EU-JAPAN DIGITAL WEEK 2025

31 MARCH - 7 APRIL, 2025

TOKYO, JAPAN

THE EU-JAPAN DIGITAL WEEK IS ORGANISED AS PART OF THE EU-JAPAN DIGITAL PARTNERSHIP

Disaggregating Computing Continuum

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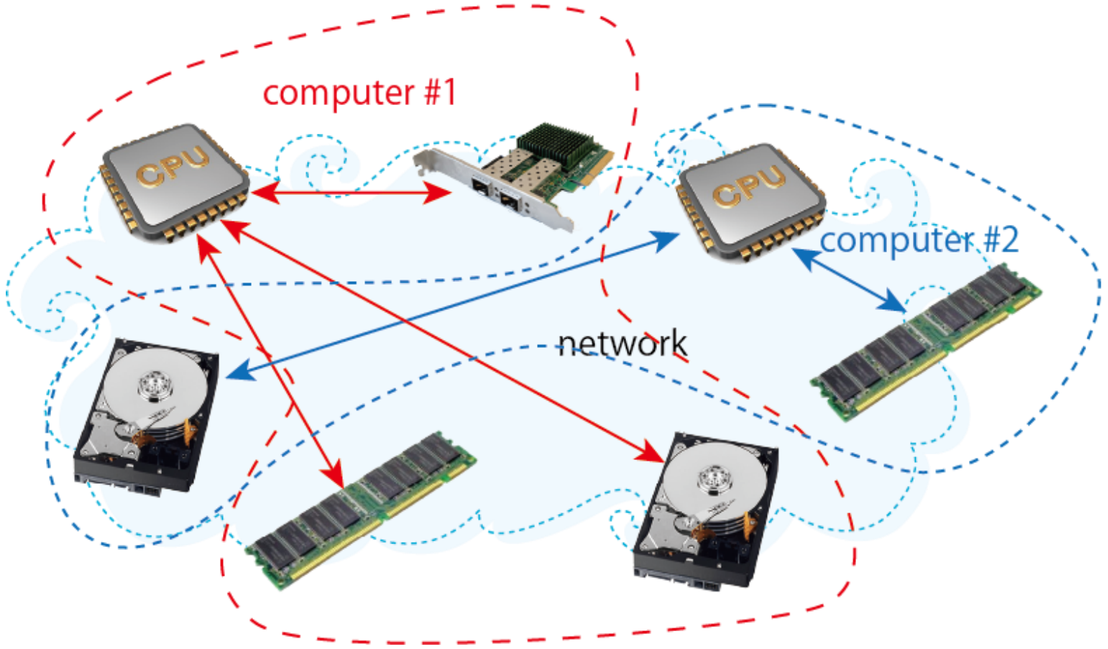
Introduction

- Widespread use of cloud computing
  - Computing resources are shared among variety of usage and users
  - Demand on computing resources is increasing due to AI and data science
  - Resource demands are different from a user to another
- Flexible resource allocation is required for efficient use of limited computing resources
  - Just enough amount of computing sources, including processors, storages, memory, network, and other devices, for a particular usage are put together and compose a computer

Disaggregated Computing

- Disaggregated computing is introduced for flexible computing resource allocation
- The required amounts of computing resources are used to compose a computer by some switches
- Remote computing resources may be integrated into disaggregated computing using photonic network

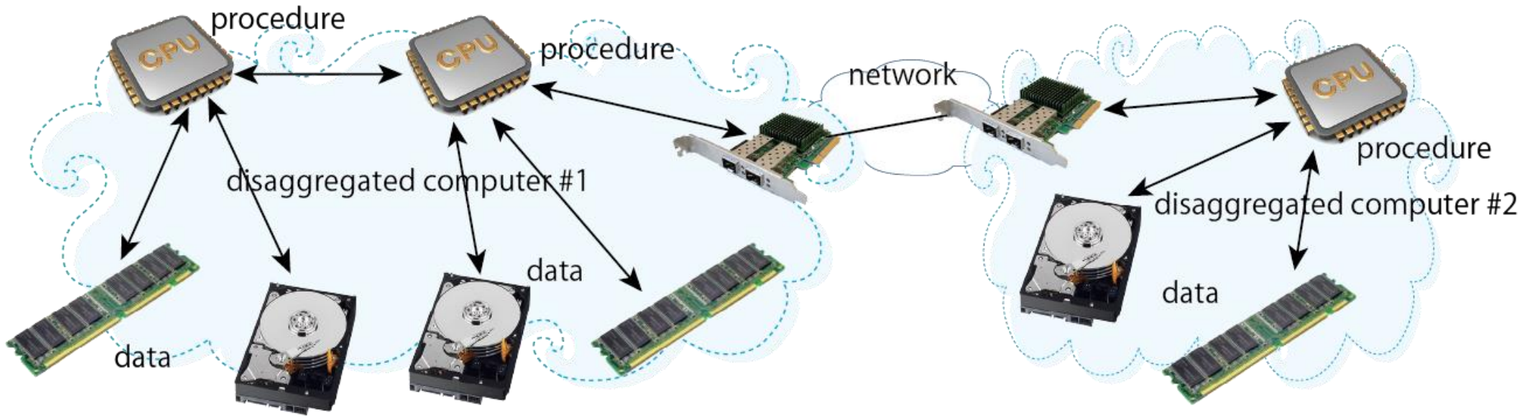


Disaggregated Computing

- Data and procedures exist in computing resources distributed over a network
- Although they are distributed, the data and procedures can be accessed as they exist locally ®Distribution Transparent
  - Distribution transparency only applies within one composed (disaggregated) computer

Disaggregated Computing

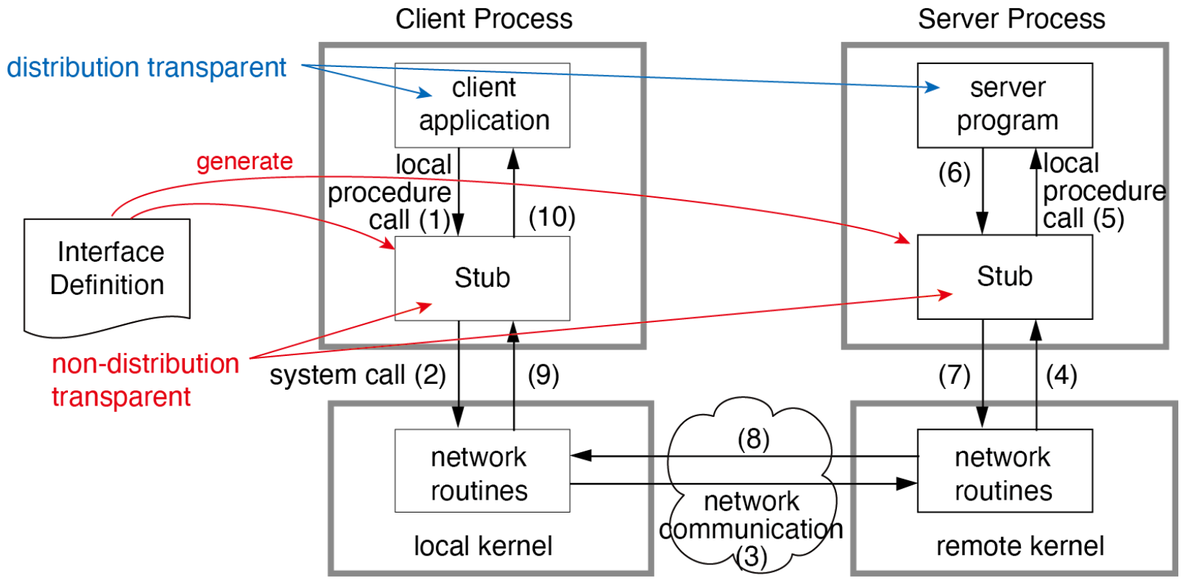
- Data and procedures existing in other (disaggregated) computer can be only accessible by specifying network location
  ®Non-Distribution Transparent



- Once a disaggregated compute is composed, flexibility in resource usage is restricted

Distribution Transparency

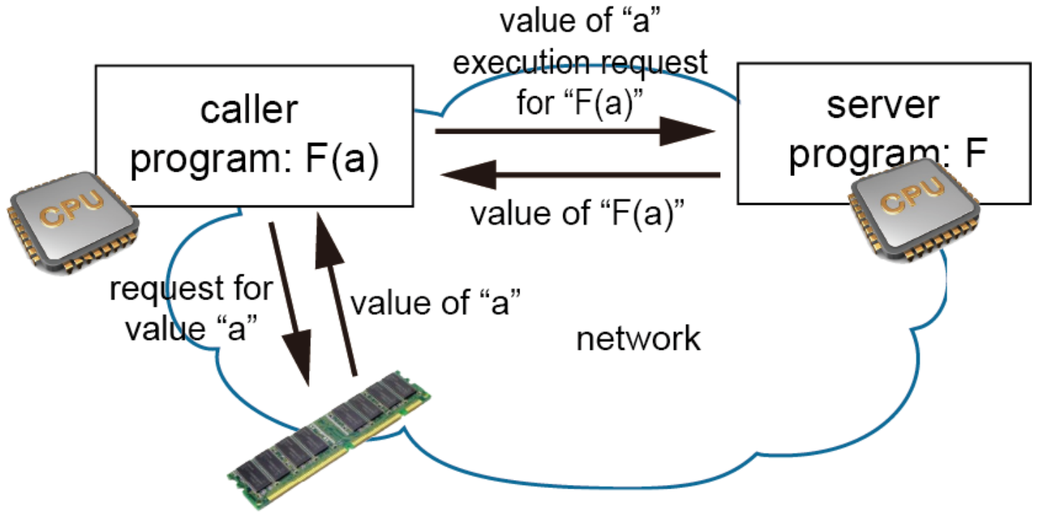
- Distribution transparency over remote computers is provided by gRPC, CORBA, etc.



- Distribution is transparent in applications, but the stubs specify particular servers and resource allocation is static

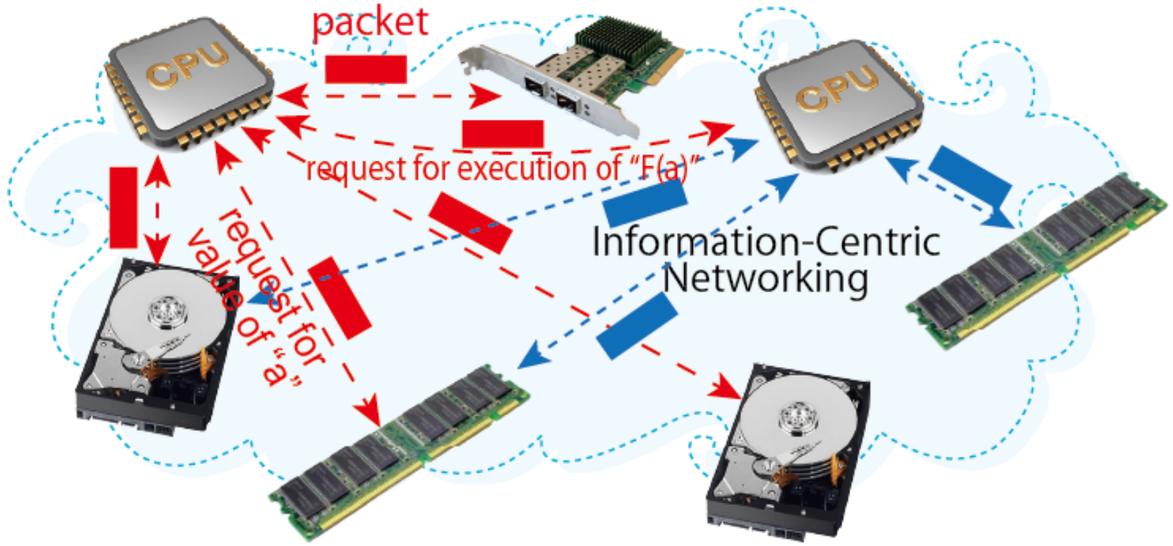
More Flexible Resource Allocation

- More dynamic resource allocation, over disaggregated computing and gRPC, is required to use up available computing resources
  - Unified syntax to access any computing resources existing in the network, i.e., distribution transparency
  - Network support of distribution transparency and computing resource allocation by the network



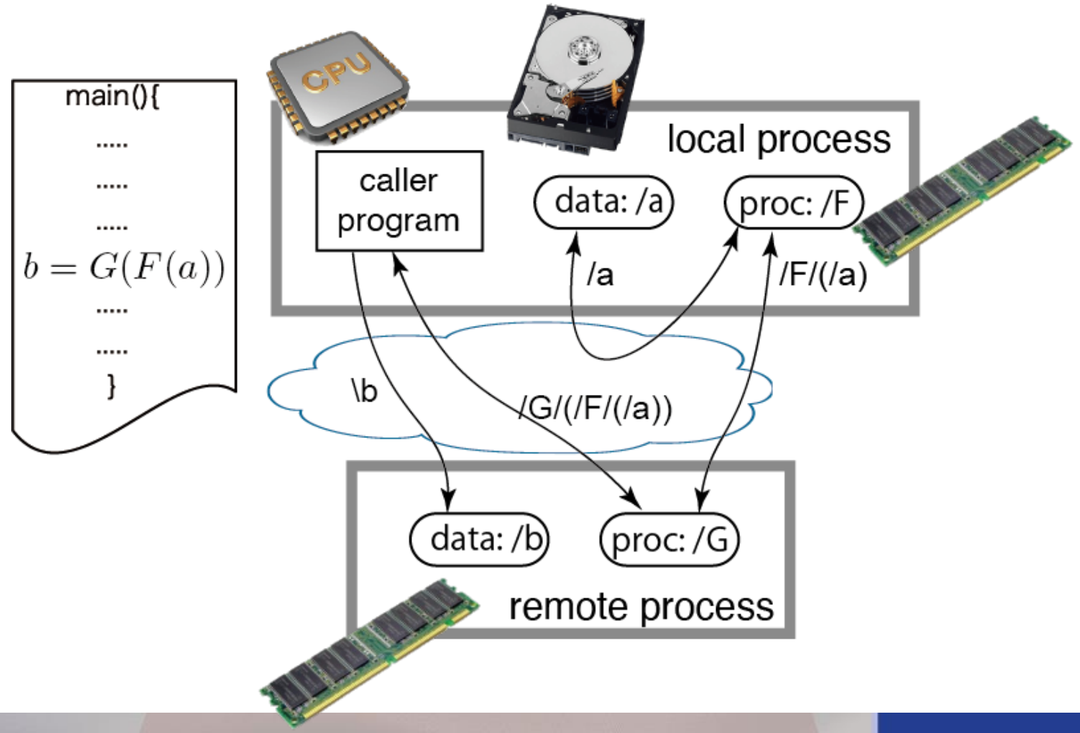
Network Support for Distribution Transparency

- Information-centric networking can support flexible resource allocation due to its capability to access data and procedures with their names
- By requesting access to data and procedures with their names, information-centric networking forwards the requests to the data and procedures having the matching names



NDN Function Chaining Workflow +

- A mechanism to execute a series of procedures over Named-data Networking, an implementation of information-centric networking



Summary

- To counter ever increasing computing demand, flexible computing resource allocation is desired
- Network support for distribution transparency is effective to provide dynamic computing resource allocation
- Information-centric networking is buyable alternative to implement network support for distribution transparency

THANK YOU FOR YOUR ATTENTION!

The EU-Japan Digital Week is an initiative under the EU-Japan Digital Partnership and is supported by the following projects and organisations

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