

Interoperability in the Future Internet

Network Applications and Services

Background and challenges

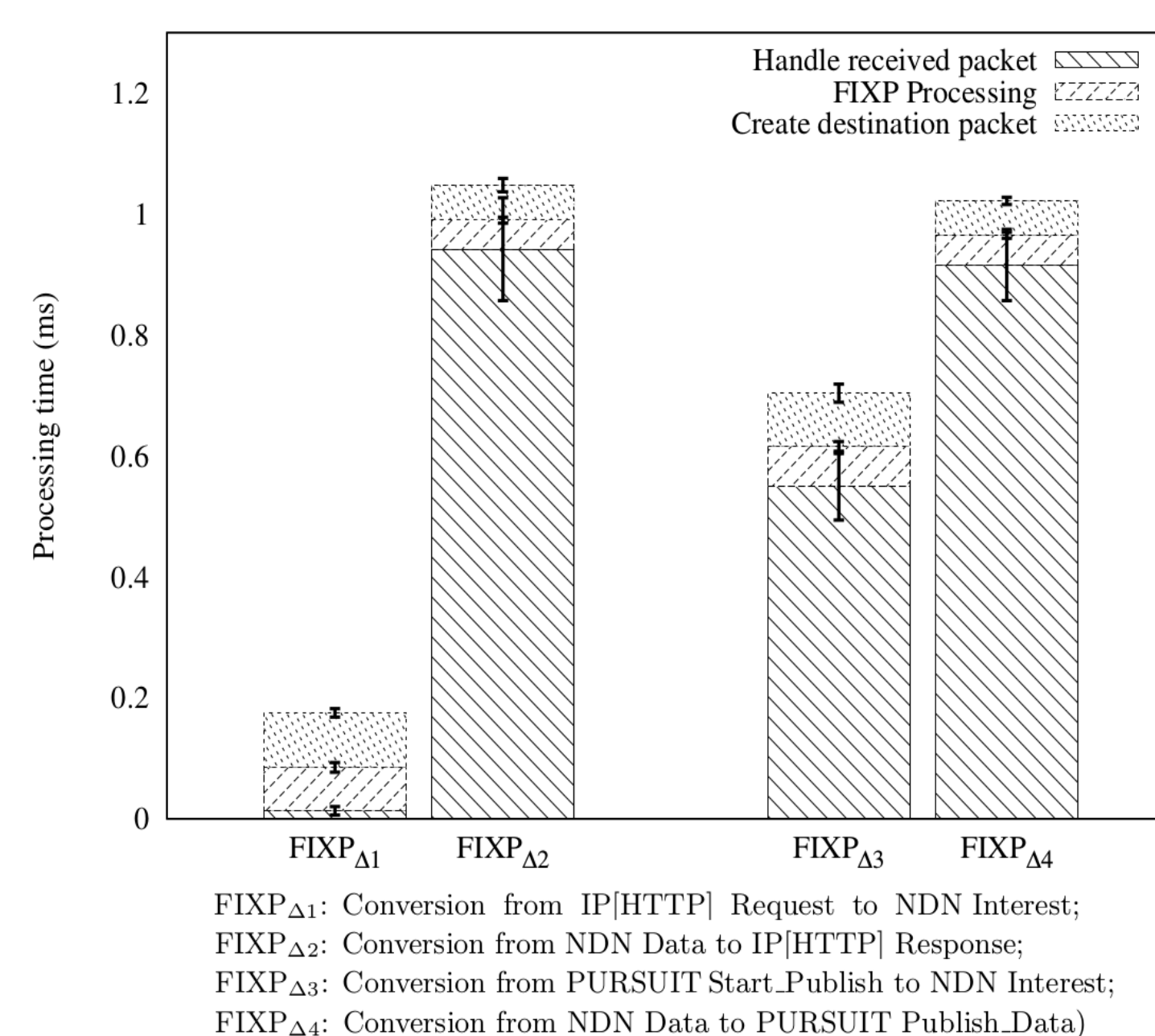
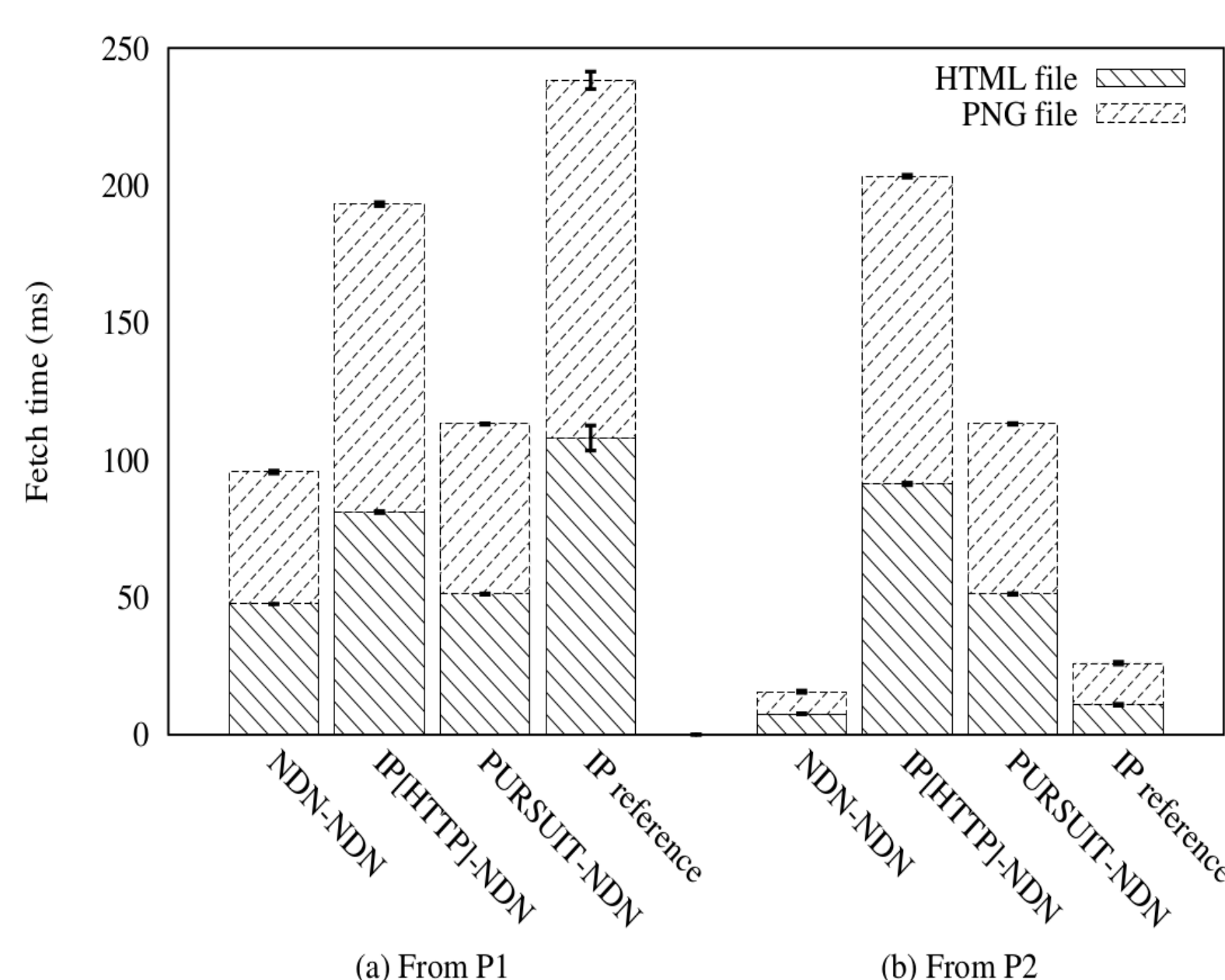
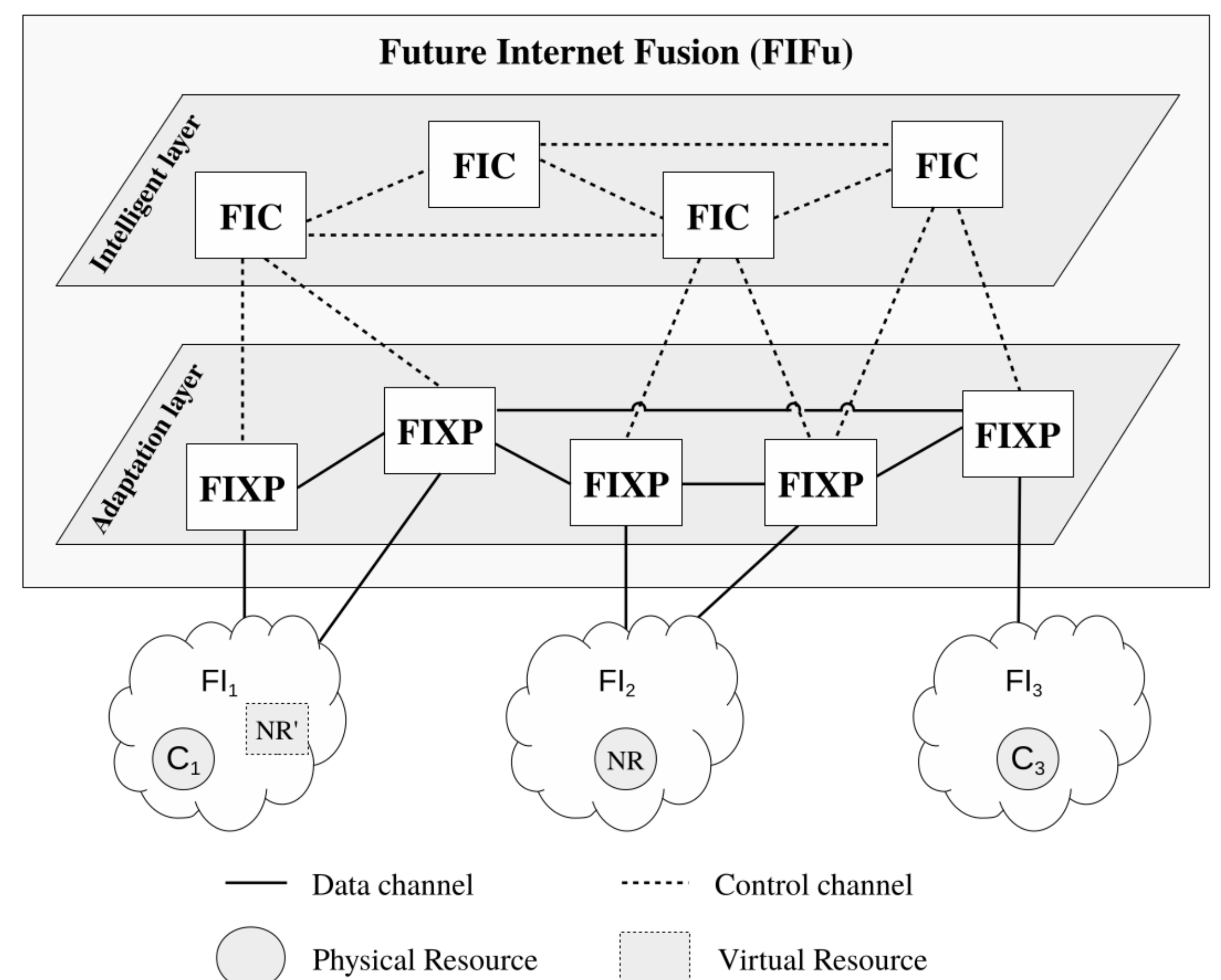
- Research on the Future Internet has gained traction in recent years.
- Information-Centric Networking (ICN) is one of proposals, which focuses on a data-oriented paradigm, instead of host-oriented paradigm.
- Several instantiations that differs on how features are implemented: NDN, CCN, PURSUIT, ...
- Deployment of novel network architectures may be a slow process, leading to a period where multiple proposals coexist simultaneously.
- Mobile Nodes (MNs) may move from one network architecture to another, while accessing content.
- Interoperability between network architectures is required to avoid the creation of information silos.

Description and main innovation

Definition of an interoperability framework, named Future Internet Fusion (FIFu), composed by two different layers:

- the adaptation layer, composed by Future Internet eXchange Points (FIXPs), responsible for converting the signaling between protocols of each network architecture.
- the intelligent layer, composed by Future Internet Controllers (FICs), is responsible for (i) handling mappings of resources on each network architecture; (ii) management of FIXPs;

Paving the way for a new set of scenarios where MNs are able to move across different network architectures while accessing resources



	Total Size w/ content (bytes)	Signaling size wo/ content (bytes)	Exchanged messages
C1 NDN	NDN: 7078	NDN: 827	NDN: 4
C2 IP[HTTP]	IP: 7345 NDN: 7078	IP: 1093 NDN: 827	IP: 19 NDN: 4
C3 PURSUIT	PURSUIT: 9355 NDN: 7078	PURSUIT: 2929 NDN: 827	PURSUIT: 10 NDN: 4
IP Reference	IP: 7345	IP: 1093	IP: 19

Achievements

- Validation of the proposed framework regarding:
 - Interoperability between IP and different ICN instantiations (NDN and PURSUIT)
 - Different use case scenarios (IoT, web browsing, live and on-demand video streaming)
- Enable MNs to move across different network architectures while accessing content
- Publications (1 published, 3 pending):
 - 1 published paper for Internet Technologies Letters
 - 1 book chapter accepted to publication
 - 1 journal article submitted to Elsevier Journal of Network and Computer Applications (JNCA)
 - 1 conference paper submitted to IEEE ICC 2019