Use Cases for In-Network Computing

https://www.ietf.org/archive/id/draft-irtf-coinrg-use-cases-03.txt

Purpose of this draft

COIN Charter, Scope #2:
“Research on use case driven requirements analysis: [..] Identify potential benefits to these networks from in-network functionality [..]”

• This draft
  ▶ Collection of use cases
  ▶ Structured for providing insights into benefits, research questions, and opportunities for COIN

• Goal
  ▶ Provide input for scope #2
Use Case Structure

3. Providing New COIN Experiences ........................................... 4
   3.1. Mobile Application Offloading ......................................... 4
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   5.3. Virtual Networks Programming ................................. 29

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   6.1. Distributed AI .................................................. 33
Current Status

- Use case descriptions aligned based on (new) taxonomy
- Draft finished from authors’ point of view
- Next step: RGLC
Purpose of this draft

• Collect COIN-related terminology
  ▶ Terminology needed for the use case draft
  ▶ I-D.draft-kutscher-coinrg-dir-02 expired

• Moved from use case draft to a dedicated document

• Questions to RG
  ▶ Who can take over managing the document?
  ▶ Goal for this document?
    ■ Living collection of terminology?
  ▶ Scope of this terminology?
  ▶ Changes? Additions?
COIN RG Terminology

Programmable Network Devices (PNDs): network devices, such as network interface cards and switches, which are programmable, e.g., using P4 or other languages.

(COIN) Execution Environment: a class of target environments for function execution, for example, a JVM-based execution environment that can run functions represented in JVM byte code.

COIN System: the PNDs (and end systems) and their execution environments, together with the communication resources interconnecting them, operated by a single provider or through interactions between multiple providers that jointly offer COIN capabilities.

COIN Capability: a feature enabled through the joint processing of computation and communication resources in the network.

(COIN) Program: a monolithic functionality that is provided according to the specification for said program and which may be requested by a user. A composite service can be built by orchestrating a combination of monolithic COIN programs.

(COIN) Program Instance: one running instance of a program.

COIN Experience: a new user experience brought about through the utilization of COIN capabilities.
Use Case Analysis for In-Network Computing

https://www.ietf.org/archive/id/draft-irtf-coinrg-use-case-analysis-00.txt

Purpose of this draft

- draft-irtf-coinrg-use-cases-03.txt provides use case descriptions

**This draft**

- Analyze opportunities, research questions and requirements to identify commonalities
- Provide general research directions for COIN

**Current status**

- Started with research questions
  - Deeper analysis still to do
- Missing
  - Opportunities
  - Requirements

<table>
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<th>Applicability Areas</th>
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| Distributed Computing FRAMEWORKS and LANGUAGES to COIN |

| ENABLING TECHNOLOGIES for COIN |

| VISION(S) for COIN |
Questions to RG

- Who can take over managing the document?
- Who is interested in contributing / doing the analyses?