Data Discovery

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

Mike McBride - Futurewei
Jim Guichard - Futurewei
Yingzhen Qu - Futurewei
Thomas Hardjono - MIT
Carlos J Bernardos - UC3M
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

The data capabilities of devices need to be discoverable in order to steer the application packets based upon app requirements, i.e., 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

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

- Dynamically steer traffic to the best resource, i.e., dyncast.
- Rendering tasks need to be diverted to be resources.
- Traffic/compute offloading
Use Case: Executing a Process

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