Service Oriented Networking

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Korea-EU Workshop: Future Internet and Cloud

Seoul, Korea

30 September - 1 October 2013

Service Oriented Networking – problem space

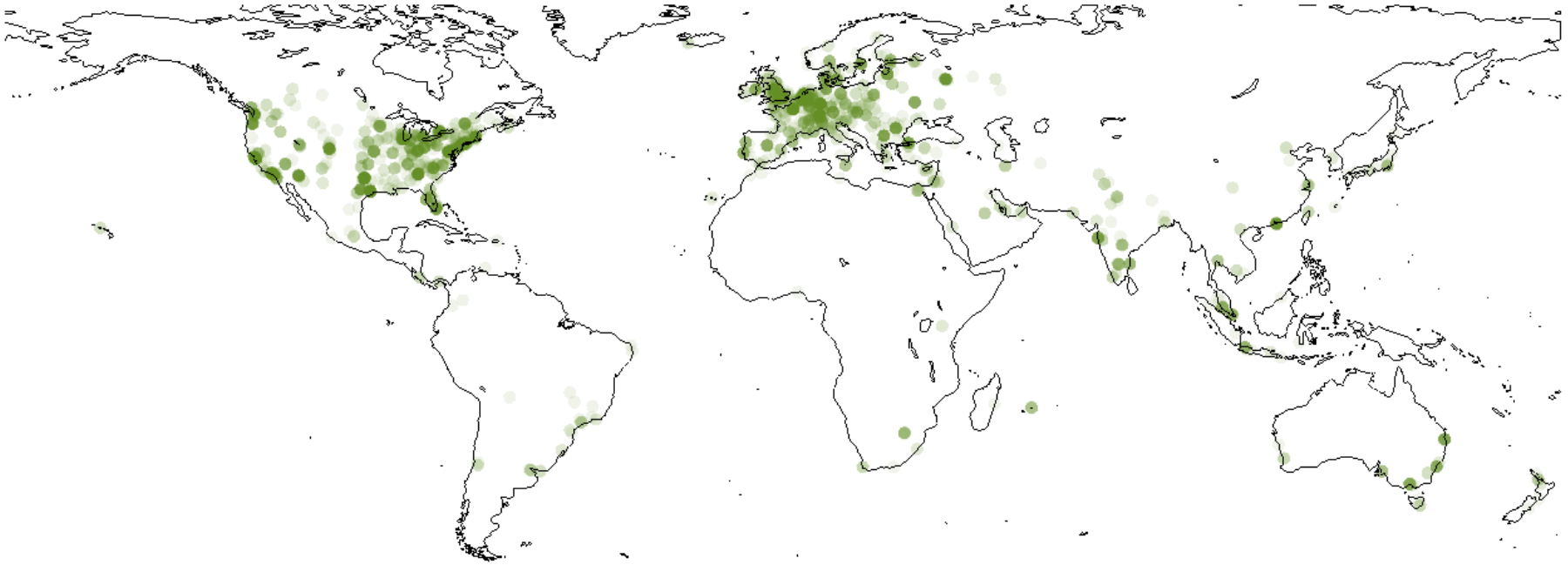
- Media applications are no longer stand-alone or just running in end terminals
- Cloud storage and applications are limited and unsuitable for dynamic, real-time, high-bandwidth applications
  - Granularity
  - Localisation
  - Configurability
- CDNs are fine for distributing static content efficiently
- ICN takes CDNs a stage further with fine grained caching
- Neither are suitable for deploying and accessing service processing capabilities

Service Oriented Networking - approach

- Positioning of service processing nodes at a very fine granularity
  - in access points close to the users;
  - collocated with routers within an ISP's network;
  - in local data-centres owned and operated by ISPs;
  - in traditional data-centres and service farms operated by cloud and service providers.
- Infrastructure and tools for services to be flexibly deployed over this distributed service-execution platform to **optimise** the location of individual service component instances
- Native service-oriented routing based on anycast
  - Inherent support for load-balancing, resilience and elasticity
- A ***fusion*** of service deployment and execution technologies with native service-centric routing capabilities throughout the network to provide a service-oriented network ecosystem

Fine grained service placement

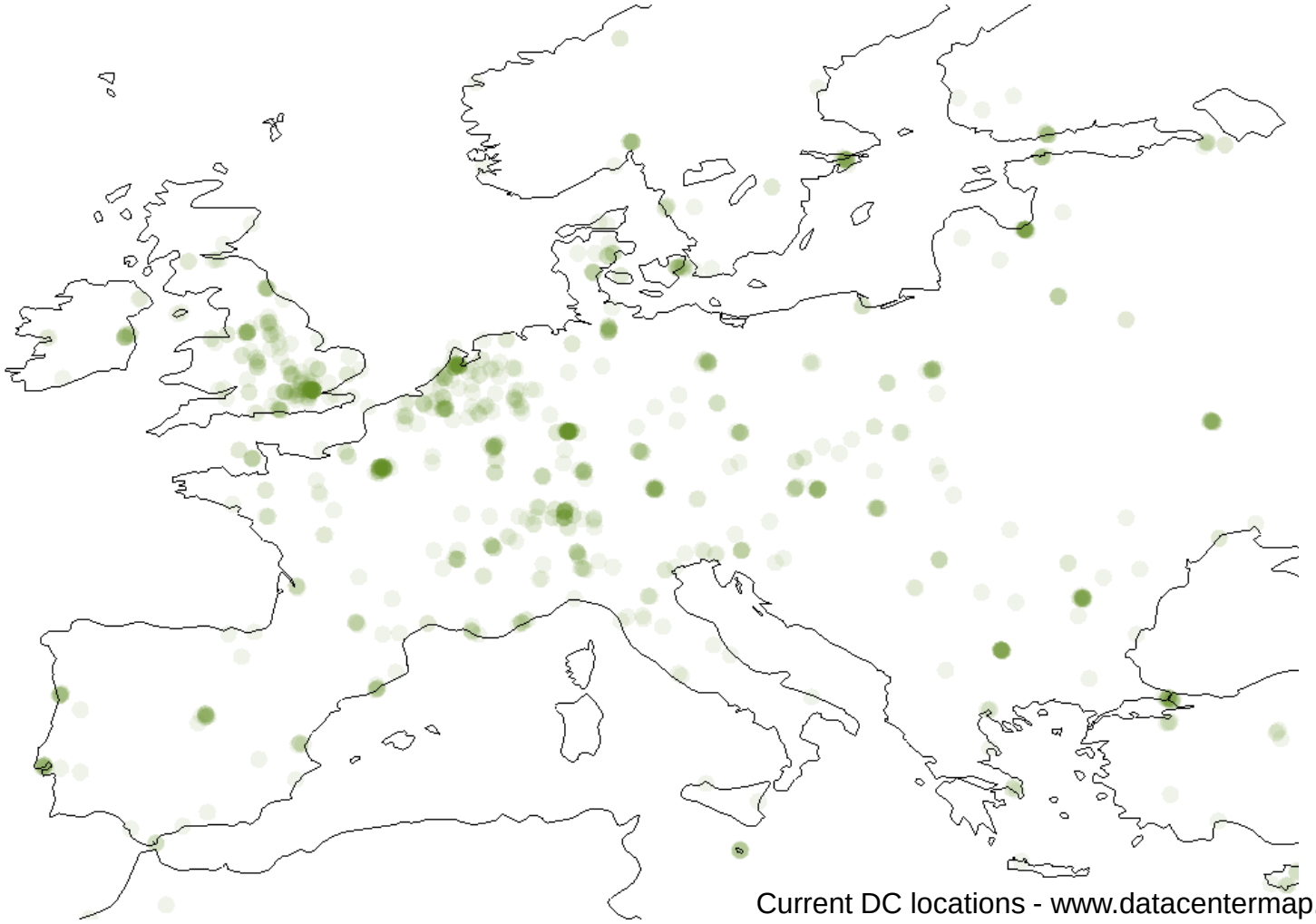
Fine grained service placement



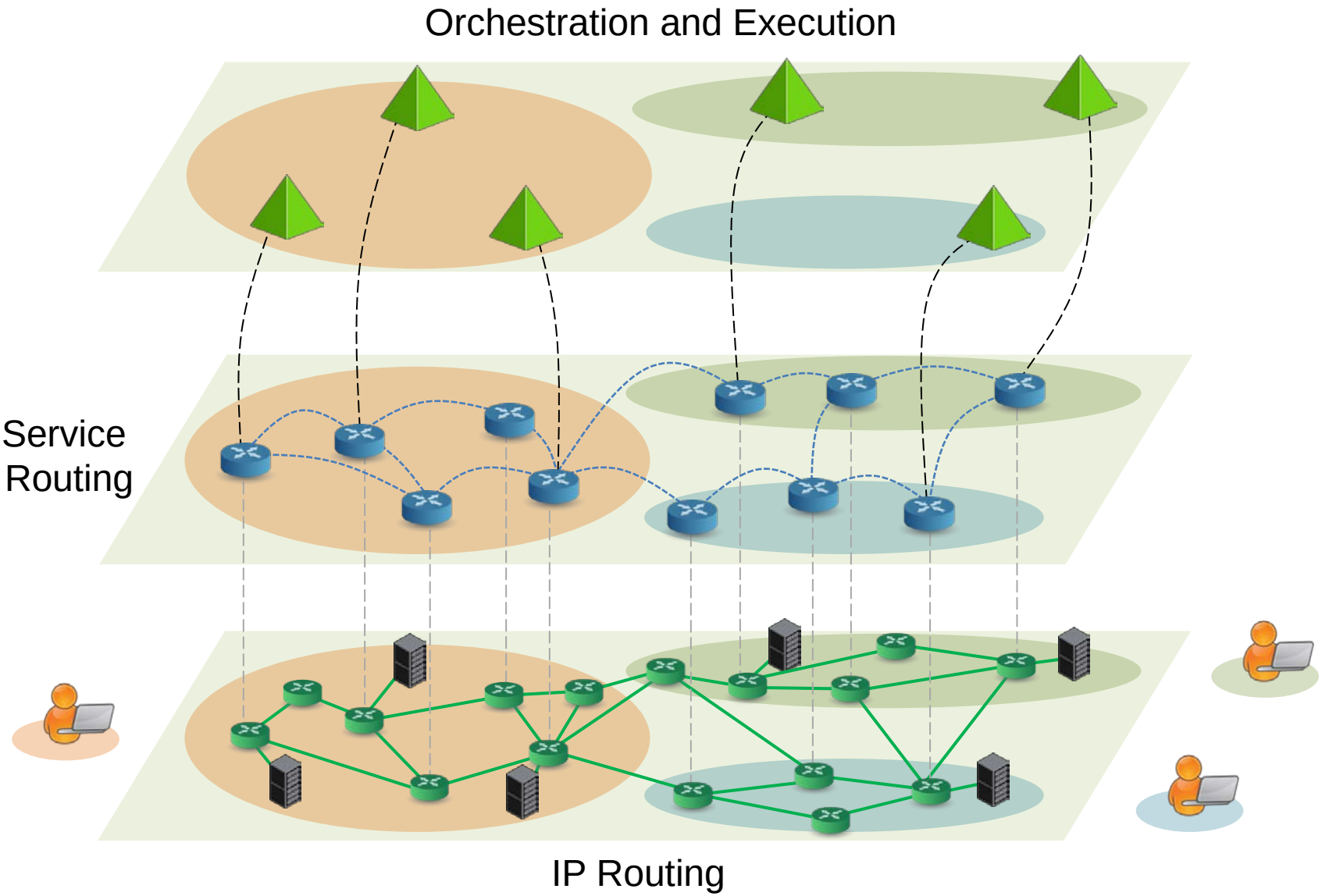
Current DC locations - www.datacentermap.com

Fine grained service placement

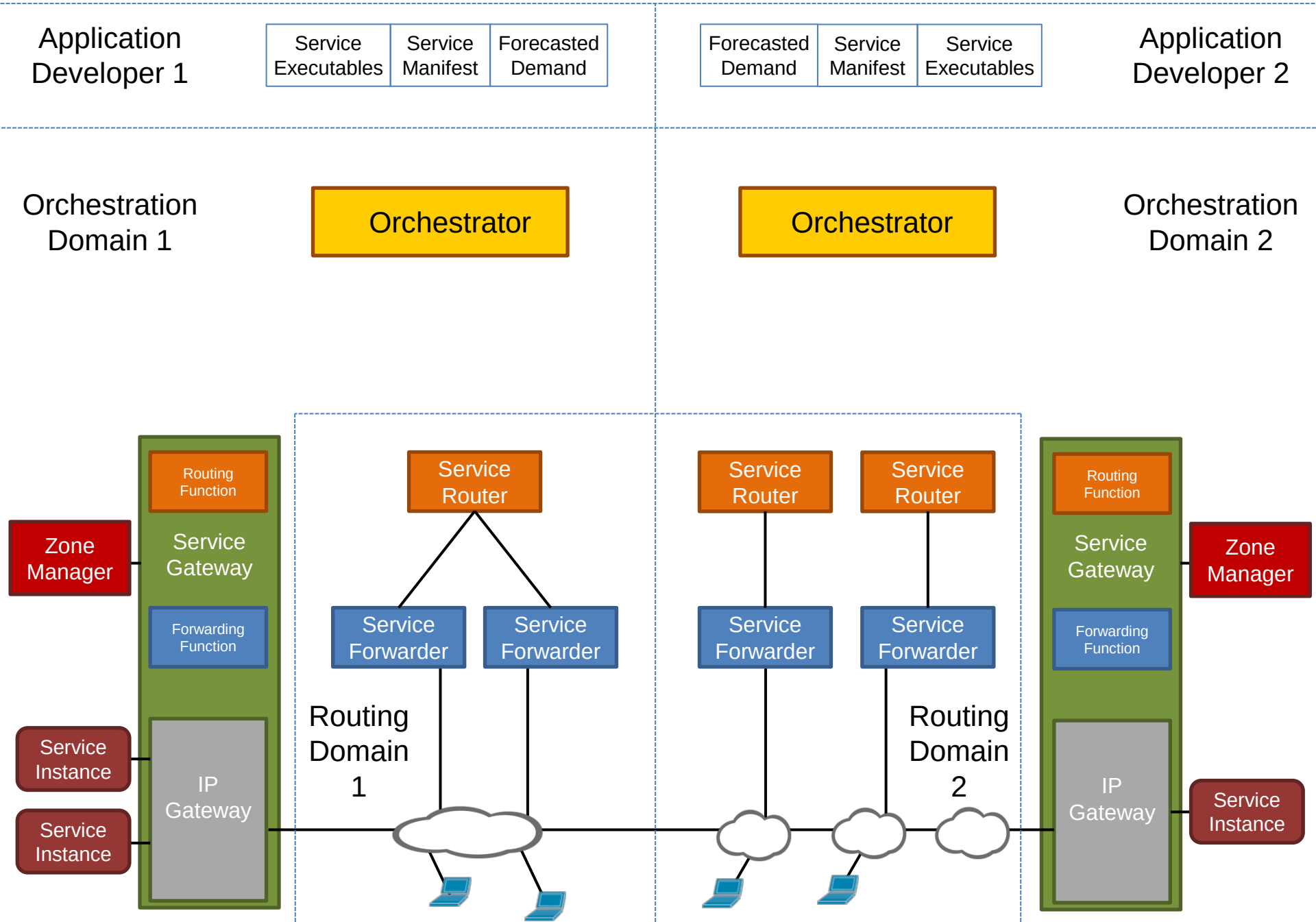
Fine grained service placement



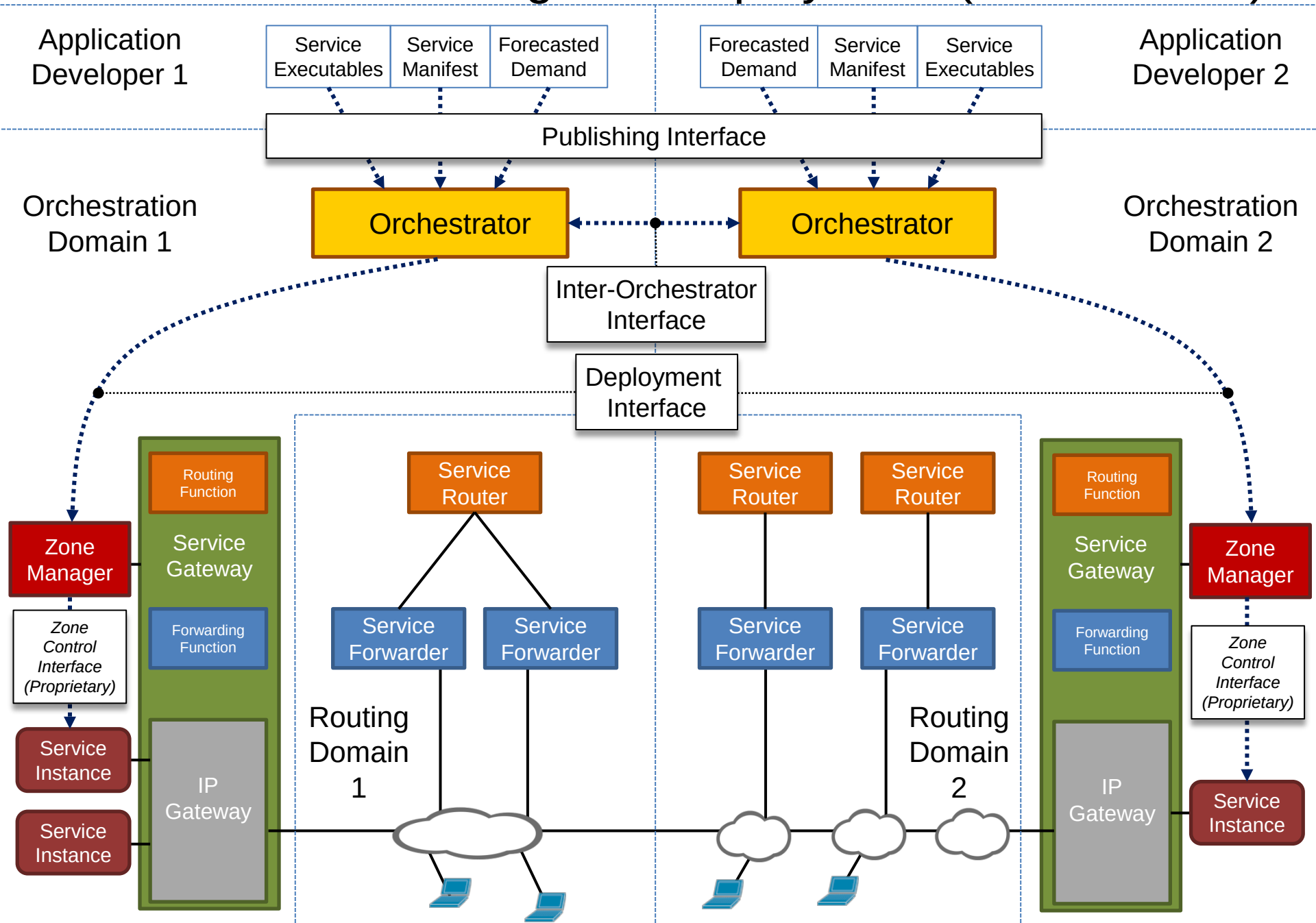
Service Oriented Networking Layers



FUSION Architecture



Service Publishing and Deployment (Instantiation)



Service Routing Plane

Application Developer 1

Service Executables | Service Manifest | Forecasted Demand

Forecasted Demand | Service Manifest | Service Executables

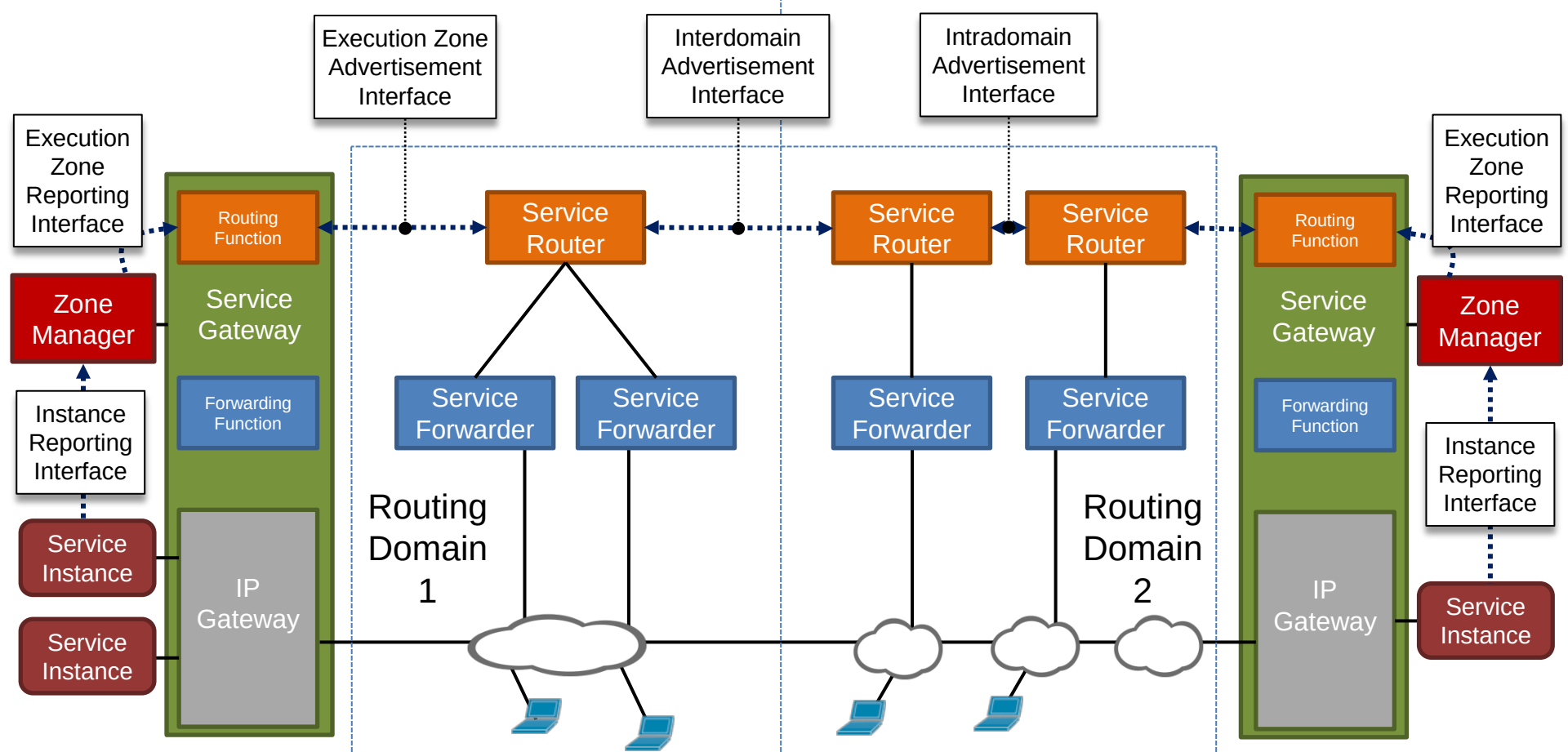
Application Developer 2

Orchestration Domain 1

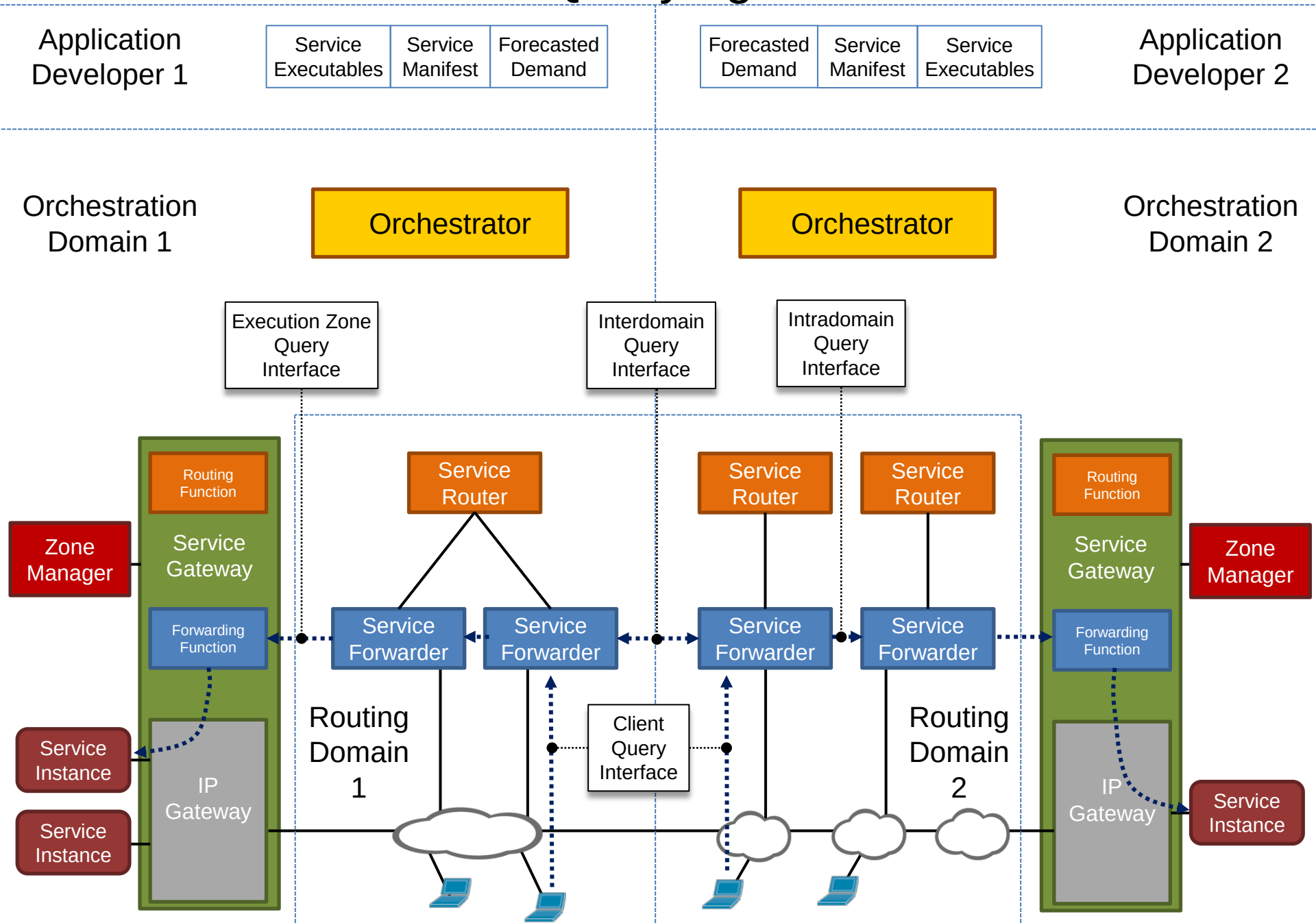
Orchestrator

Orchestrator

Orchestration Domain 2



Service Querying/Invocation



Service Delivery

Application Developer 1

Service Executables	Service Manifest	Forecasted Demand

Forecasted Demand	Service Manifest	Service Executables

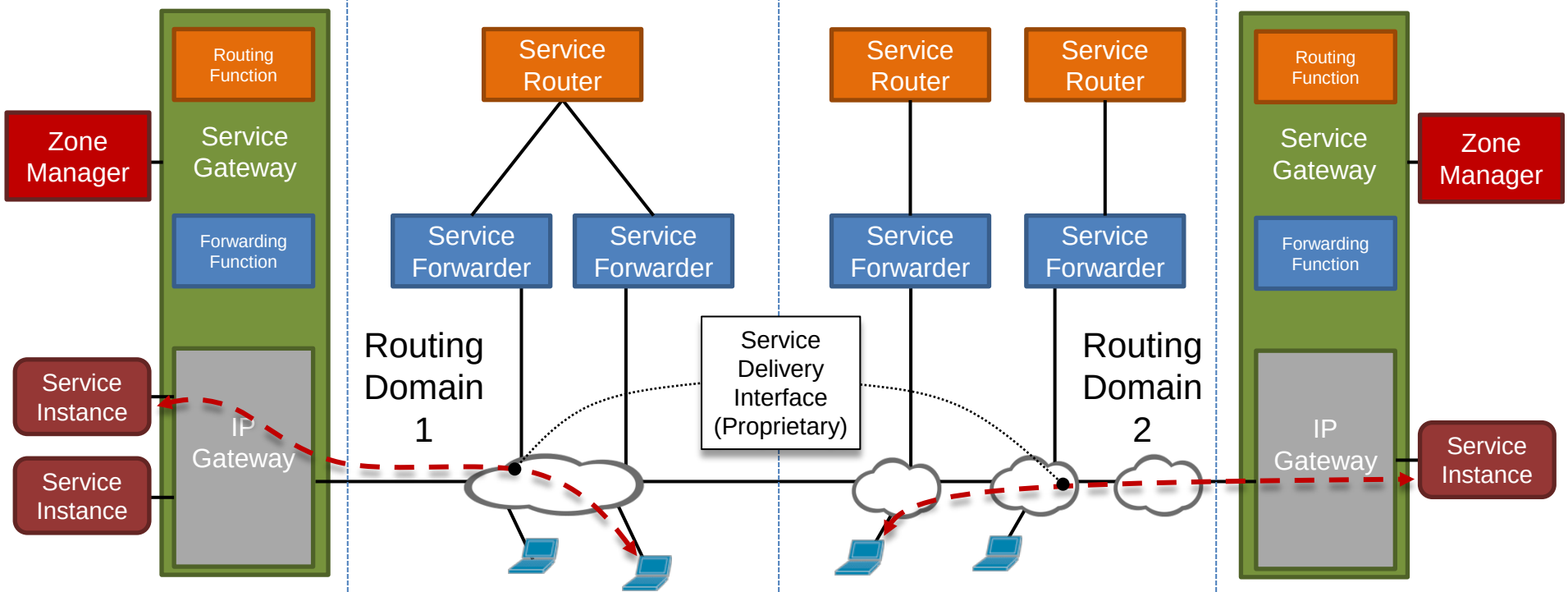
Application Developer 2

Orchestration Domain 1

Orchestrator

Orchestrator

Orchestration Domain 2



Research Challenges

- Optimising the placement and replication of service instances
  - Large number of fine grained execution nodes
  - According to user demand patterns and network performance
- Routing/forwarding of service invocations based on service names
  - Scalability of exchange of routing information for a large number of services
  - Multi-metric anycast routing, utilising network (e.g. latency) and service-layer metrics (e.g. server load)
- Techniques for instantiation and selection of SDN and NFV functions for flexibly deployed networks
- Extension of SDN concepts for edge ISP/DC network resource allocation/management under the control of service routers for service-specific data-plane treatment

FUSION Partners

- University College London, UK
- Alcatel-Lucent Bell NV, Belgium
- Telekomunikacja Polska S.A., Poland
- Spinor GmbH, Germany
- iMinds, Belgium

www.fusion-project.eu