PS-21

Service Composition System Optimizing Network and Service Resources in E³-DCN

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Introduction

uGrid + DCN + Energy Efficient → E³-DCN

uGrid (Ubiquitous Grid Networking Environment)
- Users are provided contents generated combining data and software (Service-Parts) connected to the network.
  - Faithful to users' demands
  - Simplification of the apparatus of the sources and users

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DCN (Data Centric Network)
- Users require network by contents name.
- Contents in caches return as responses of demands from network.

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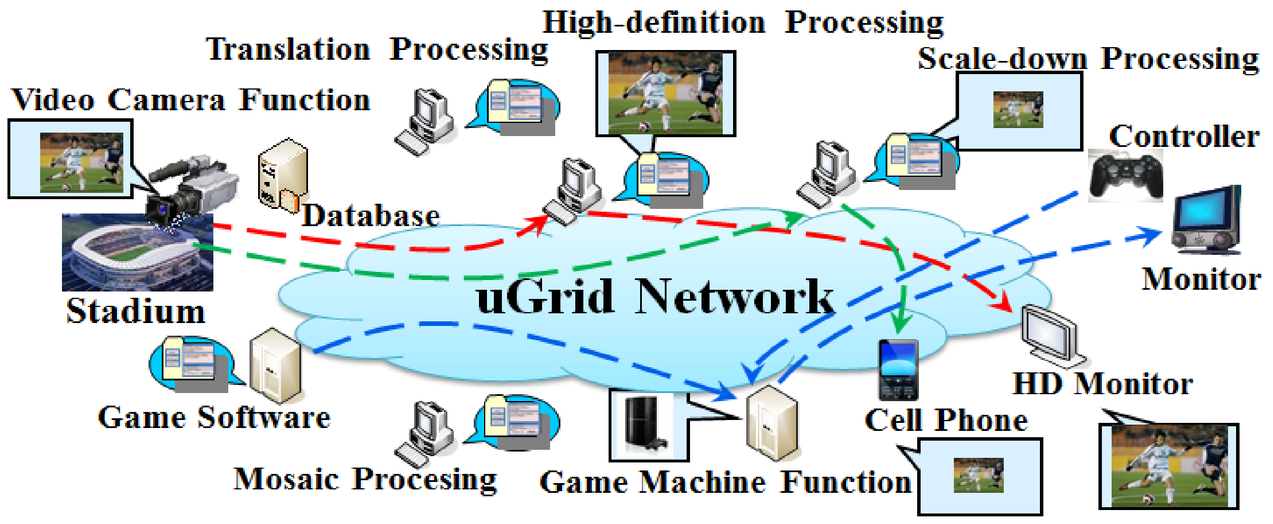
Energy Efficient
- Cost reduction by avoiding the detour of paths



E³-DCN (Energy Efficient, and Enhanced-type Data Centric Network)
- Users require by contents name and receive from cached routers.
- If there are no contents users demand, they are generated combining Service-Parts.

E³-DCN Architecture

The contents users demand are generated combining Service-Parts if needed.

DCN : Network for looking for contents

DGN (Data Generation Network) : Network for generating contents
- C-Plane (Control-Plane) : Routing Protocol, Signaling Protocol
- D-Plane (Data-Plane) : Transmission of contents

From users' demands to offers of contents

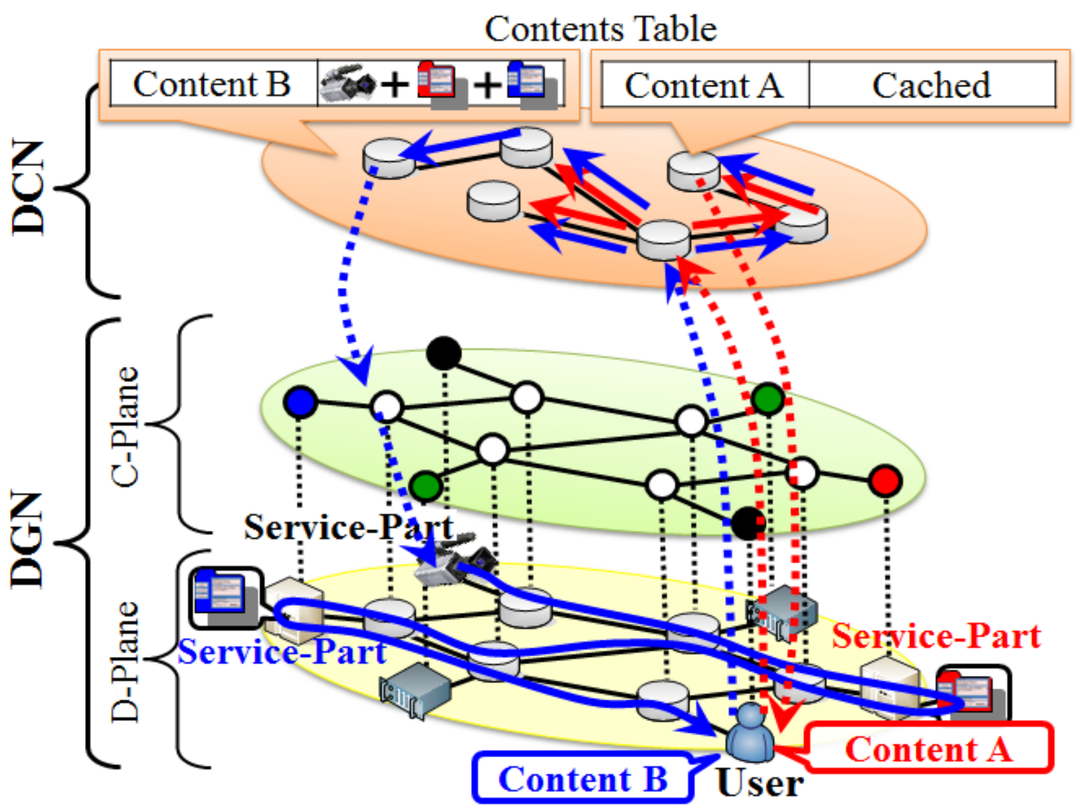
Step 1) **Users require of DCN by contents name.**

Step 2) **Contents are searched on DCN.**

When found in cache → Contents are transmitted to users on DCN.(End)

When found in Service-Parts specification → Step 3)

Step 3) **Contents are generated combining Service-Parts on DGN, and transmitted to Users.**
- **Service-Routing** : Paths from sources to users via Service-Parts are determined.
- **Service-Signaling** : The paths determined by Service-Routing are established.

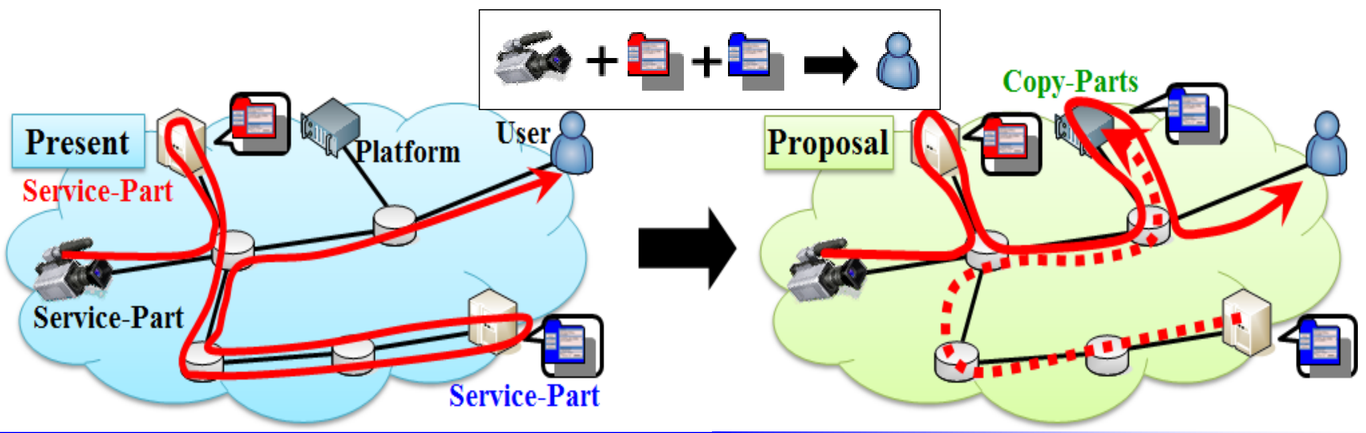


Service Copy

Energy efficient system

Present Way
- **Paths via fixed Service-Parts are redundant.**
  - High cost, Generating of congestion

Proposed Way
- **Service-Parts are copied to platforms (Service-Copy).**
  - Lower cost, Avoiding congestion

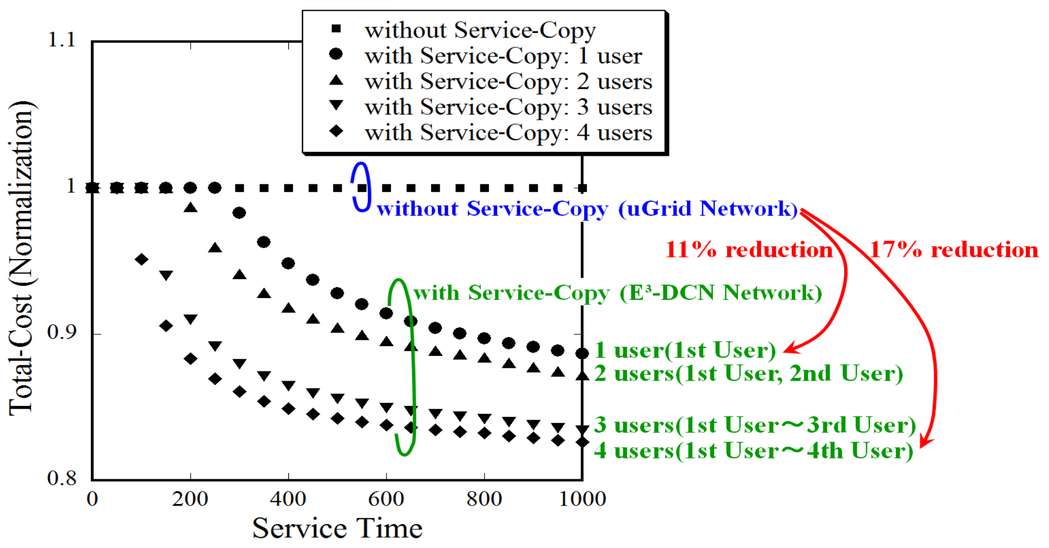


Evaluation

Simulation by Integer Linear Programming

Comparison of the Total-Cost by with Service-Copy and without

- **Cost reduction by Service-Copy is so large that there are many users.**
  - It is possible for many users to use Copy-Parts after Service-Copy.
- **Cost reduction by Service-Copy is so large that service time is long.**
  - Execution of Service-Copy requires cost.



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