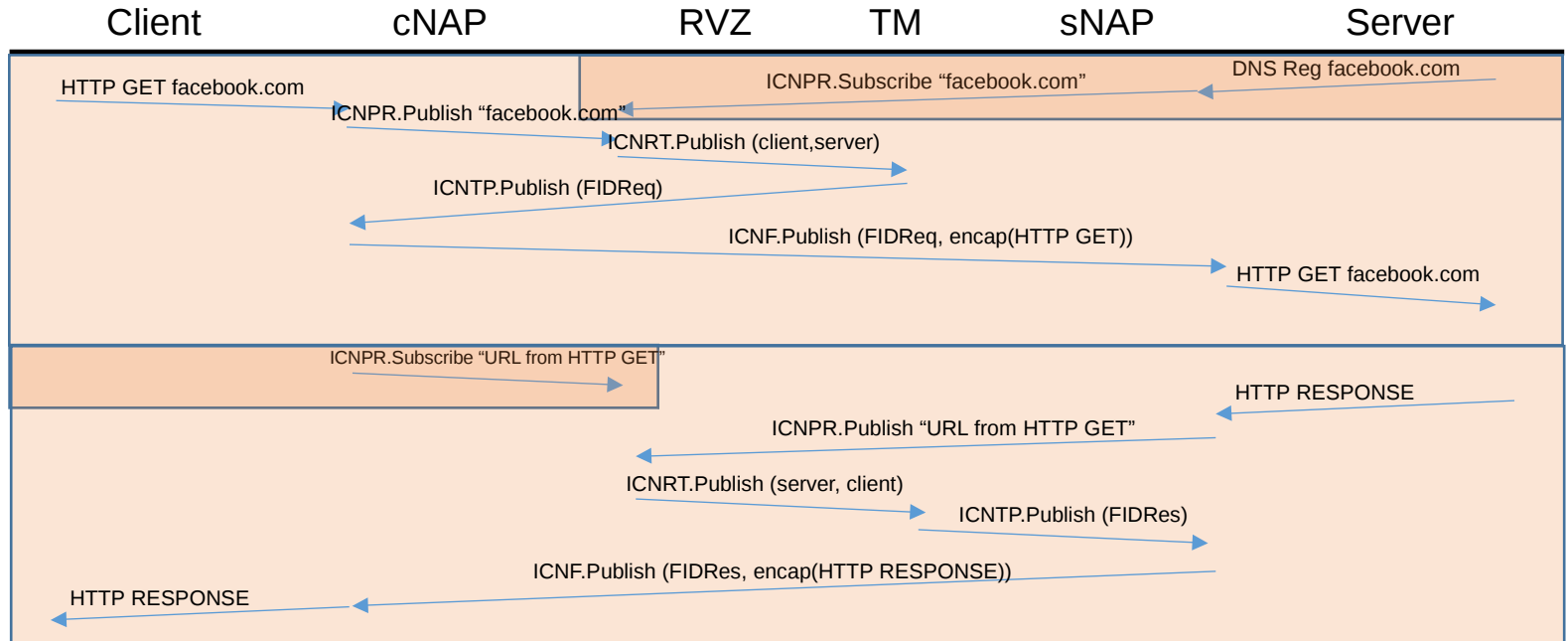
HTTP over ICN mapping: Namespace

FQDN: host.myname.tld
URL: host.myname.tld/path/resource



More Detail

Utilizing an Existing ICN Architecture



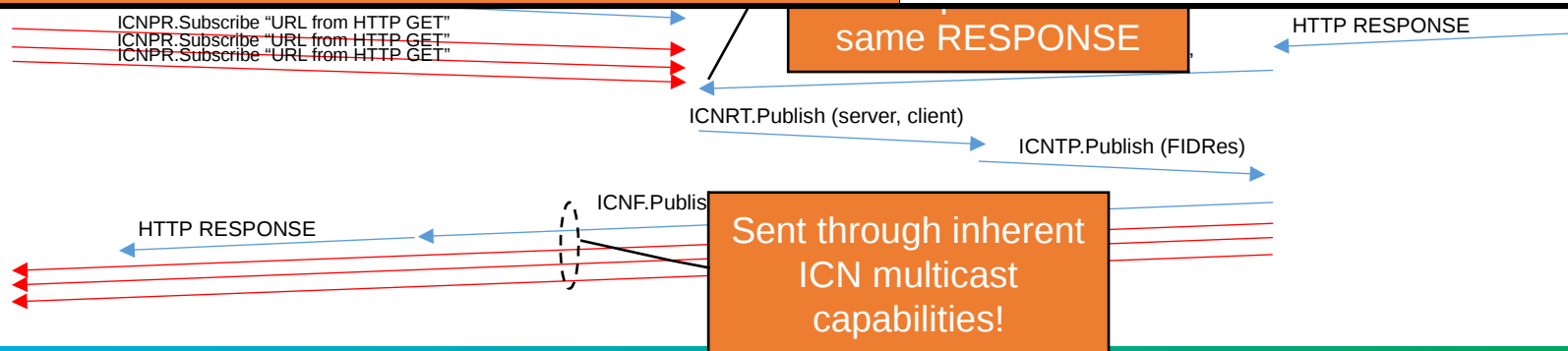
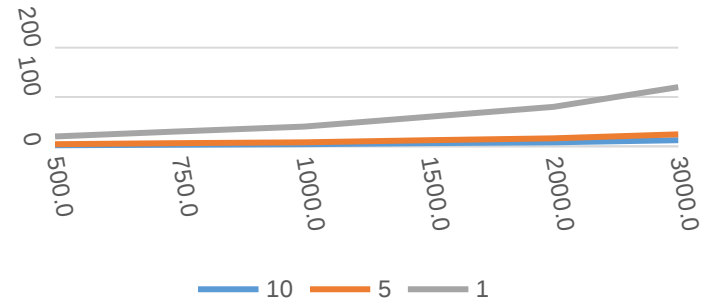
Opportunities

Re-introduce multicast for increased network utilization

Scenario:

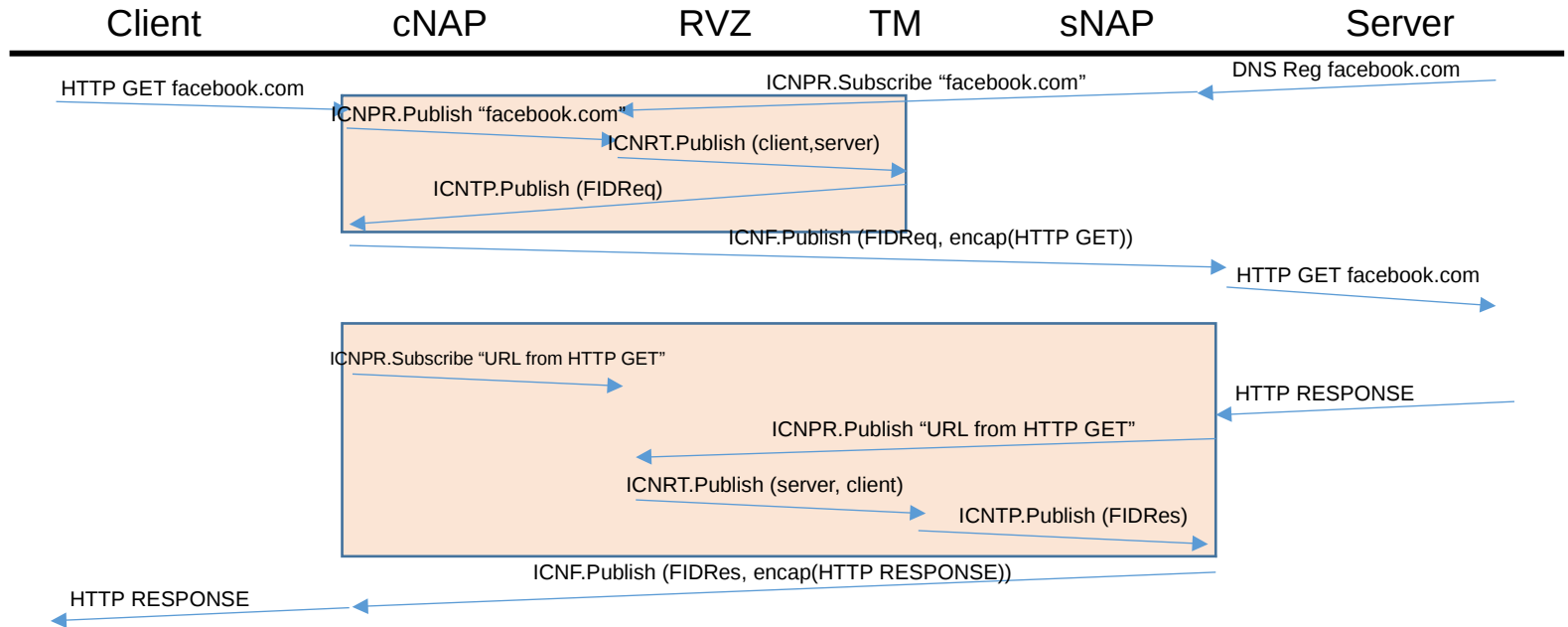
- Live video transmission with {500, 750, 1000, 1500, 2000, 3000} viewers
- Quasi-synchronization within interval of 10s, 5s or 1s with uniform distribution of video chunk requests
- This amounts to 250, 125 or 25 possible multicast groups being formed for each chunk request
- Multicast gain ranges from 2 to 120

Multicast Gain vs. sync interval



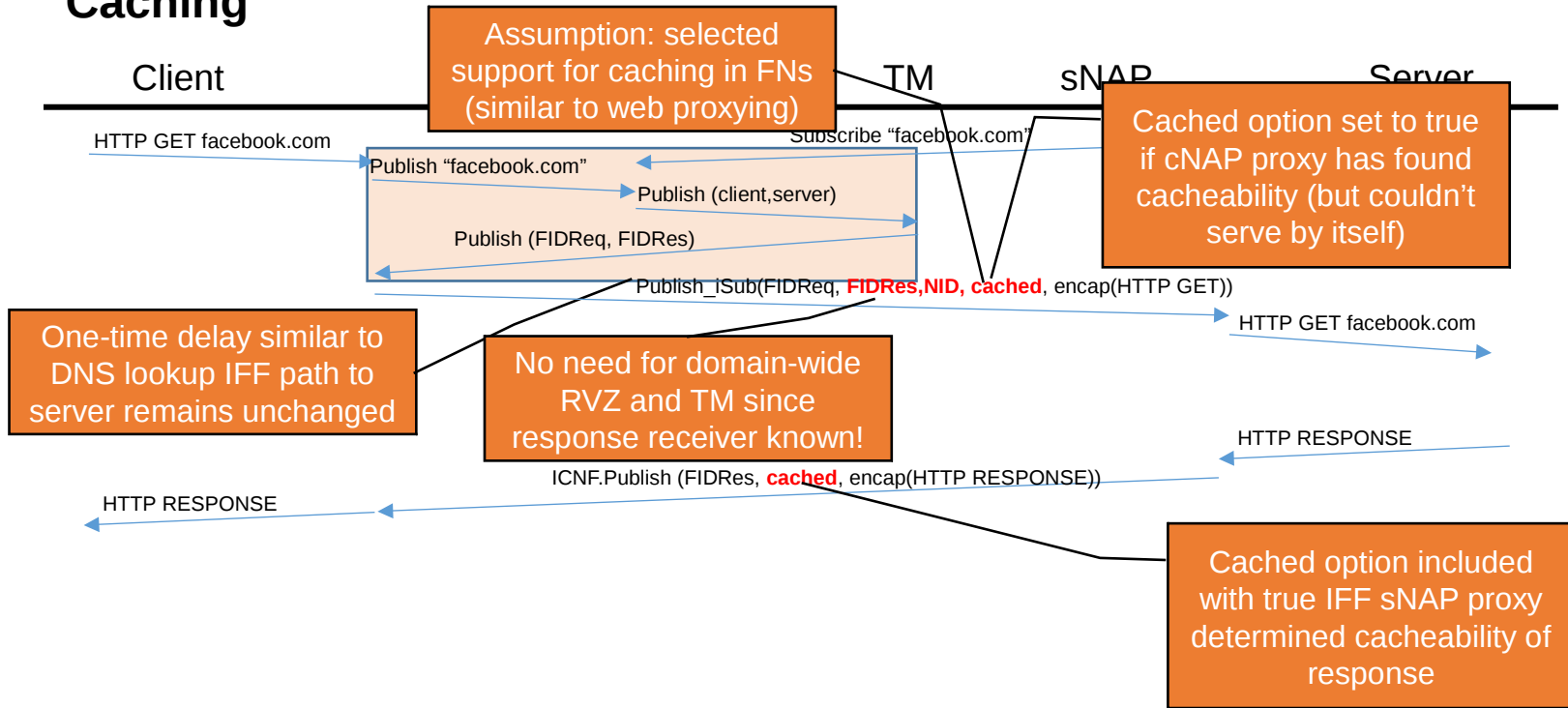
Obvious Delays

Nice for Showing Messages but Hardly Scalable



After a Bit More Engineering

Remove domain RVZ and TM Delays plus Support Optional On-Path Caching










Summary








- ICN is an ongoing evolution
 - We have moved from true endpoint communication to content oriented communication a long time ago
- We believe that the current Internet is the ultimate use case for ICN
 - Make it work – great! Make it work better – potential for ICN deployment!
- POINT is dedicated to making IP/HTTP over ICN work
 - KPI-driven approach to quantify the **better** part

A Set of Partners (and Looking for More...)

POINT (3.5MEuro)

Partner	Role
	Academia (coordinator)
	Technology provider (technical mgr)
	Operator (trial lead)
	Vendor
	Content provider
Ell.i	IoT provider
	Academia (development lead)
	Academia (evaluation lead)
Athens Univ. of Economics & Business	Academia (architecture lead)

RIFE (3.0MEuro)

Partner	Role
	SME (coordinator)
	Academia (technical mgr)
	Technology provider (architecture lead)
	Community operator (trial lead)
	Sat vendor
	Sat operator
	Academia (evaluation lead)

Additional trial in Bristol (UK), ...

Demo



IP-based Services in our POINT Overlay Network

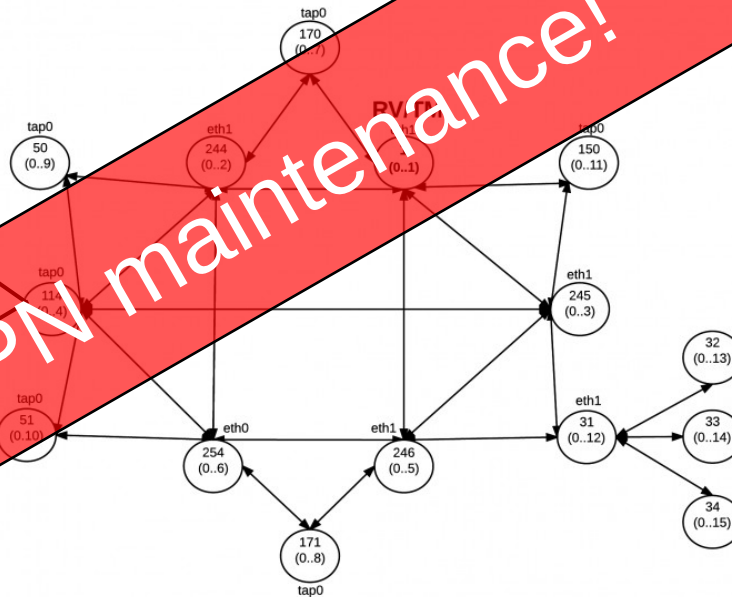
Browser



Web Server



Scheduled VPN maintenance!



POINT Overlay Network