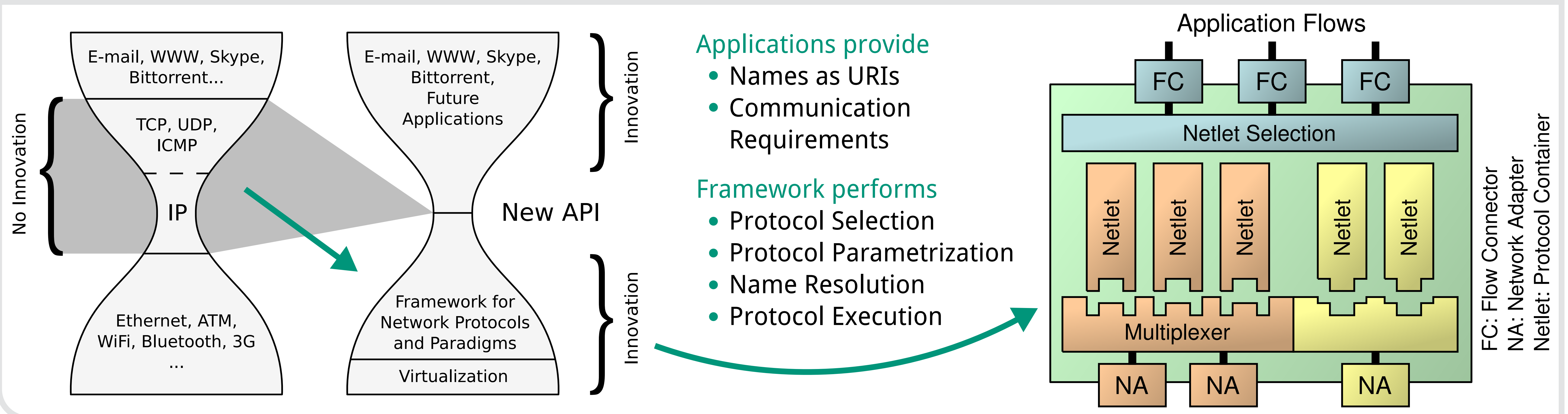


Evaluating a Framework for Different Networking Paradigms

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Decoupling Applications and Protocols: NENA – Netlet-based Node Architecture [1]



Evaluation Methodology

How to evaluate (Framework) Architecture?

- Concept Evaluation → Use Cases
- Determine Invariants [2]

Criteria for Use Cases

- C1 – Basic Communication Services usable?
- C2 – Advanced Options/Services usable?
- C3 – Naming with URIs suitable?
- C4 – Services transparent to applications?

Implemented Use Cases for Evaluation

Applications

- Web-Browser, Chat/IM, Video, Fileserver

Network Protocols & Paradigms

- CCNx – Content-Centric
- BitTorrent – Non-Sequential Download
- XIA – eXtensible Internet Architecture
- DTN – High Delay, Intermittent Connectivity
- MQTT (Pub/Sub) – Network Services
- Today's Protocols – TCP-like, HTTP-like, Video-Transport

Evaluation Results and Conclusion

API Usage & Criteria	API Usage							
	TCP-like	Video	HTTP-like	BitTorrent	CCNx	DTN	Pub/Sub	XIA
GET	○	○	✓	✓	✓	○	✓	✓
PUT	✓	✓	✓	○	✓	✓	✓	✓
CONNECT	✓	✓	✓	○	○	○	○	✓
BIND	✓	✓	✓	✓	○	✓	✓	✓
C1	✓	✓	✓	✓	✓	✓	✓	✓
C2	○	○	✗	✗	✓	✗	✓	✓
C3	✓	✓	✓	✓	✓	✓	✓	✓
C4	✓	✓	✓	✗	✓	✗	✓	✓

✓ intuitive usage ✗ additional implementation necessary
 ○ not applicable

Invariants

Application Interface

- URIs as Names
- API Primitives
- Requirements

Network Protocol Implementations

- Query Interfaces
- Netlets, Multiplexers & Servlets
- Network Attachment
- Flow Identification & Flow Control
- User Feedback & Session Management

Decoupling of Applications and Protocols →

Beneficial for Application Programmers

Framework for Network Protocols and Paradigms →

Minimal Design Constraints for Protocols

Future Work

Definition of suitable Requirements & Properties for matching protocols to application requests

[1] D. Martin, L. Völker, and M. Zitterbart, "A Flexible Framework for Future Internet Design, Assessment, and Operation", Computer Networks, vol. 55, no. 4, pp. 910–918, Mar. 2011.

[2] B. Ahlgren, M. Brunner, L. Eggert, R. Hancock, and S. Schmid, "Invariants: A New Design Methodology for Network Architectures", in Proc. of the ACM SIGCOMM Workshop on Future Directions in Network Architecture (FDNA'04), Portland, OR, USA, 2004, pp. 65–70.

[3] NENA Project Homepage: <http://nena.intend-net.org/>