IETF-119 MONM Side Meeting

Intent-Based Network Management Automation in 5G Networks
(draft-jeong-nmrg-ibn-network-management-automation-03)

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Problem Statement

- The goal of this draft [1] is to make a use case of IBN for 5G network management.
  - The common part of the definitions of Intent from IETF NMRG and 3GPP [2-6] is used for IBN.

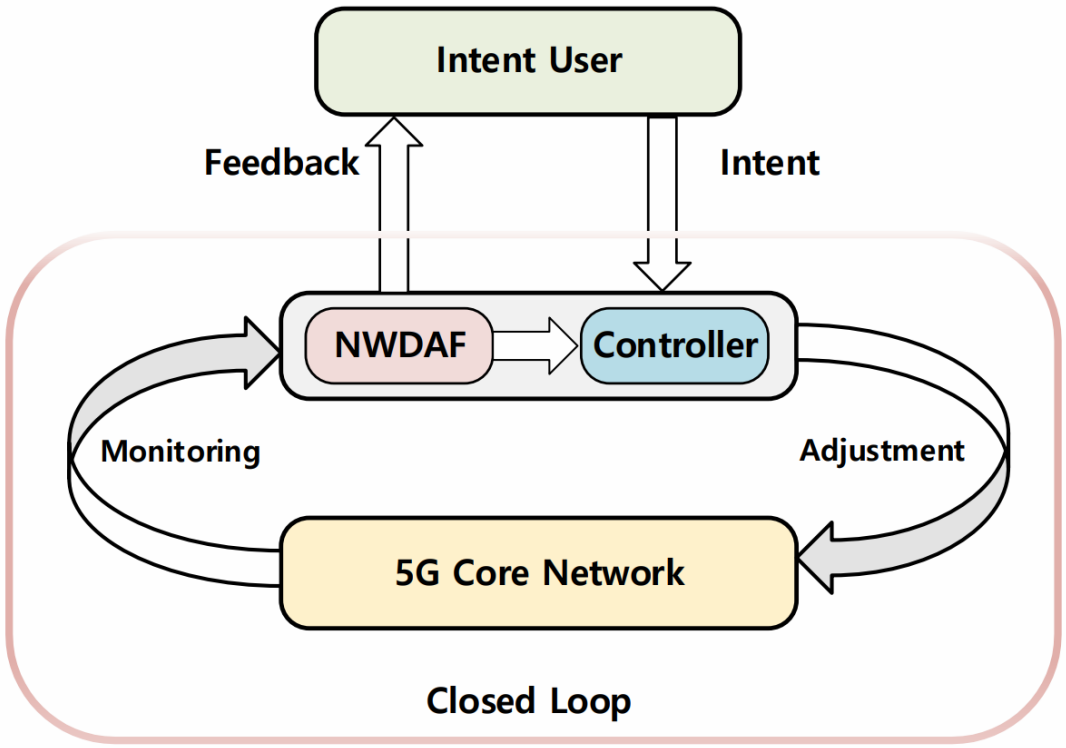
- The following work items will be investigated:
  - A framework for 5G intent-based network management,
  - A data model mapper between an intent data model and a policy data model,
  - An intent translator from an intent to a policy,
  - A closed-loop control for intent assurance, and
  - A network audit system for secure intent provisioning.

Suggestion for NMRG Use Cases

- NMRG can work for guidelines for an intent translator and closed-loop control mechanism for demands from other SDOs (3GPP, ETSI, ITU-T) such as
  - 5G core network management (e.g., network slicing, SRv6 routing, and fault recovery),
  - Internet of Things (IoT) device management, and
  - V2X vehicular network management (for terrestrial vehicles, Urban Air Mobility (UAM), and drones).
- NMRG can use the Security Policy Translator (SPT) of I2NSF WG as a reference:
  - https://datatracker.ietf.org/doc/html/draft-yang-i2nsf-security-policy-translation-15

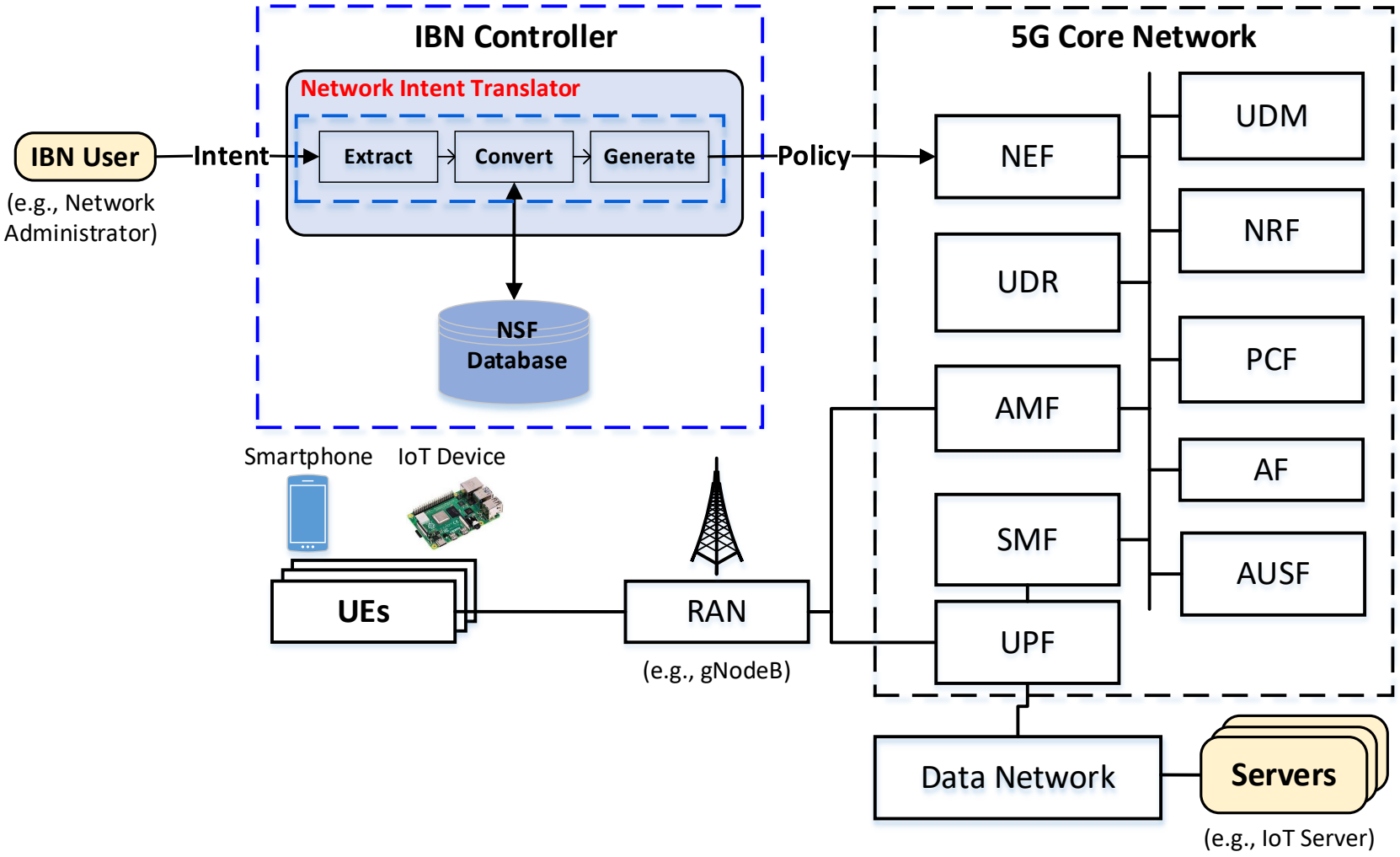
Intent Driven Management Service [3-6]

- Intent [2] can be used for management and control of closed-loop automation.
- Intent User provides an intent to the Controller, which will be translated to configure the 5G Networks.
- Then the NWDAF can monitor and collect data from the 5G Networks to analyze the performance.
- Feedback will be given to adjust the 5G Networks to ensure the performance is up to the intent of the user.



Intent-based closed loop system for 5G core networks

Intent-Based Network Management Automation (1/7)



- **Intent Translation**

1. Extract: Verify an intent [1,2] given by IBN User and extract data.
2. Convert: Transform the extracted intent data to the corresponding policy data and select the proper Network Functions to apply the policy.
3. Generate: Producing a policy in a JSON format to be delivered to the selected Network Function (e.g., NEF).

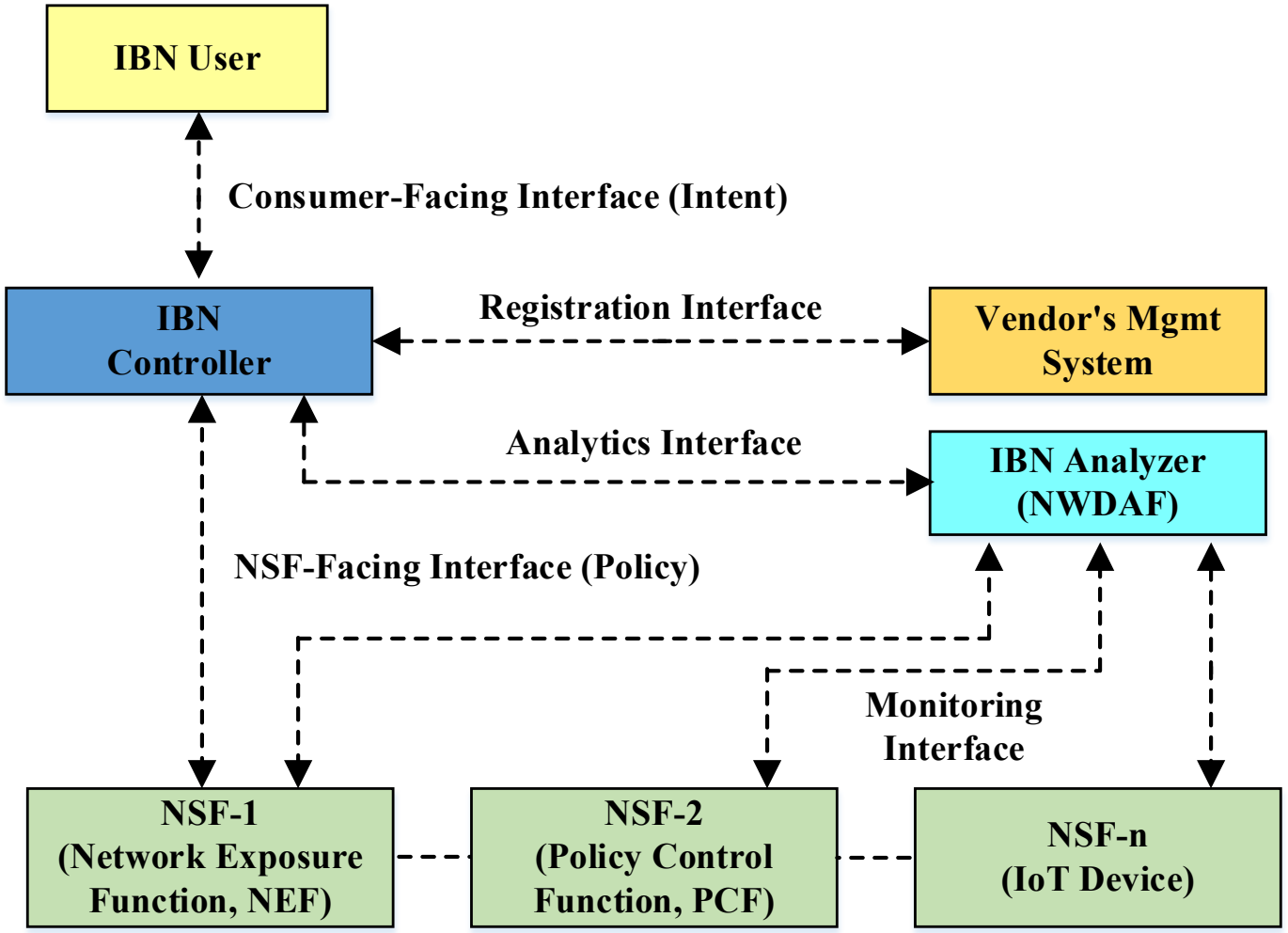
Intent-Based Network Management Automation (2/7)

- SKKU, SSU, and ETRI are working for an Intent-Based Network Management Automation for 5G Networks.
  - Intent-Based Network Management Automation in 5G Networks [1]
    - https://datatracker.ietf.org/doc/html/draft-jeong-nmrg-ibn-network-management-automation-03
  - They have an experience of having developed a Security Policy Translator (SPT) in the I2NSF WG:
    - https://datatracker.ietf.org/doc/html/draft-yang-i2nsf-security-policy-translation-15
    - [Open Source] https://github.com/jaehoonpaul/i2nsf-framework

- The above draft [1] specifies the following:
  - The Framework of Intent-Based Network Management in 5G networks.
  - A Network Intent Translator (NIT) (with data model mapper) from an intent to a policy.
  - A Network Audit System for remote attestation of network functions
  - A Use Case of IoT device data aggregation in 5G networks

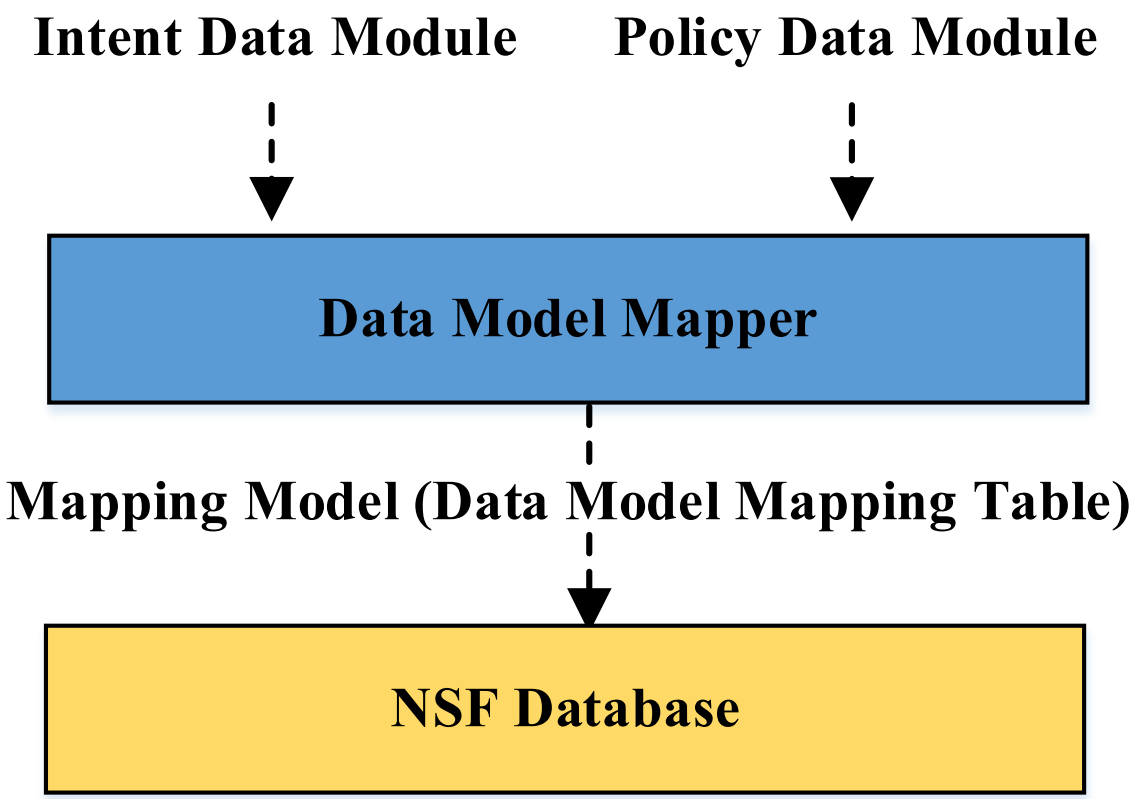
Intent-Based Network Management Automation (3/7)

- 5G Intent-Based Network Management Framework



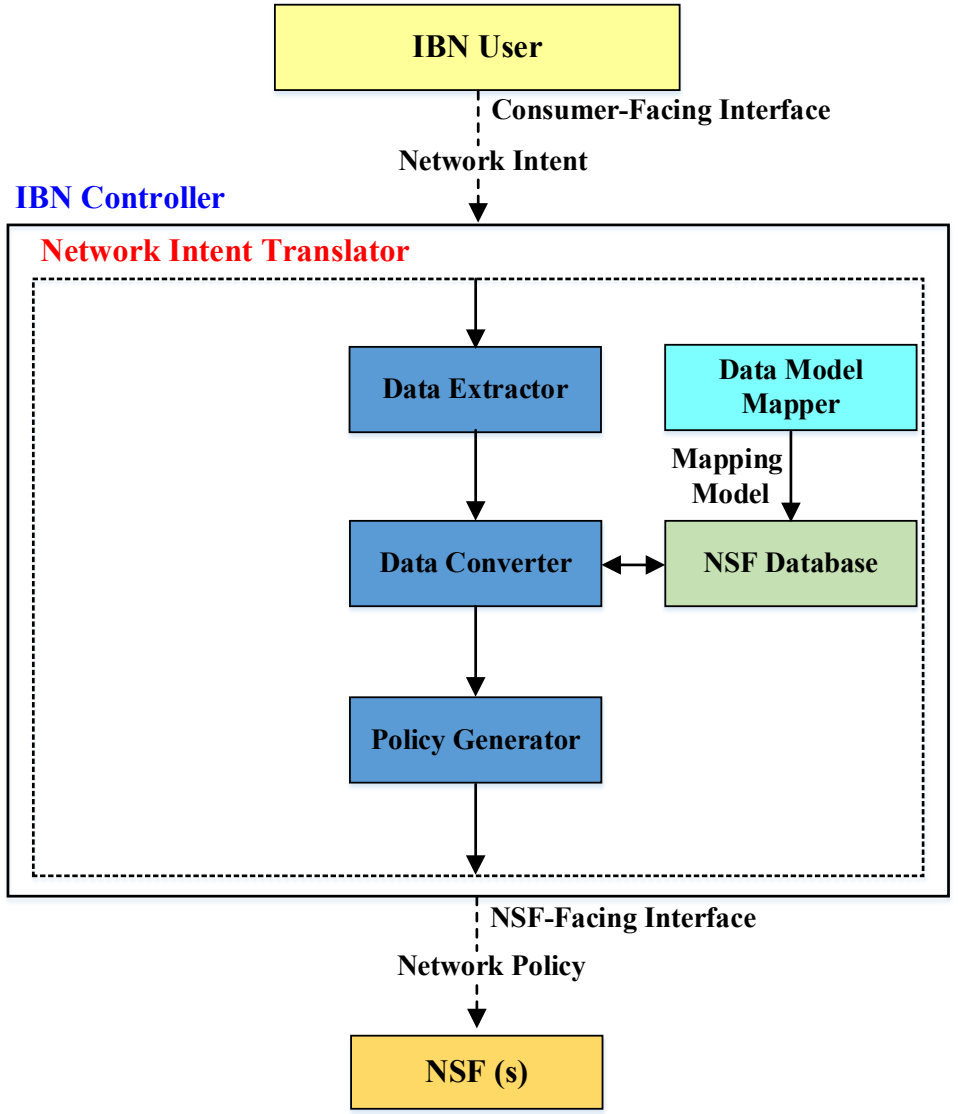
Intent-Based Network Management Automation (4/7)

- Automatic Mapping of Intent and Policy Data Models



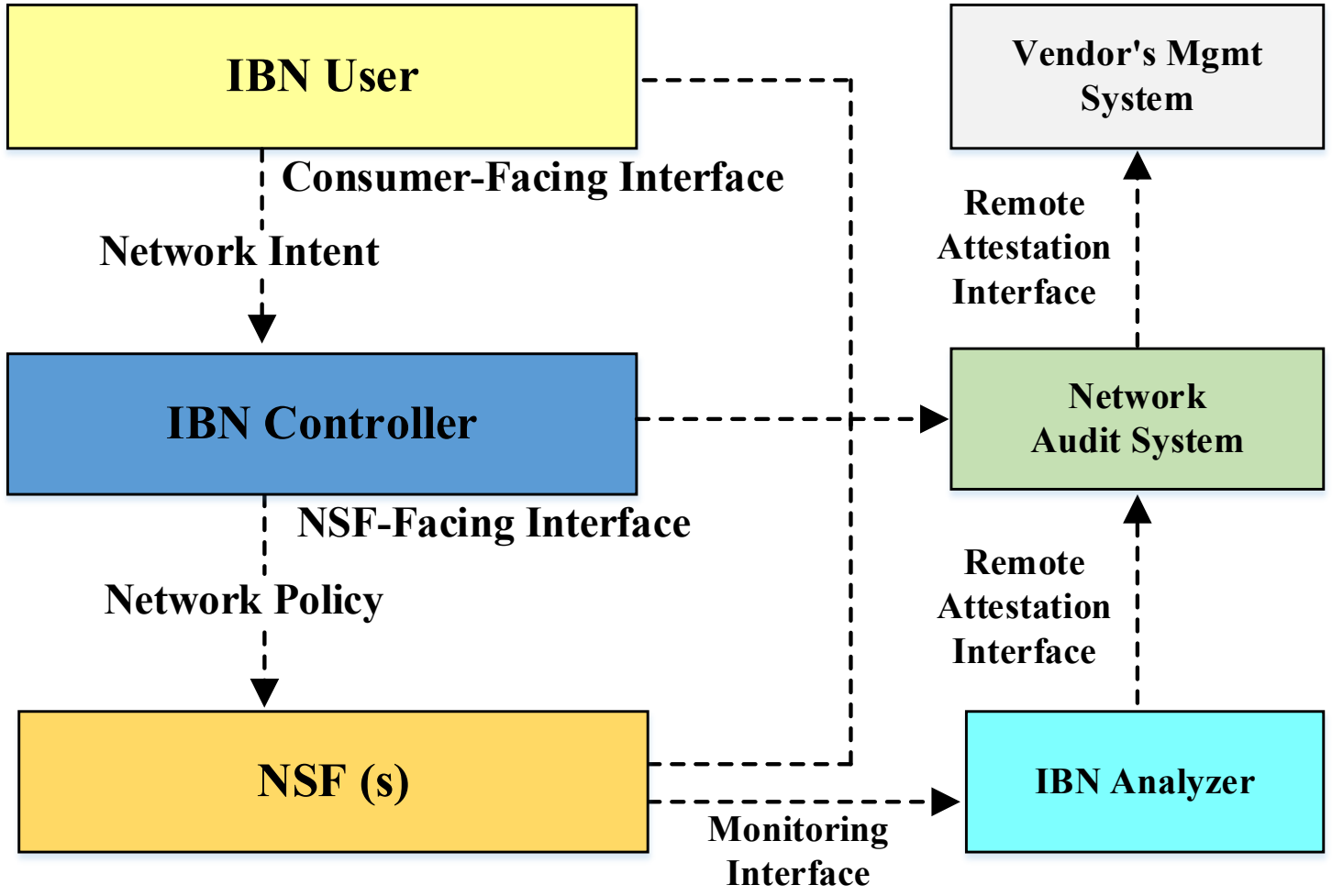
Intent-Based Network Management Automation (5/7)

- Network Intent Translator (NIT)
  - Translates Network Intent into Network Policy.



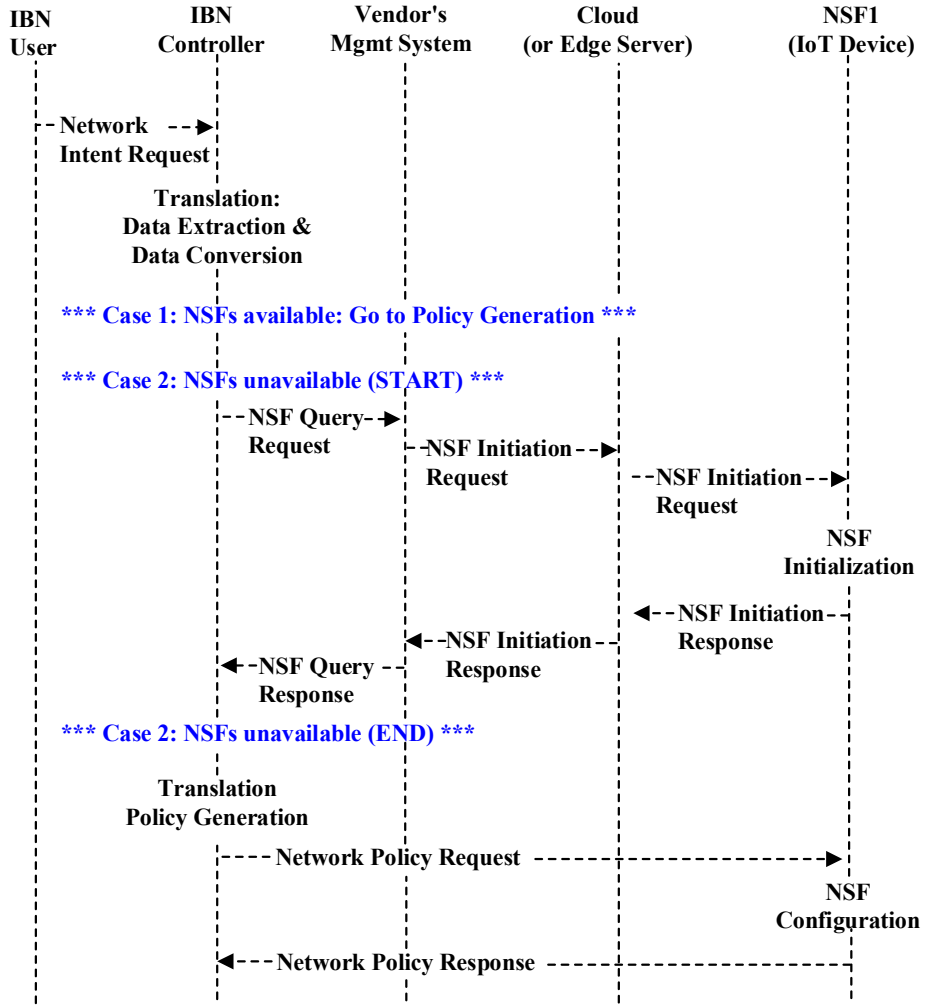
Intent-Based Network Management Automation (6/7)

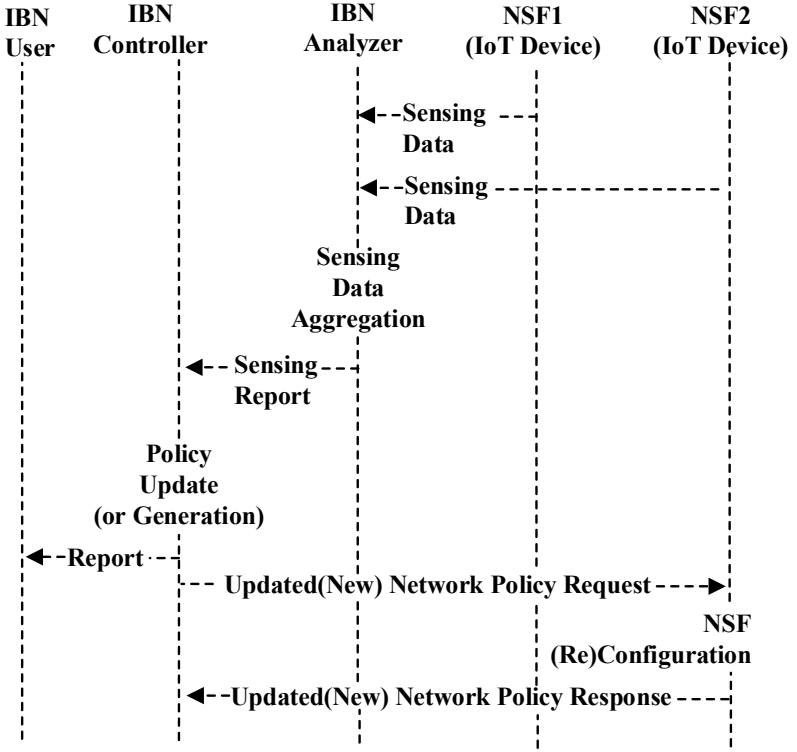
- Network Audit System for Activity Auditing



Intent-Based Network Management Automation (7/7)

- IoT Device Data Aggregation Policy Enforcement and Reporting





Intent Types

- Intent Types
  - **Network Intent**: e.g., throughput and E2E delay
  - **Application Intent**: e.g., configuration for applications

- Examples of Intents
  - **Network Intent**: Two IoT devices at SKKU IoTLab in Suwon get 1Mbps and 50ms delay for environmental monitoring.
  - **Application Intent**: SKKU IoTLab's IoT devices measure light & temperature, and report them to an IoT server every 5 min.

Next Steps

- Is this draft valuable as a proper use case in MONM BoF?
- We welcome your comments and feedback ☺

References

1. J. Jeong, Y. Ahn, Y. Kim, and J. Park, “Intent-Based Network Management Automation in 5G Networks”, draft-jeong-nmrg-ibn-network-management-automation-03, November 2023. https://datatracker.ietf.org/doc/draft-jeong-nmrg-ibn-network-management-automation/
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