Data Discovery

draft-mcbride-data-discovery-use-cases

draft-mcbride-data-discovery-problem-statement
draft-mcbride-edge-data-discovery-overview

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Evolved out of EC side meetings

Gap 1: to define the mapping between any two popular machine languages

Gap 2: In order to achieve the interconnection of multiple Industrial networks that use various physical layers, an overlay is required.

Gap 3: unified information model for all kinds of verticals

Gap 4: content push in a more secure (SUIT) and efficient (multicast) way

Gap 5: Provide containers and VMs on edge computing gateways to facilitate App mobility. Sync up of states in between Edge Computing Gateways. Definition of common APIs.

Gap 6: Edge **data discovery.** Process of finding required data from edge databases and consolidating it into a single source, perhaps name, that can be evaluated

Gap 7: add the deterministic feature into wireless networks (Wifi, RF)

Gap 8: policy indications about the task division for the Edge-Cloud Orchestration

What’s the problem?

- Locating distributed data in a standardized way in order to perform networking actions.
    - Yes, there are many proprietary ways of finding data. AWS Macie, Google…

- Data may be cached, copied and/or stored at multiple locations in the network and needs to be marshalled to feed a function.
    - Sometimes the nature of the computation is determined on the fly based on context. Which algorithm to perform can be an on-demand decision.

- No standards-based networking solution to discover 1) where the databases exist throughout a network and 2) where specific data objects are located.

- The location of each data store is a first level discovery problem, and the details of the database's directory is a second level discovery problem.

What’s data?

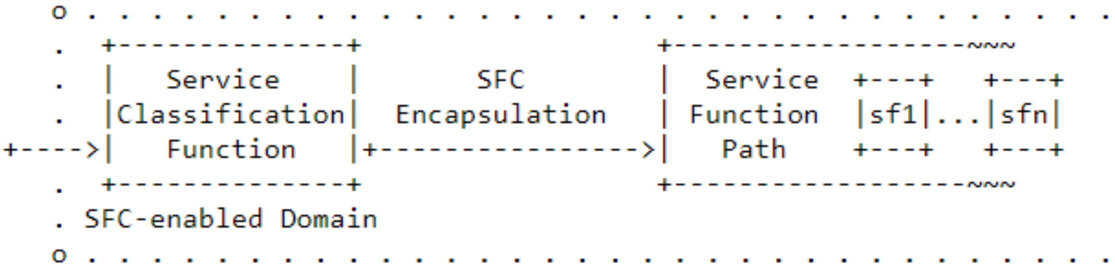
- Data can include a program, service, resource involving statistics, measurements, temperature, location, metadata, records...

  Program: applets, graphics, games, spreadsheets, database systems, browsers, etc

  Service: firewalls, load-balancers, spam filters, header manipulators, etc

  Resource: CPU, memory, etc.

Use Case: Application-Aware SFC



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     o . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
     .  +--------------+                  +------------------~~~
     .  |   Service    |       SFC        |  Service  +---+   +---+
     .  |Classification|  Encapsulation   | Function  |sf1|...|sfn|
  +---->|   Function   |+---------------->|   Path    +---+   +---+
     .  +--------------+                  +------------------~~~
     . SFC-enabled Domain
     o . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
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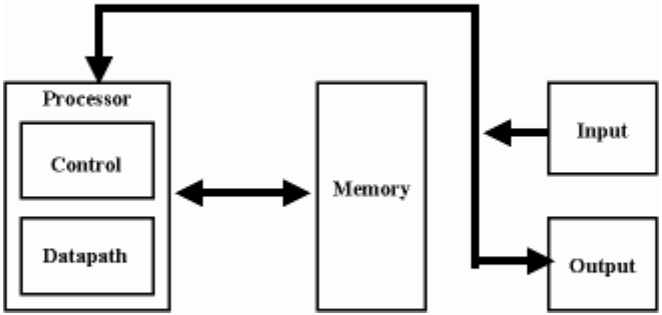
The data capabilities of devices need to be discoverable in order to steer the application packets based upon app requirements, ie, using APN.

Data to be discovered: Resources that can help the local application perform a particular task. Data which needs to be searched and discovered in order to provide a result to be acted upon by the application.

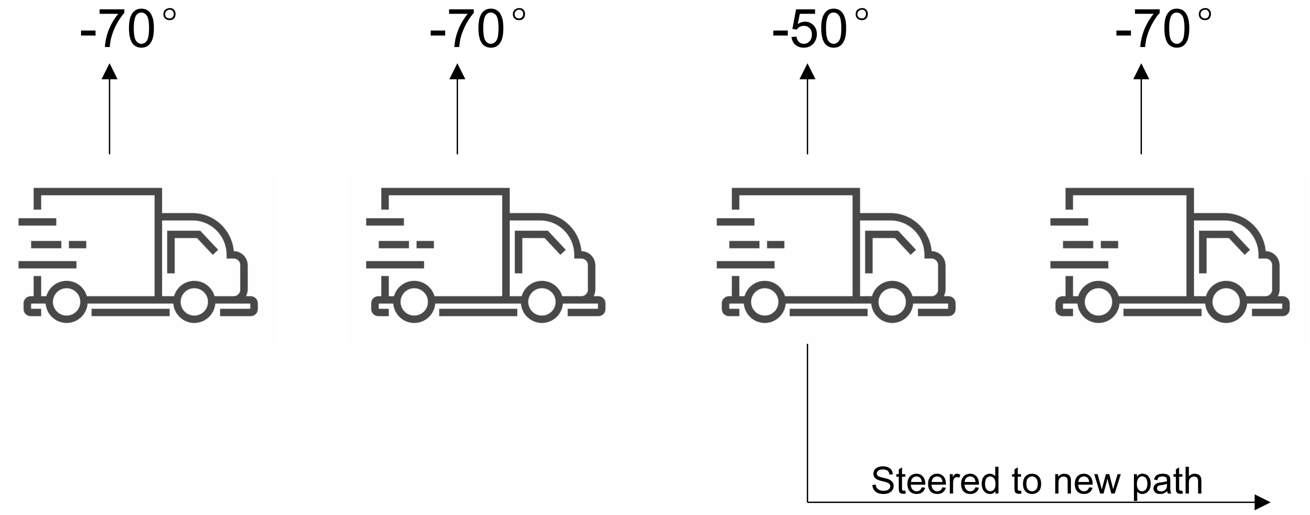
Use Case: CPU and Memory Resources



- Dynamically steer traffic to the best resource, ie, dyncast.
- Rendering tasks need to be diverted to be resources.
- Traffic/compute offloading

Data to be discovered: available server memory and compute resources in order to steer packets towards them.

Use Case: Executing a Process



-70°

-70°

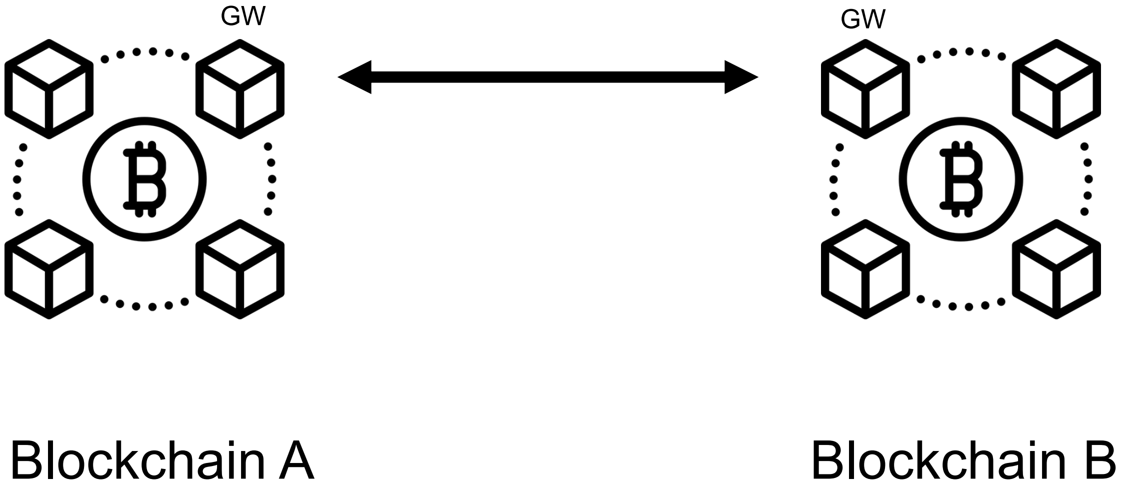
-50°

-70°

Steered to new path

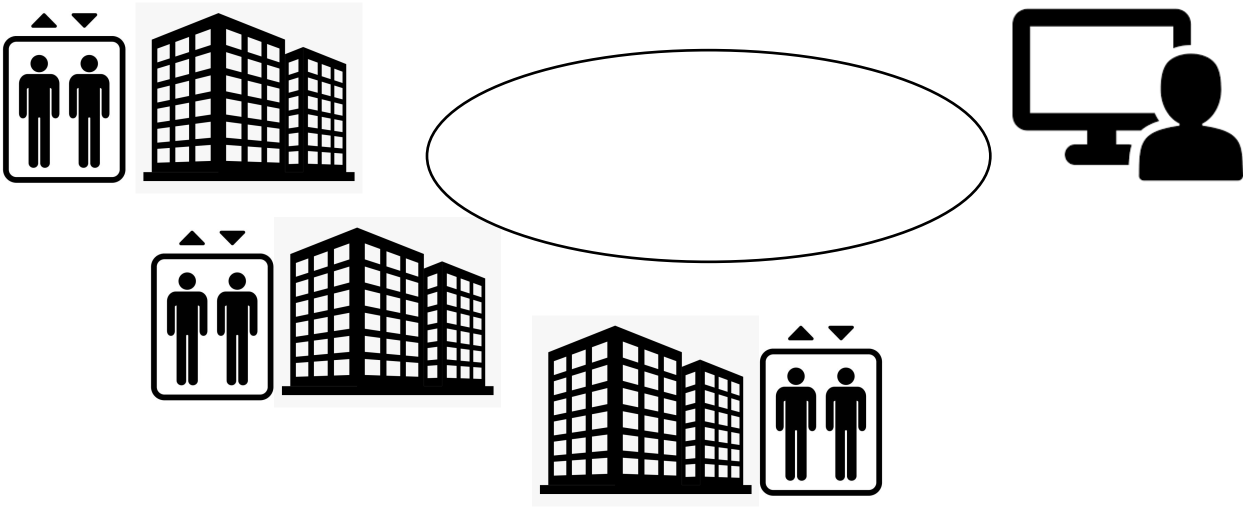
Data to be discovered: An industrial application needs real time measurement data, such as temperature, in order to execute a process.

Use Case: Distributed Ledgers



Data to be discovered: Data in the blocks of other Blockchains.
blockchain-interop@ietf.org.

Use Case: Edge Computing



Data to be discovered: Elevator data (vibration, temp, speed, brakes…) in order for the network (and/or app) to take an action.

What’s next?

- Work on data discovery solutions using existing technologies and protocols
  - Pub-Sub, DNS, BGP ☺…
- Figure out if protocol extensions or a new standard protocol is needed.
- Continue to work on it in RTGWG