DESIRE6G

TOWARDS EXTREME NETWORK KPIS WITH PROGRAMMABILITY IN 6G

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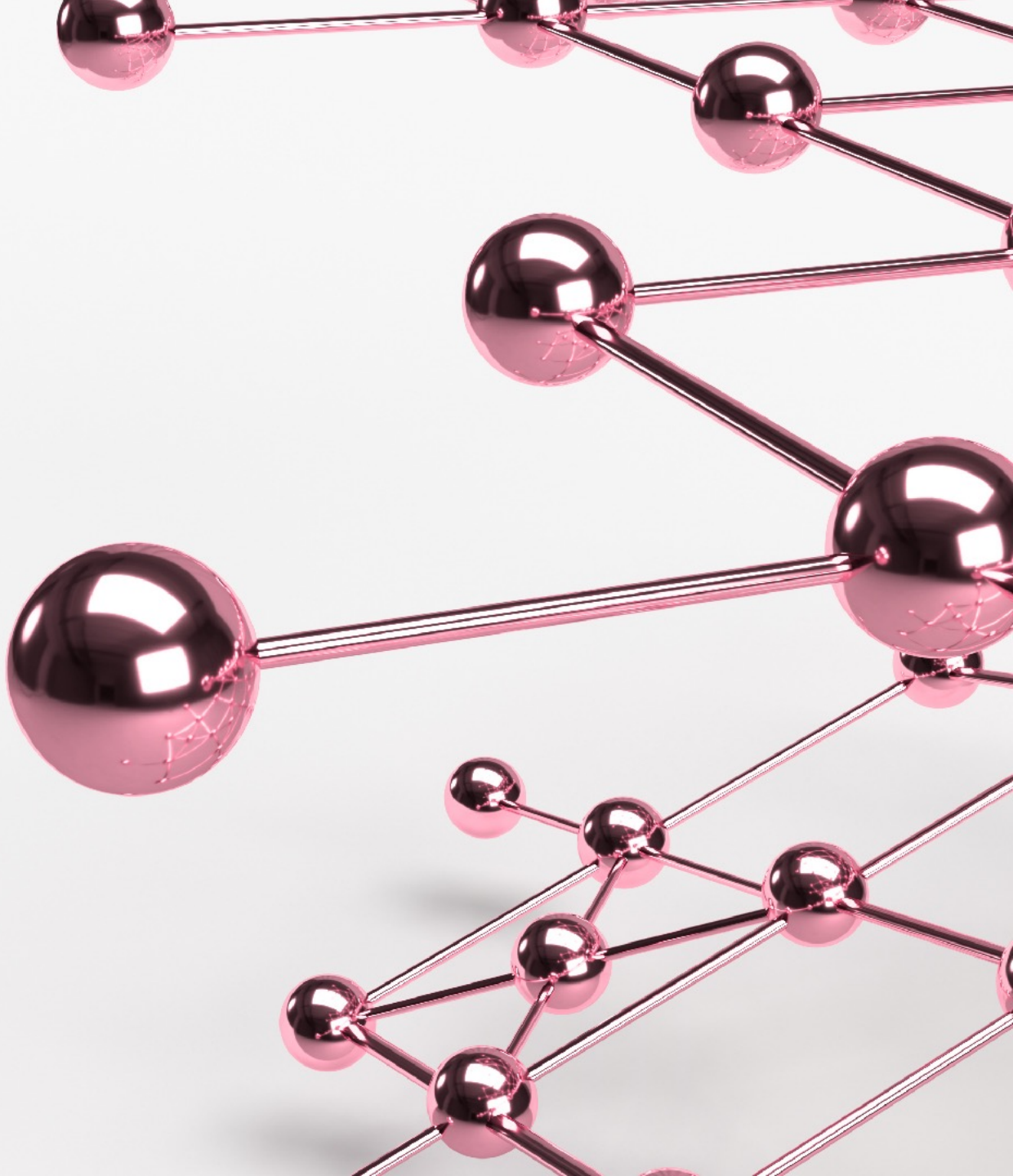

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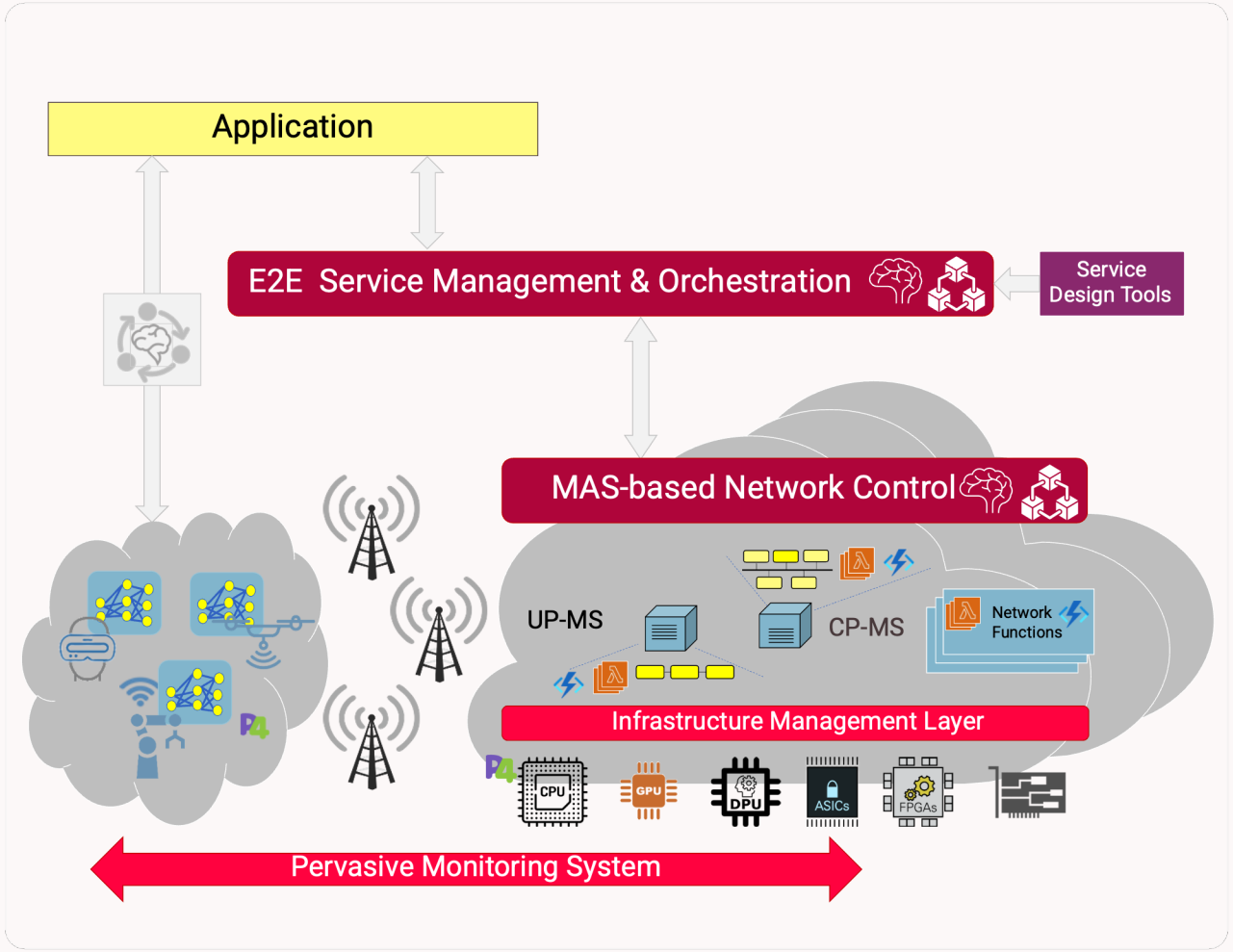
6GSNS

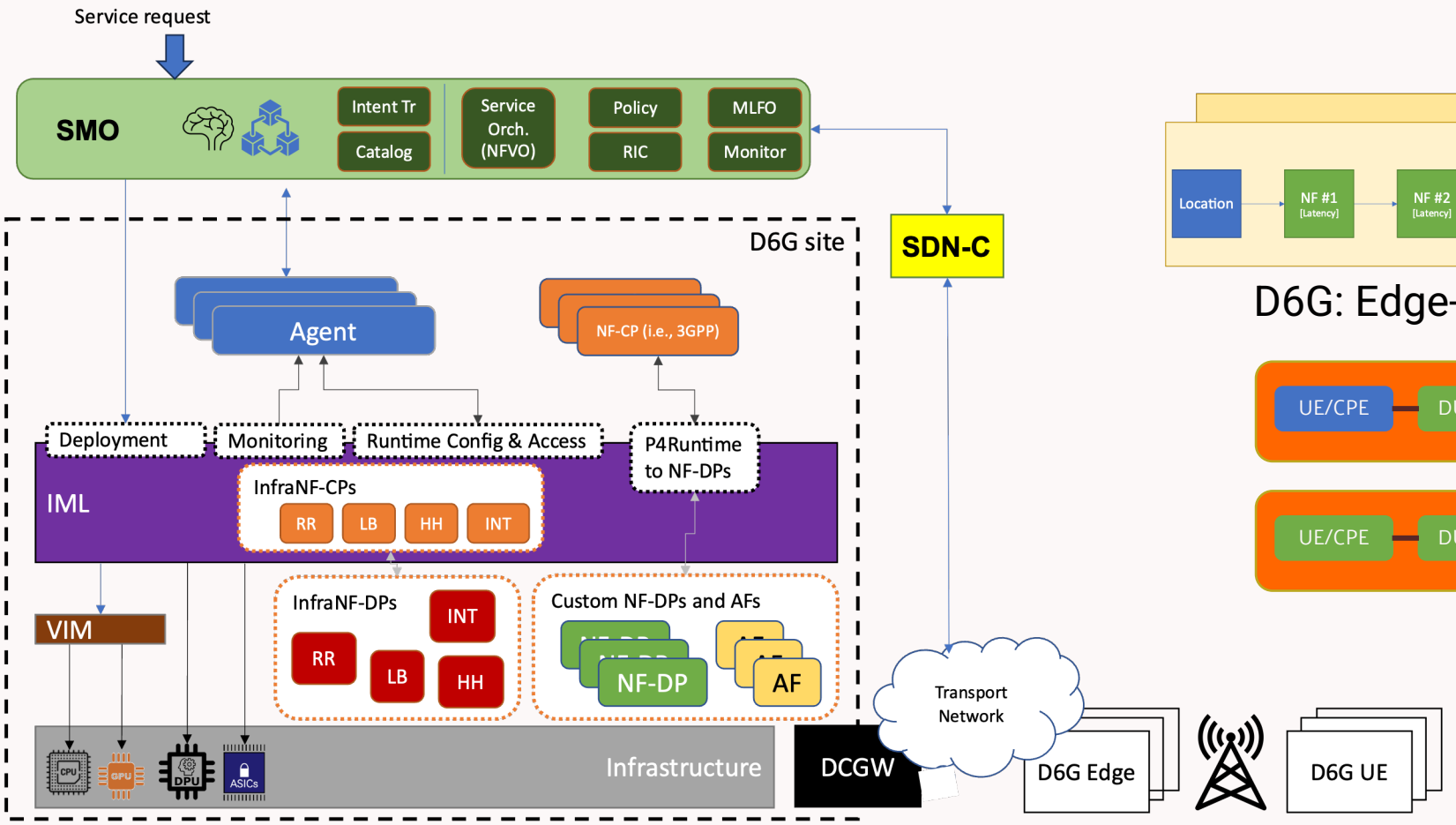
D6G KEY INNOVATIONS

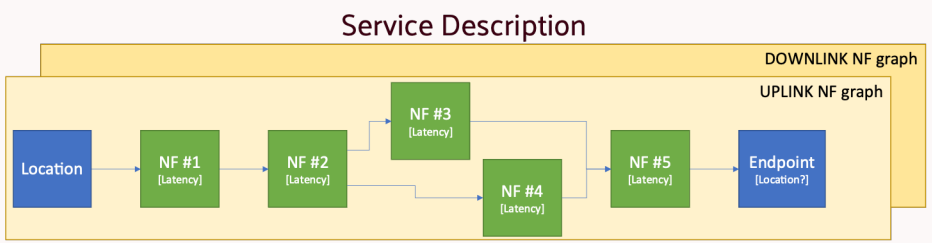


Innovation

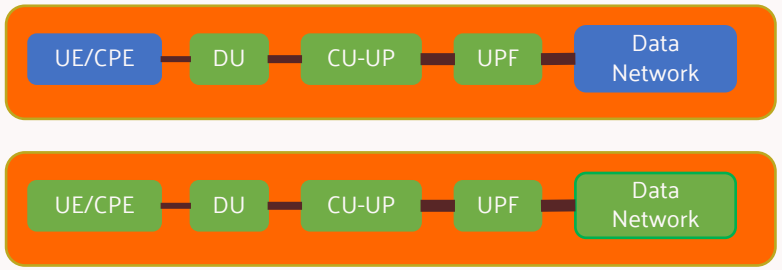
- xURLLC services
- Edge Intelligence
- Intent-based orchestration
- Blockchain-based federation
- Secure distributed intelligence
- RAN-core convergence
- Edge-to-Cloud continuum
- Serverless architecture
- E2E programmable data plane
- Multi HW acceleration
- E2E network telemetry

D6G ARCHITECTURE AND SERVICES





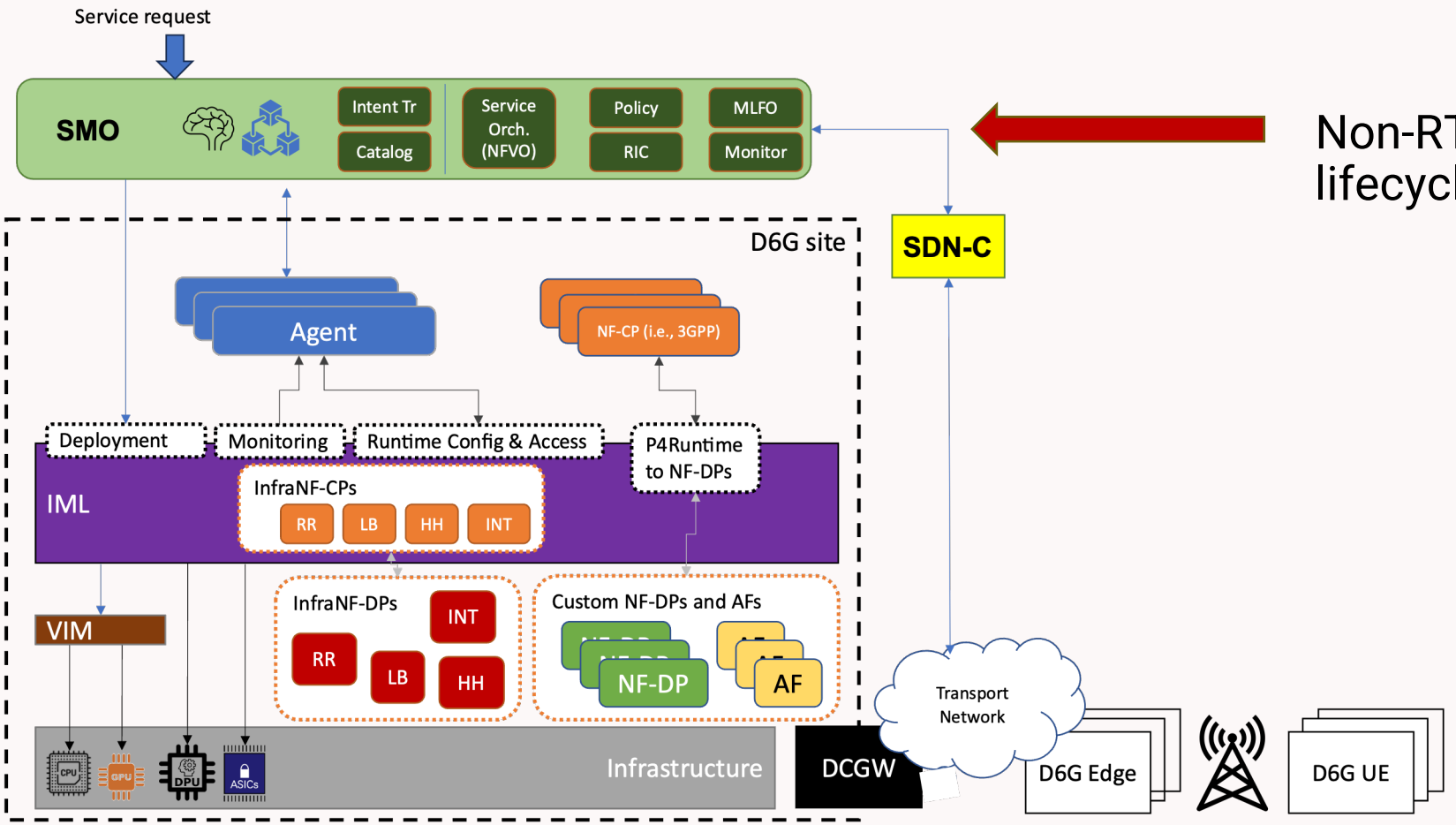
D6G: Edge-to-edge vs End-to-end services



ETSI ZSM

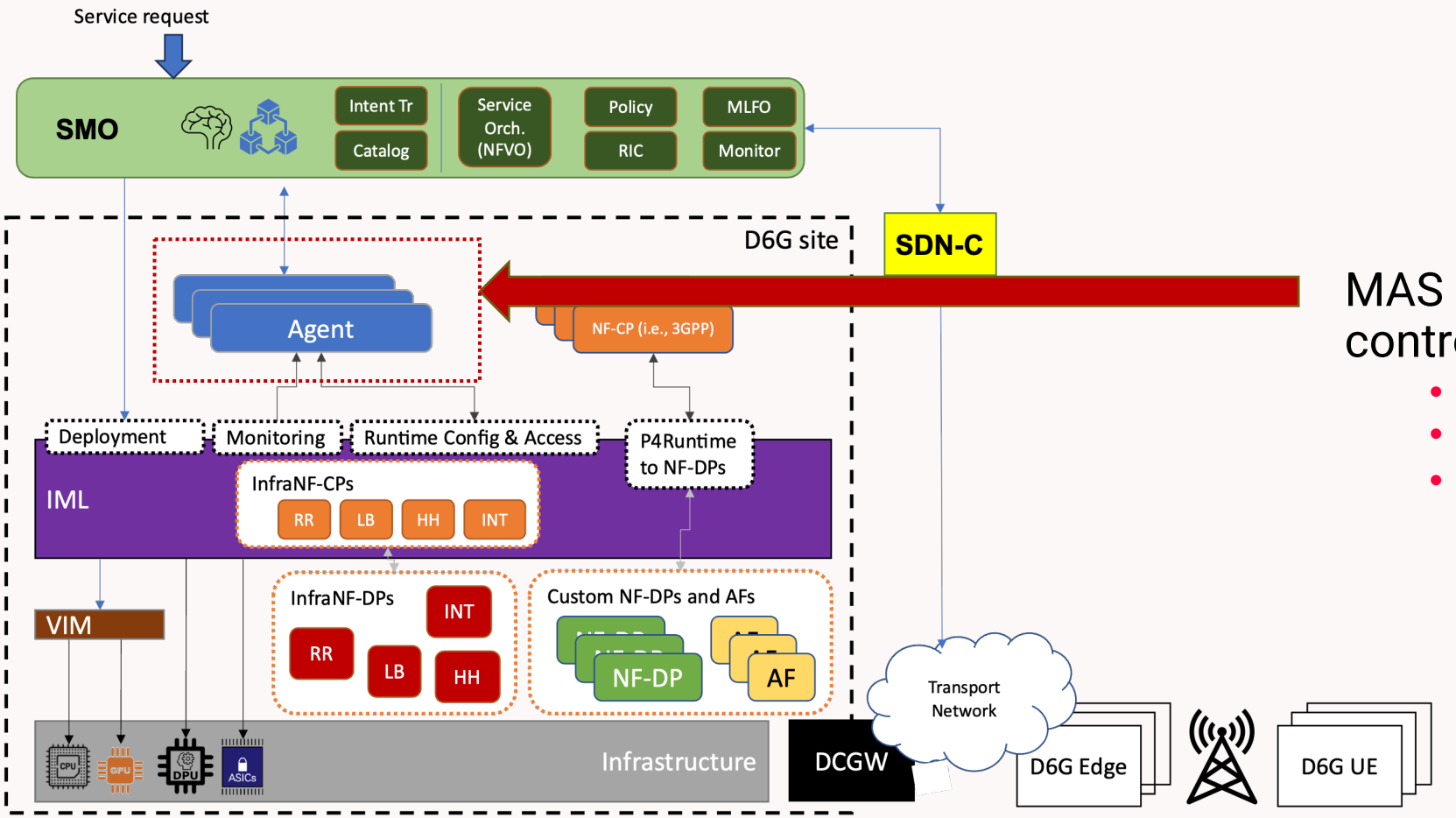
network slice: logical network that provides specific network capabilities and network characteristics, supporting various service properties for network slice customers

SERVICE MANAGEMENT & ORCHESTRATION



Non-RT intelligent E2E service lifecycle management

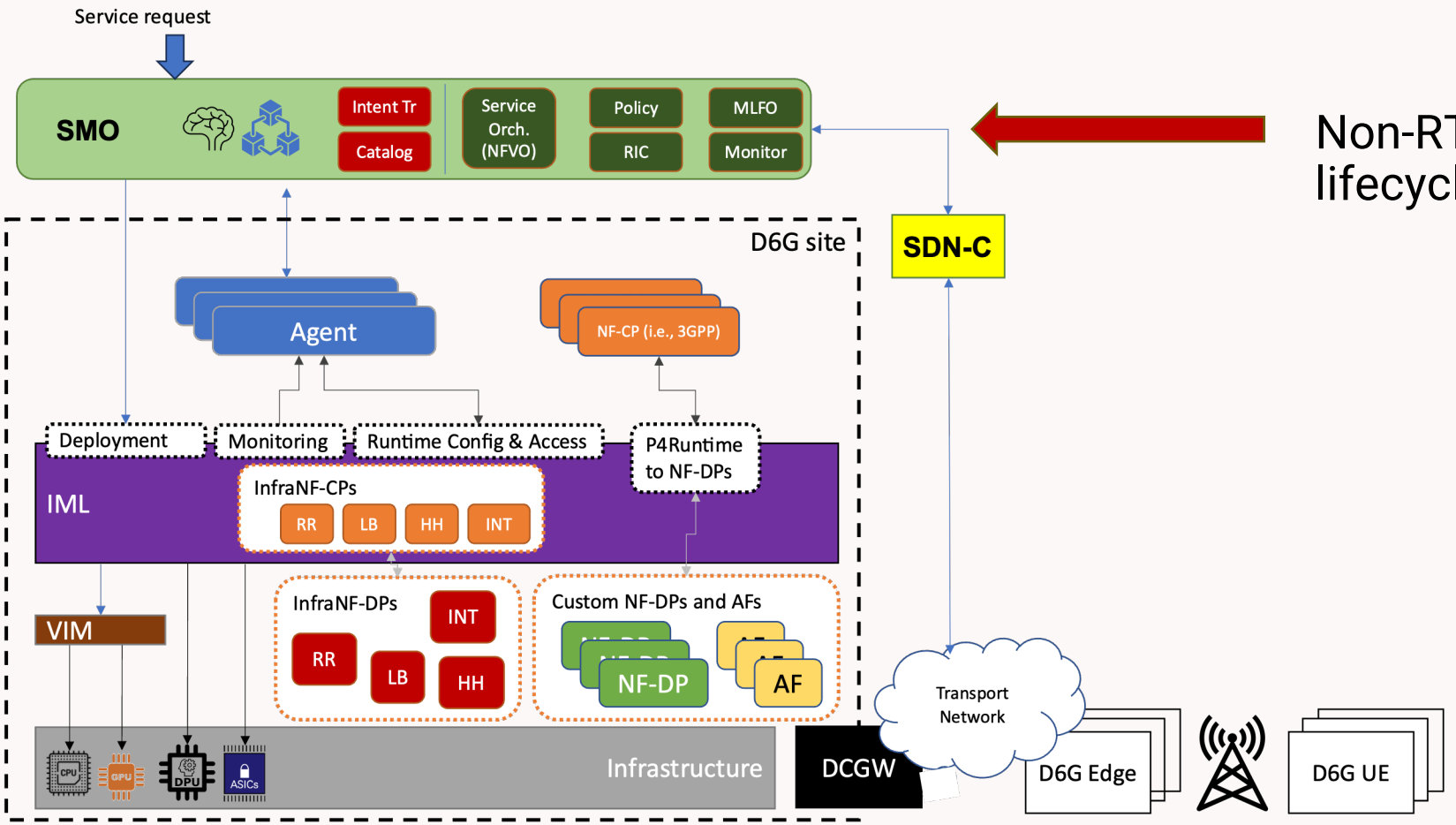
MULTI-AGENT SYSTEM



MAS enables NRT distributed control

- Telemetry collection
- AI-driven decision making
- Actuation / reconfiguration

SERVICE MANAGEMENT & ORCHESTRATION



Non-RT intelligent E2E service lifecycle management

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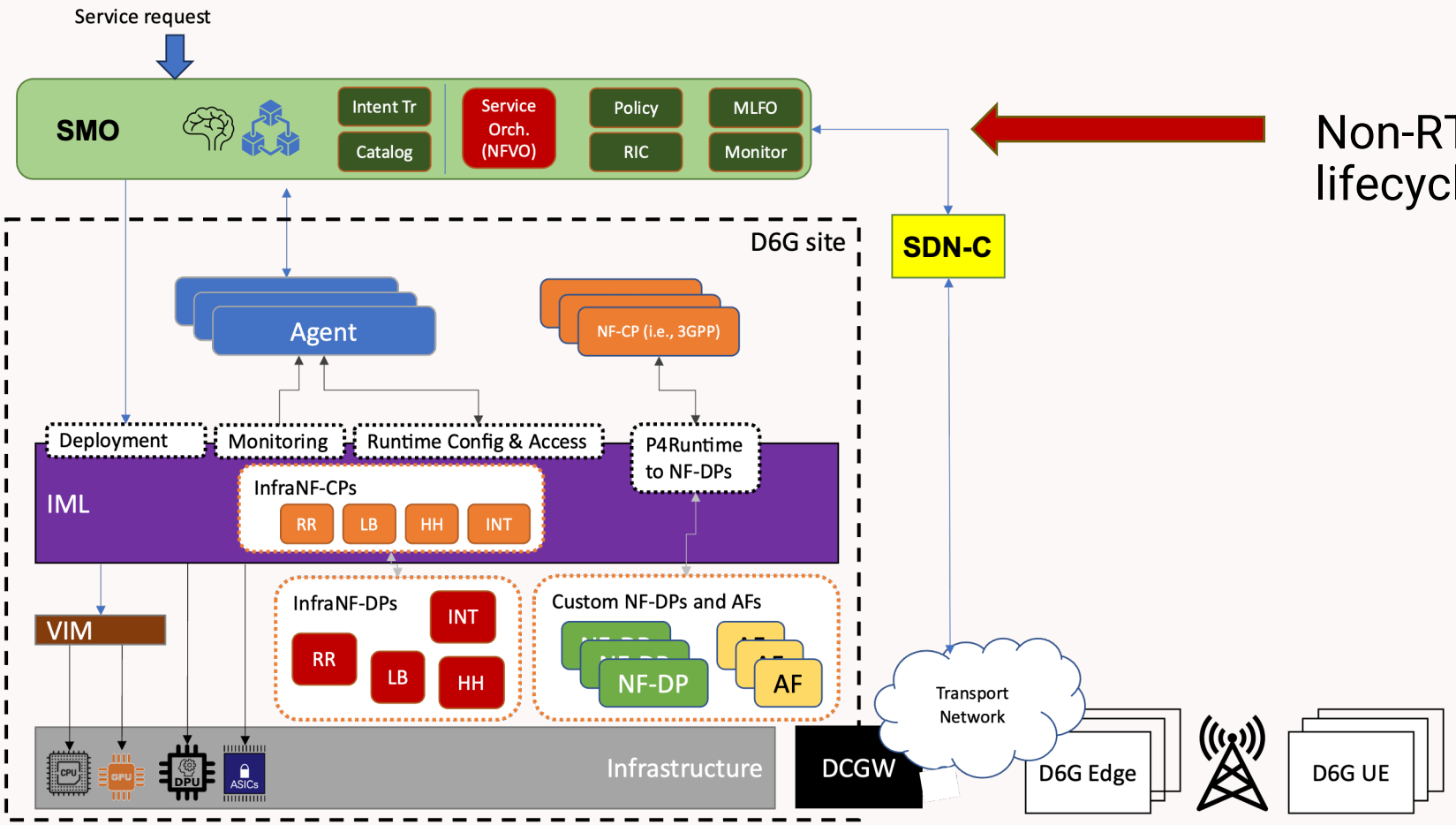

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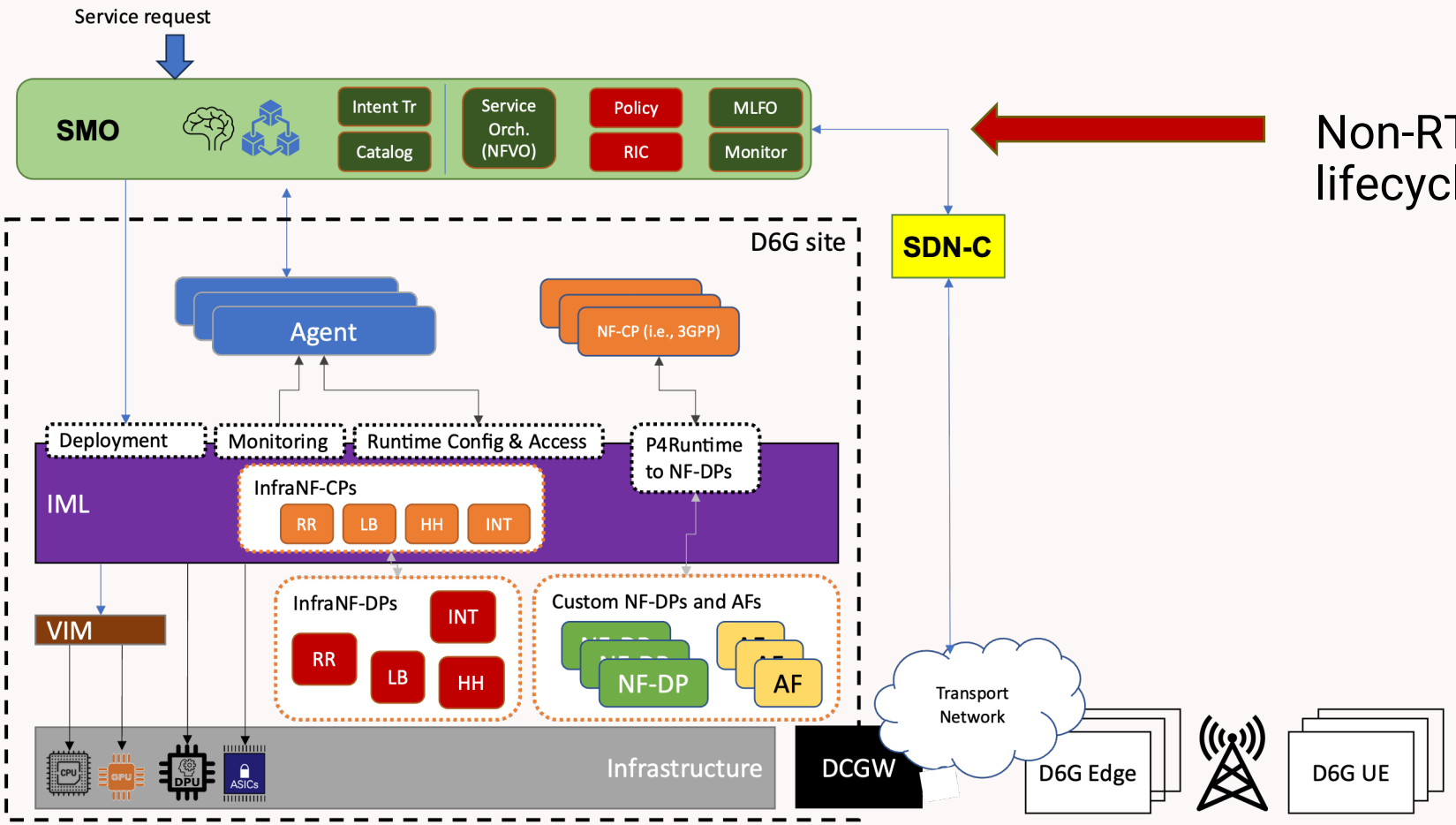

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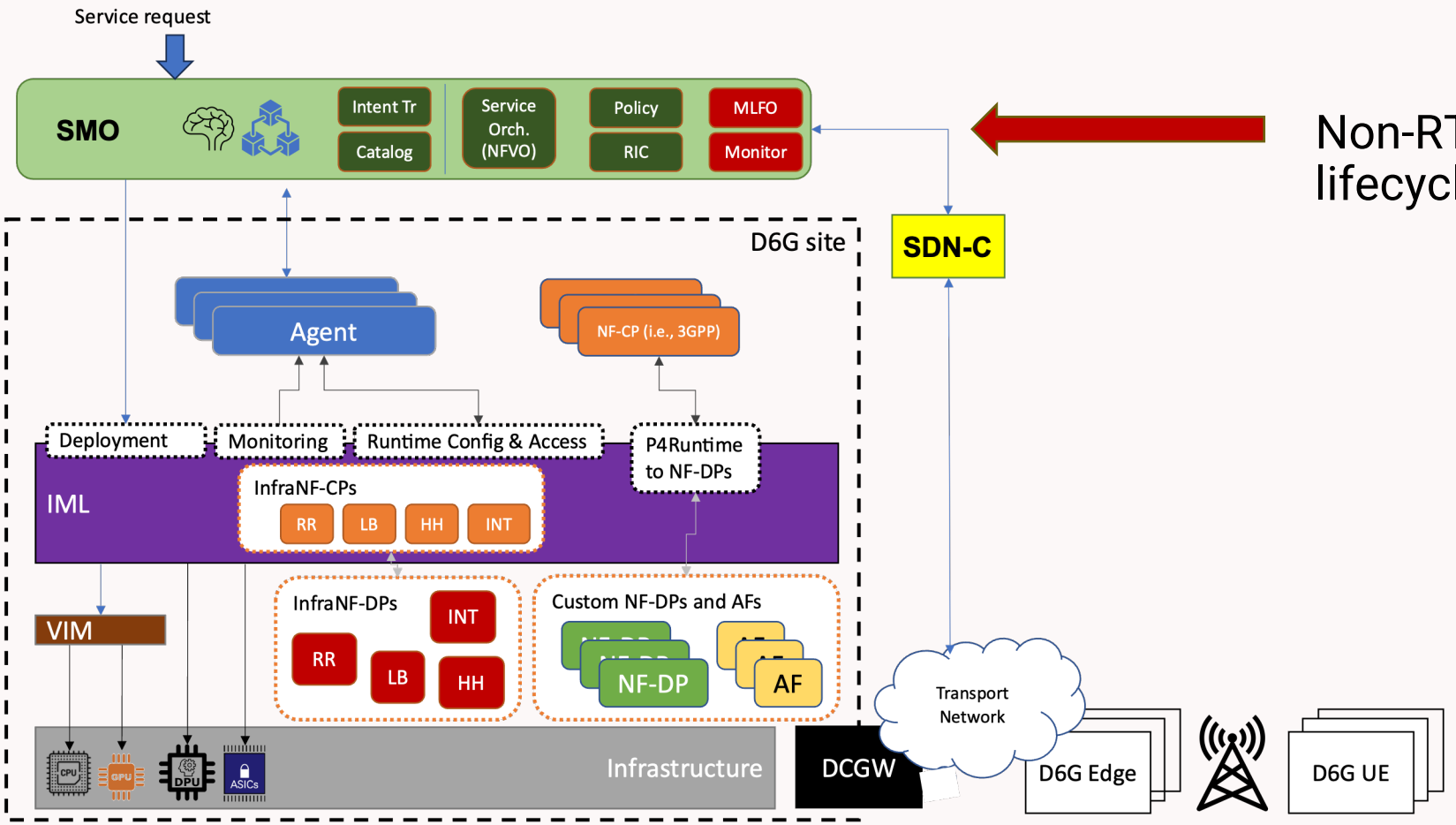
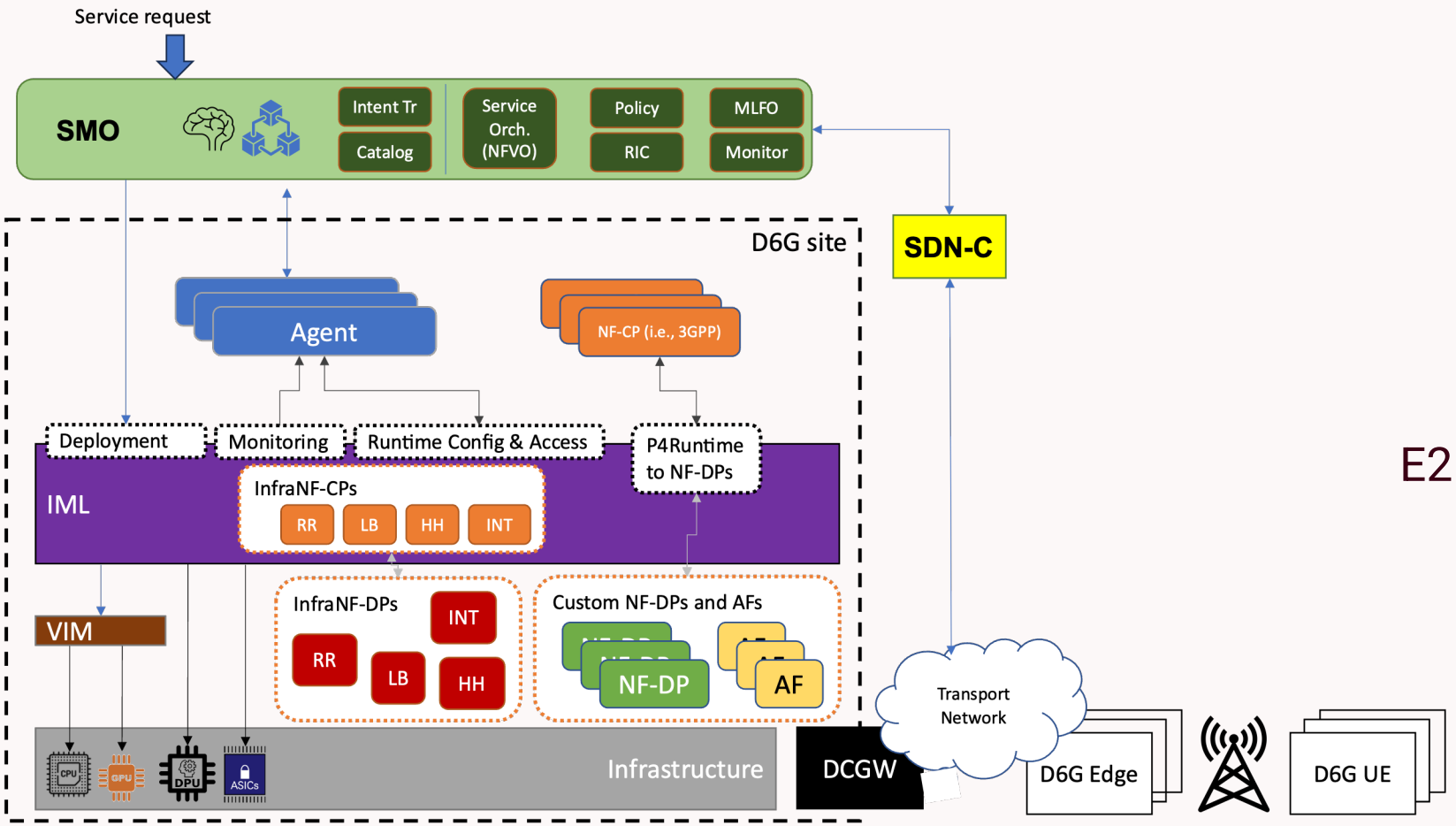


Non-RT intelligent E2E service lifecycle management

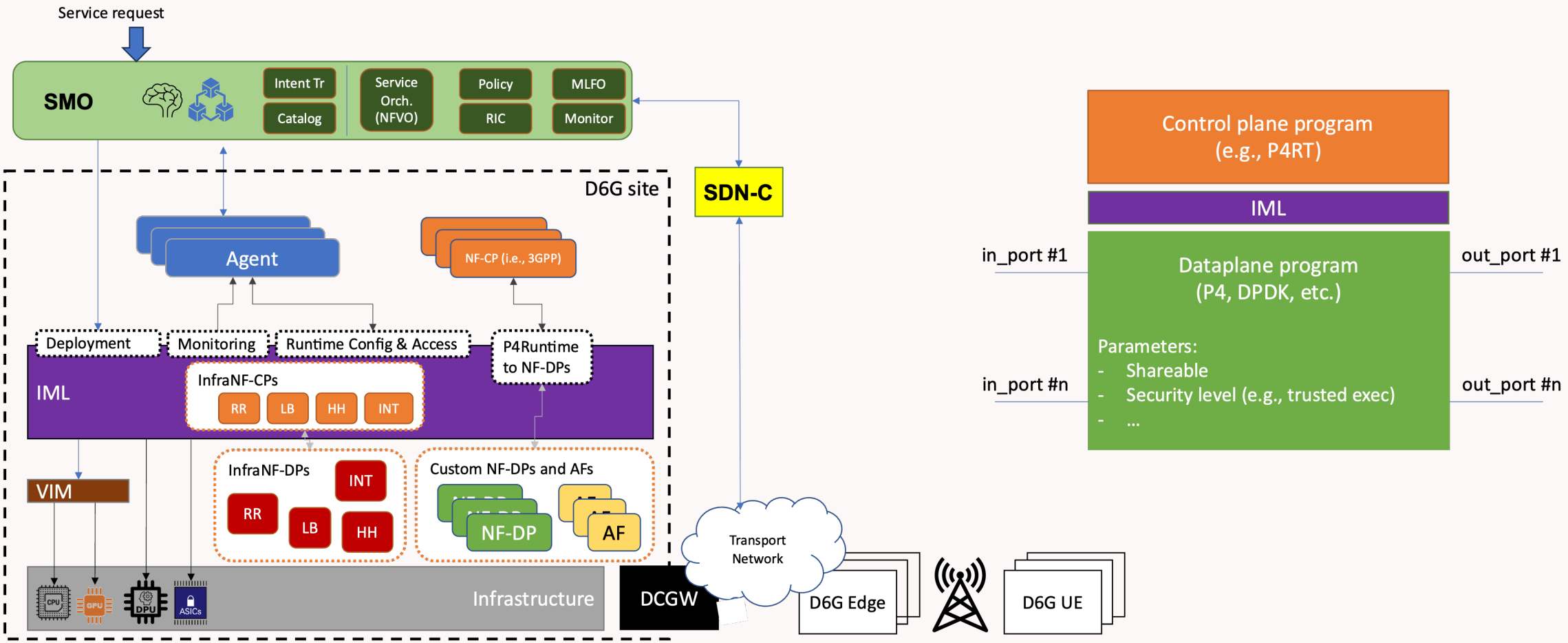
PROGRAMMABLE DATA PLANE



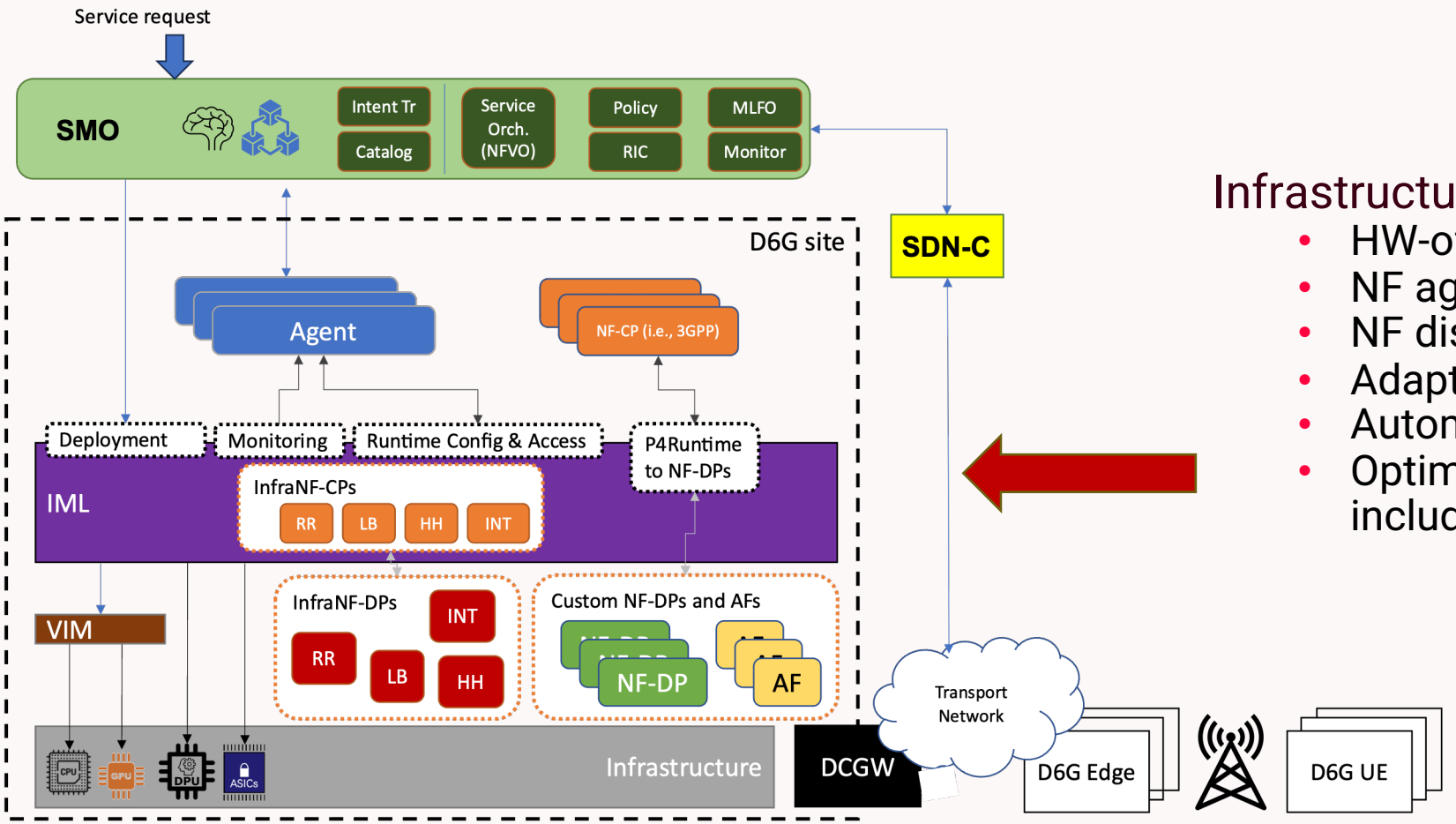
E2E programmable data plane

- Flexible, customized packet processing operations and protocol support
- (In band) Network Telemetry

PROGRAMMABLE DATA PLANE



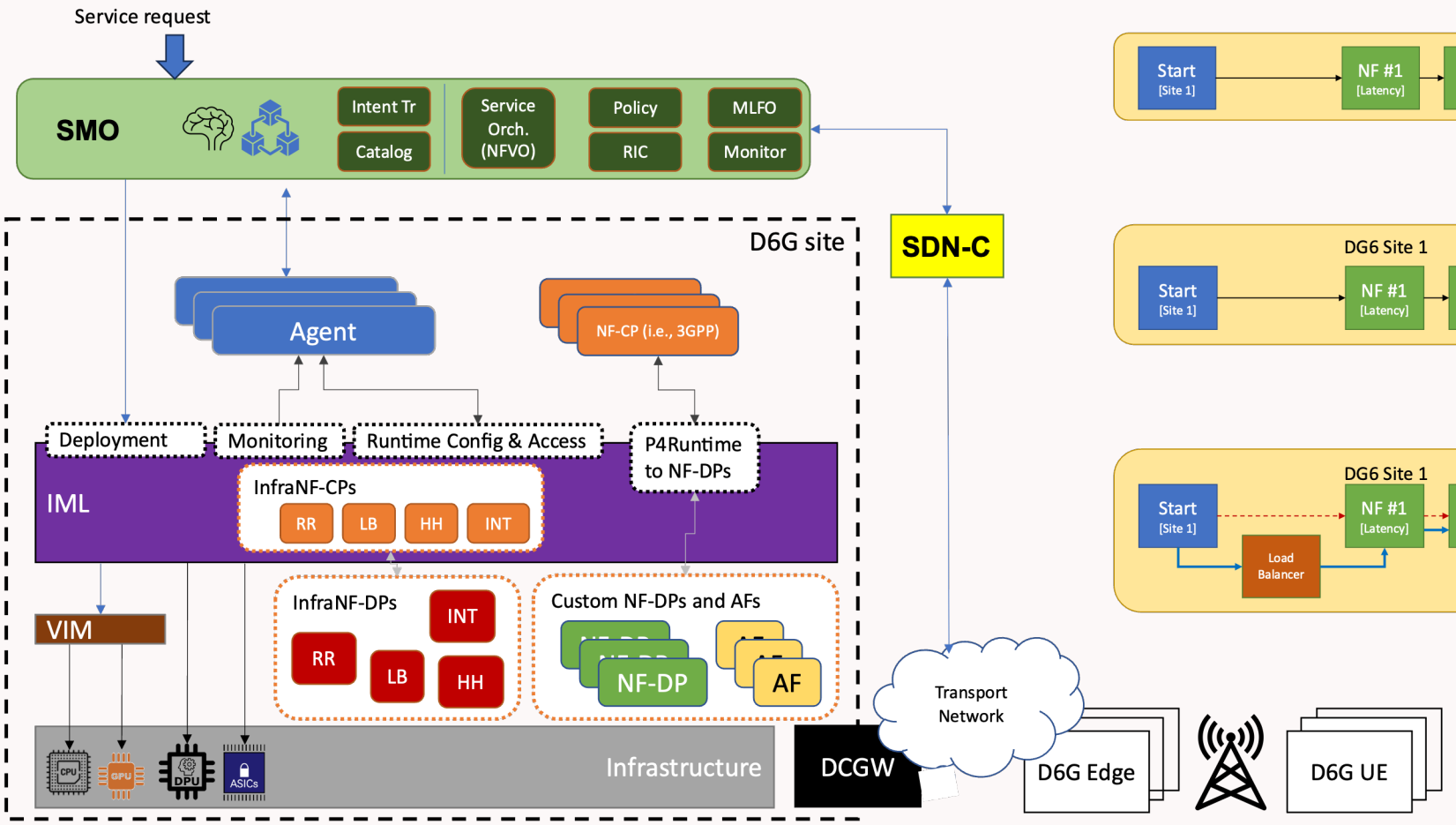
INFRASTRUCTURE MANAGEMENT LAYER

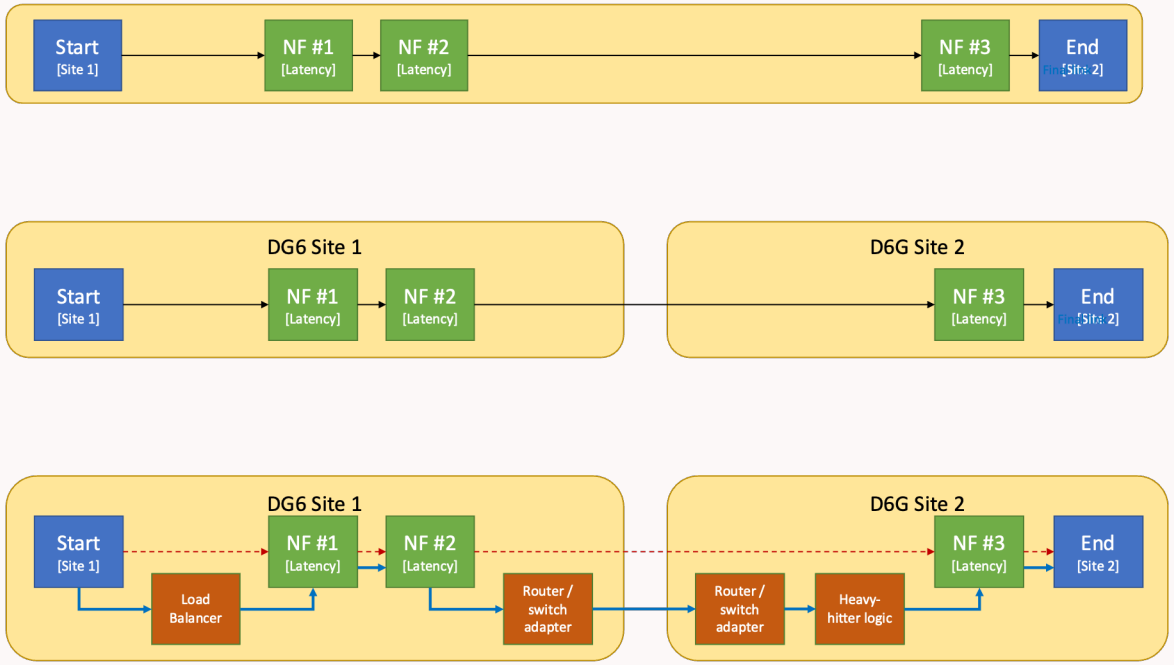


Infrastructure Management Layer

- HW-offload in CP-agnostic way
- NF aggregation with CP separation
- NF disaggregation
- Adaptation to non-PDP domains
- Automatic heavy-hitter offload
- Optimal routing between NF-DPs, including collocation optimization:

SERVICE DEPLOYMENT





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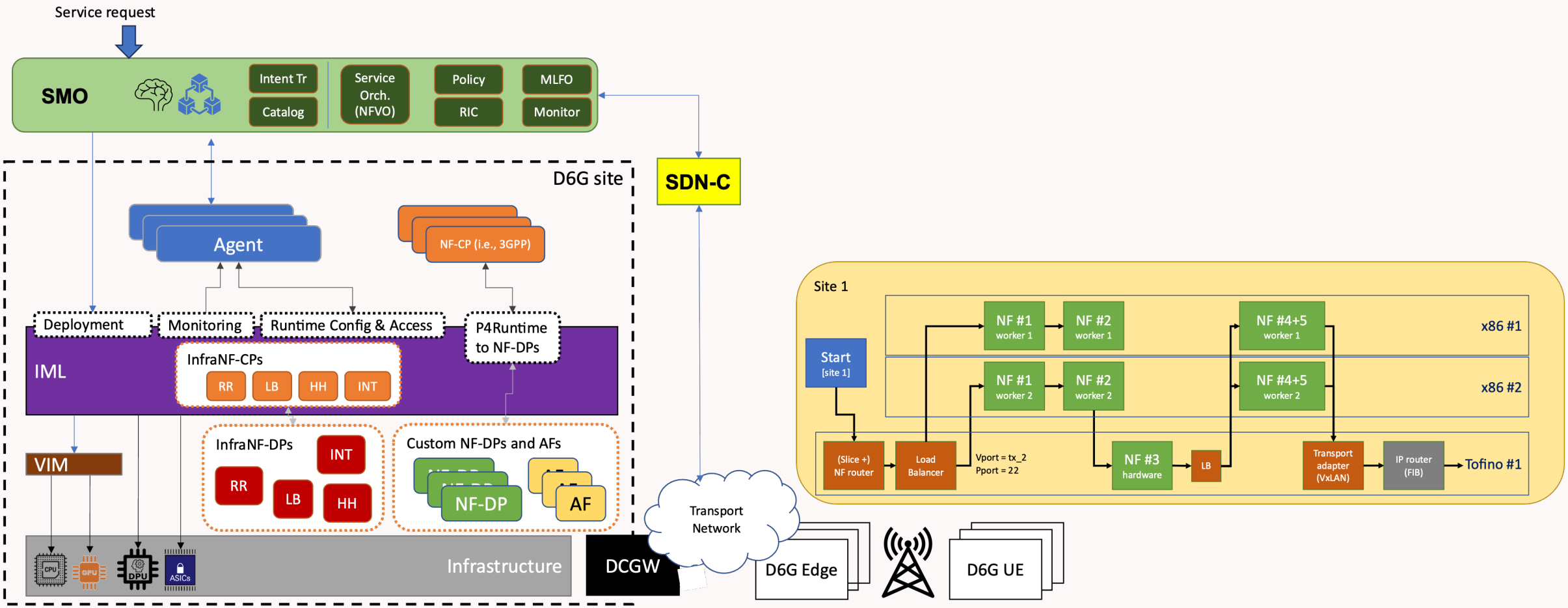
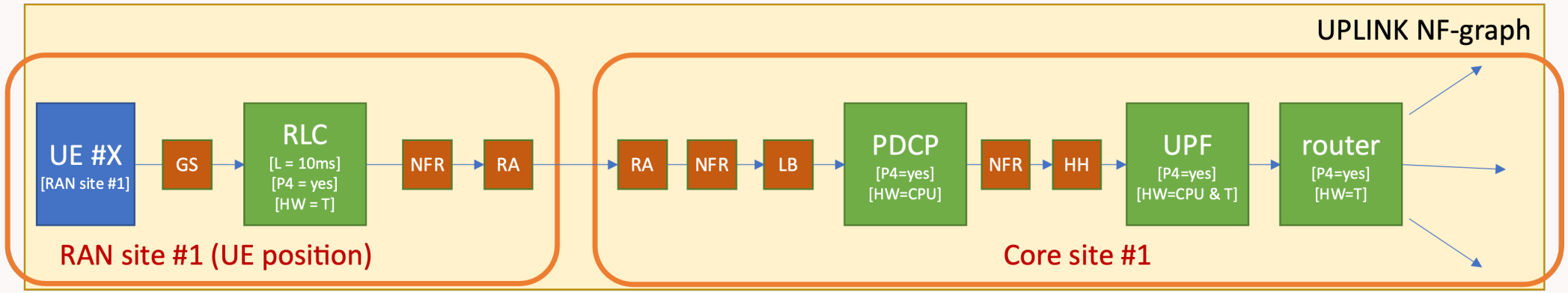


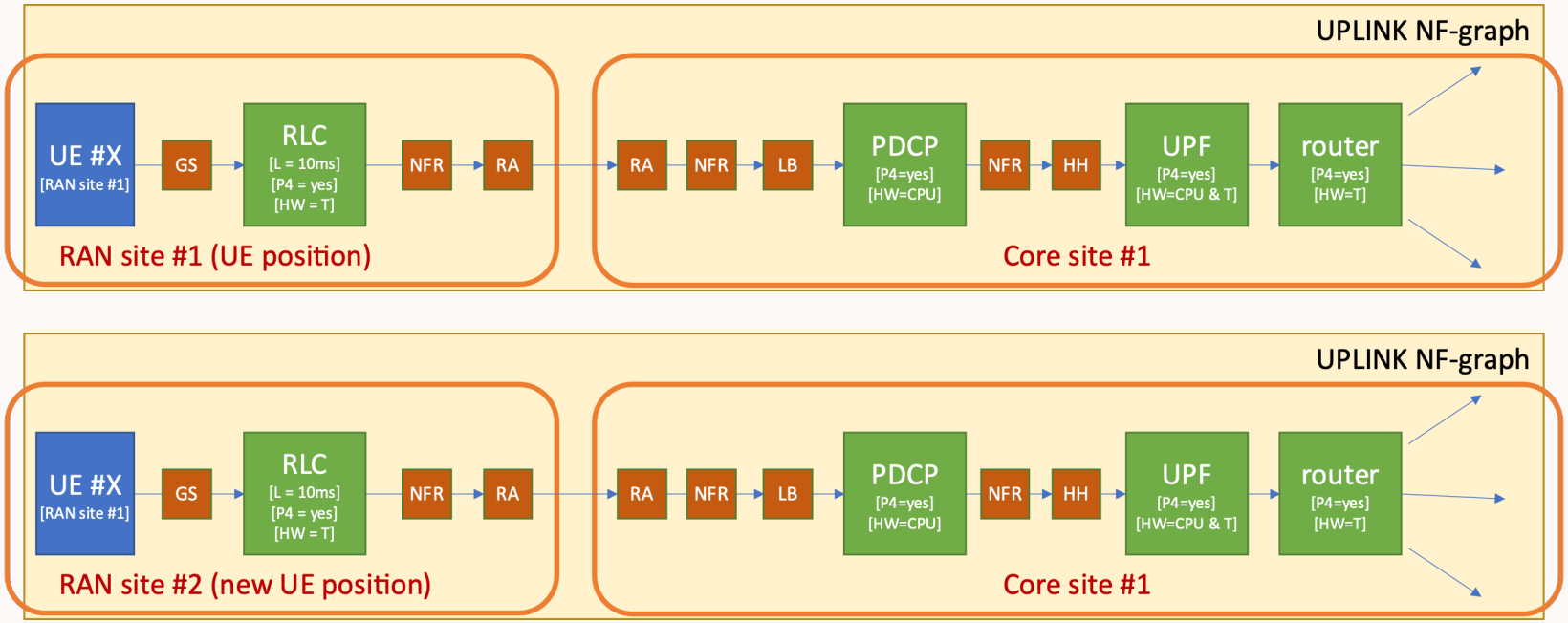
RUNTIME PROCEDURE: NF ROUTING



Two main components:

- Graph / service selector (**GS**) – at the entry of the D6G system
  - Incoming "normal" packet → D6G-internal packet
  - UE-specific or even service flow specific classification
  - Saves service ID and other routing/handling information (e.g., UE/RAN site location id, QoS tags, etc.) into packet header
- NF-routing (**NFR**) – between different network functions
  - Routes on {service id, in_port (previous NF's out_port)} pairs
  - Sends packet to next NF's in_port
  - Between sites it uses the routing adaptation (RA) logic to tunnel traffic to next site

RUNTIME PROCEDURE: HANDOVERS



UE moves to RAN site #2: RAN sub-graph has to “follow” ← can be independent from service logic

- Uplink is usually non-critical
- Downlink: either site-site routing learns new UE position (preferred)
  - … or it is set via CP

TAKE-AWAY

Simplicity and high-performance: they are not necessarily enemies!
In 6G we'll need both.

We answer the following questions:

- How to have cloud-native-like behavior also for user plane (PDP, IML)
  - Transparent acceleration
  - Automatic load balancing and heavy-hitter handling
  - These mechanisms are independent from the business logic / NF-CP
- How to maintain performance KPIs dynamically (MAS)
  - On-demand in-network telemetry
  - Multi-agent-based service optimizers
- How to offer simplicity towards users (SMO)
  - Intent-based, simple external APIs
  - Translation logic to create internal, more complex structures

DESIRE6G

THANKS!

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