A Web-Services based Architecture for Dynamic-Service Deployment

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Outline

- Problem Statement.
- Solution: Dynamic Service Deployment (DSD).
- FlexiNET
  - Architecture
  - FlexiNET & DSD
- DSD Requirements.
- Proposed DSD Architecture.
- Conclusions.

Problem Statement

- Network Characteristics:
  - Complexity.
  - Heterogeneity.

- Demand of an Architecture for Network-based Services:
  - Scalability.
  - Flexibility.
  - Adaptability.
  - Efficiency.

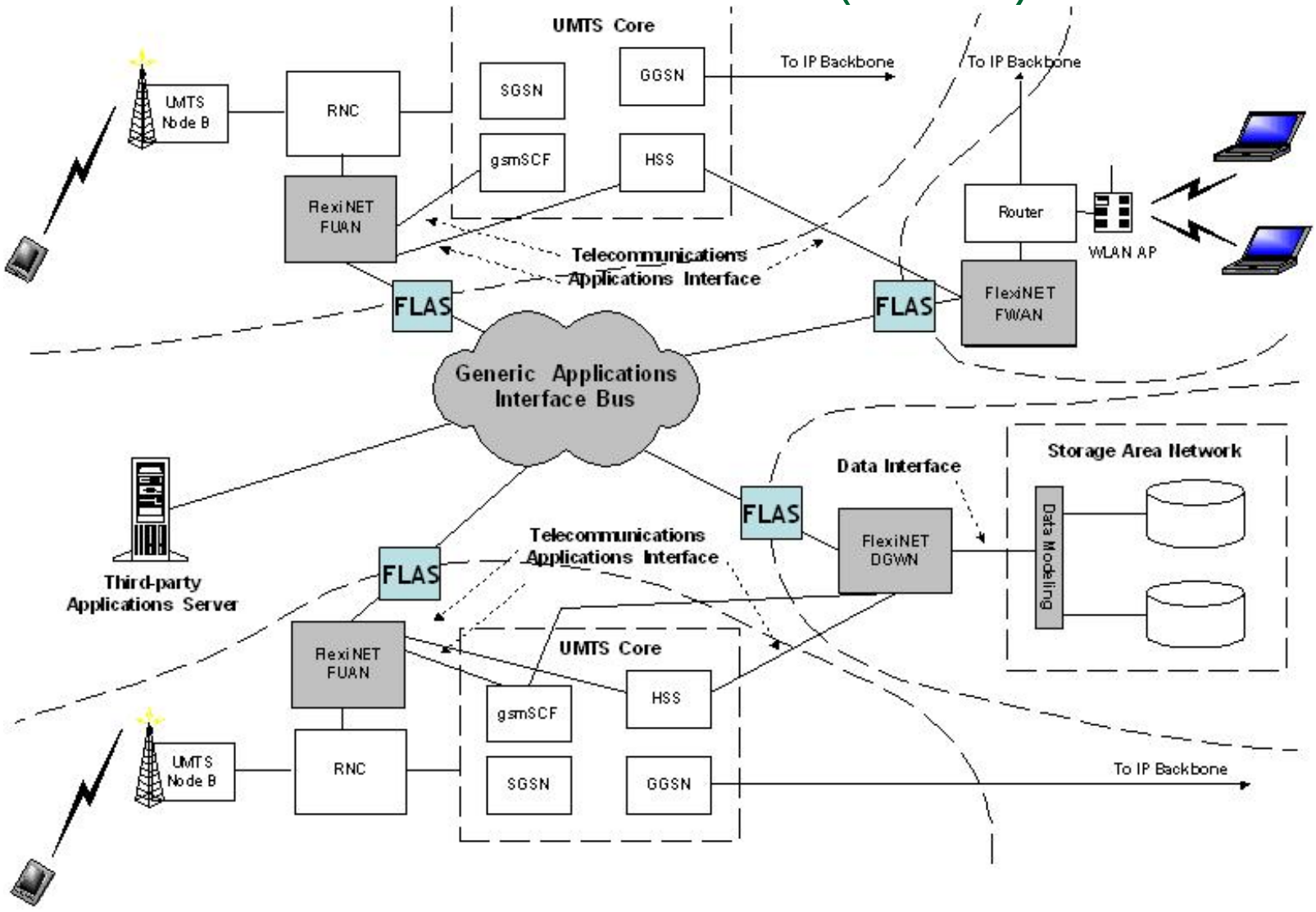
Solution: Dynamic Service Deployment

- Dynamic Service Deployment: A series of sequential steps in order to deploy a service.
  - Resource Monitoring.
  - Node Selection.
  - Resource Allocation.
  - Code Download.
  - Code Deployment.

FlexiNET Architecture

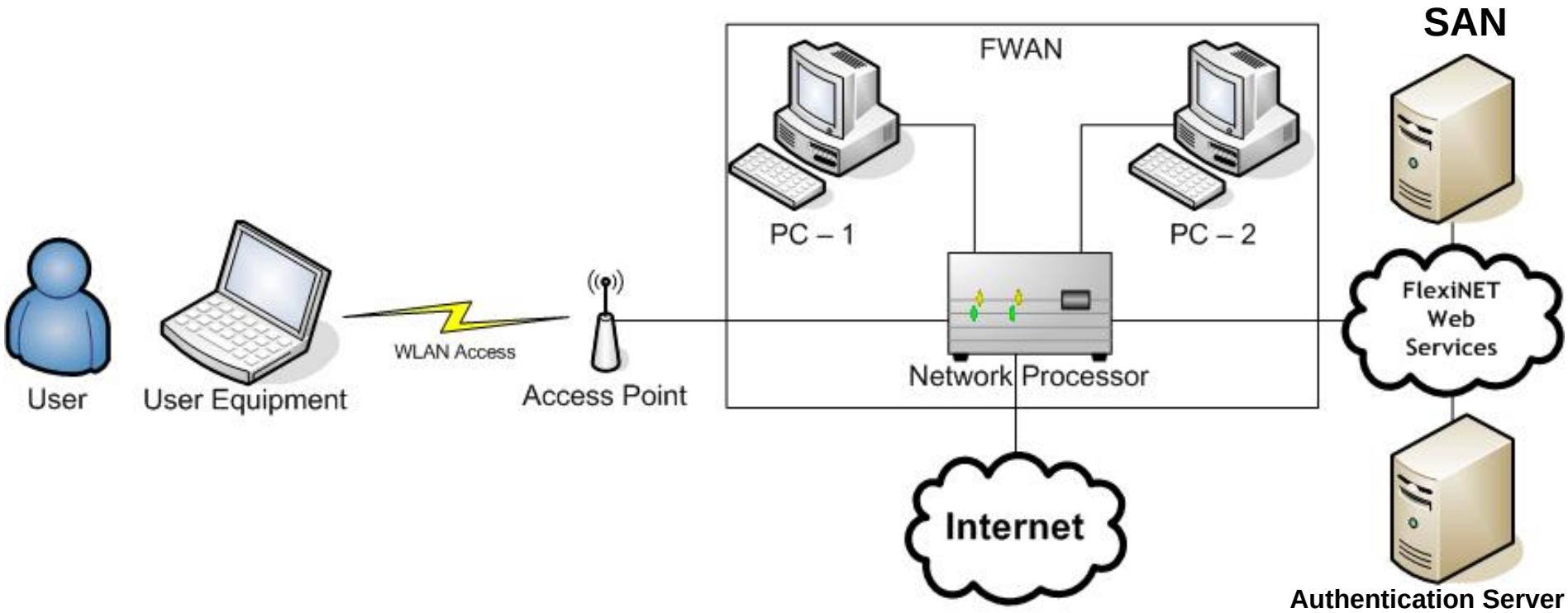
- Define and implement a scalable and modular network architecture incorporating adequate network elements offering cross-connect control, switching/routing control, and advanced services management/access functions at the network access points that currently only support connectivity between user terminals and network core infrastructures.
- FlexiNET Node Instances:
  - FUAN
  - FWAN
  - DGWN
  - FLAS

FlexiNET Architecture (con.)



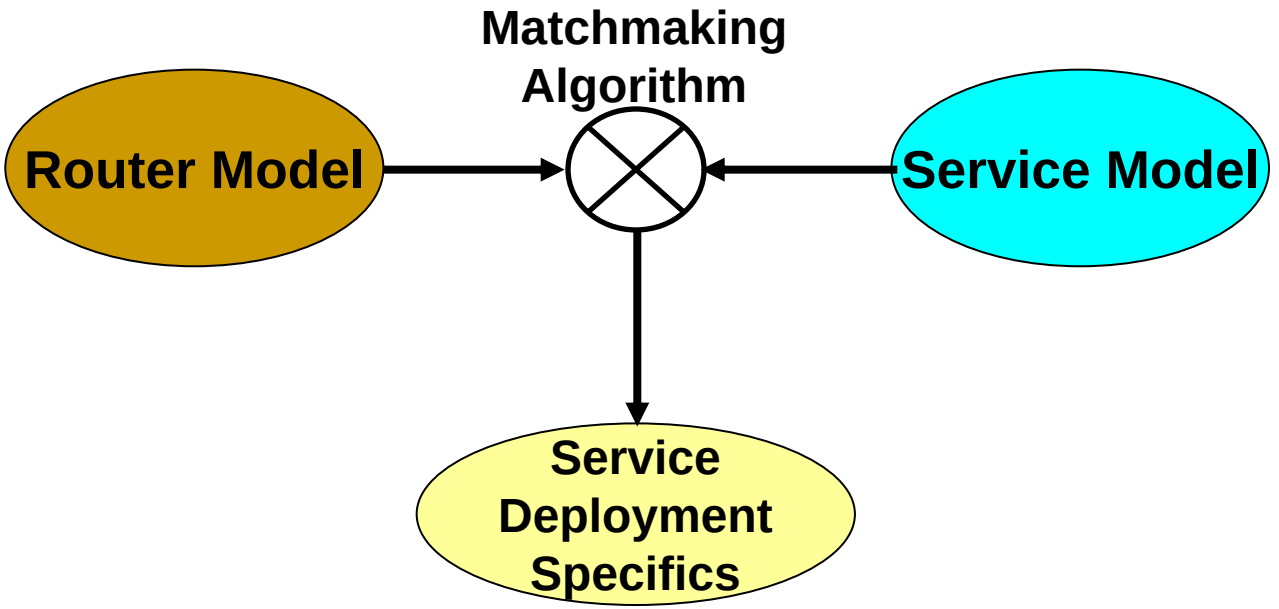
FlexiNET (European IST Project) & DSD

- The FWAN is based on Hitachi's distributed router.
- The FWAN is responsible for authenticating native and roaming users through the FLAS using an AAA proxy.

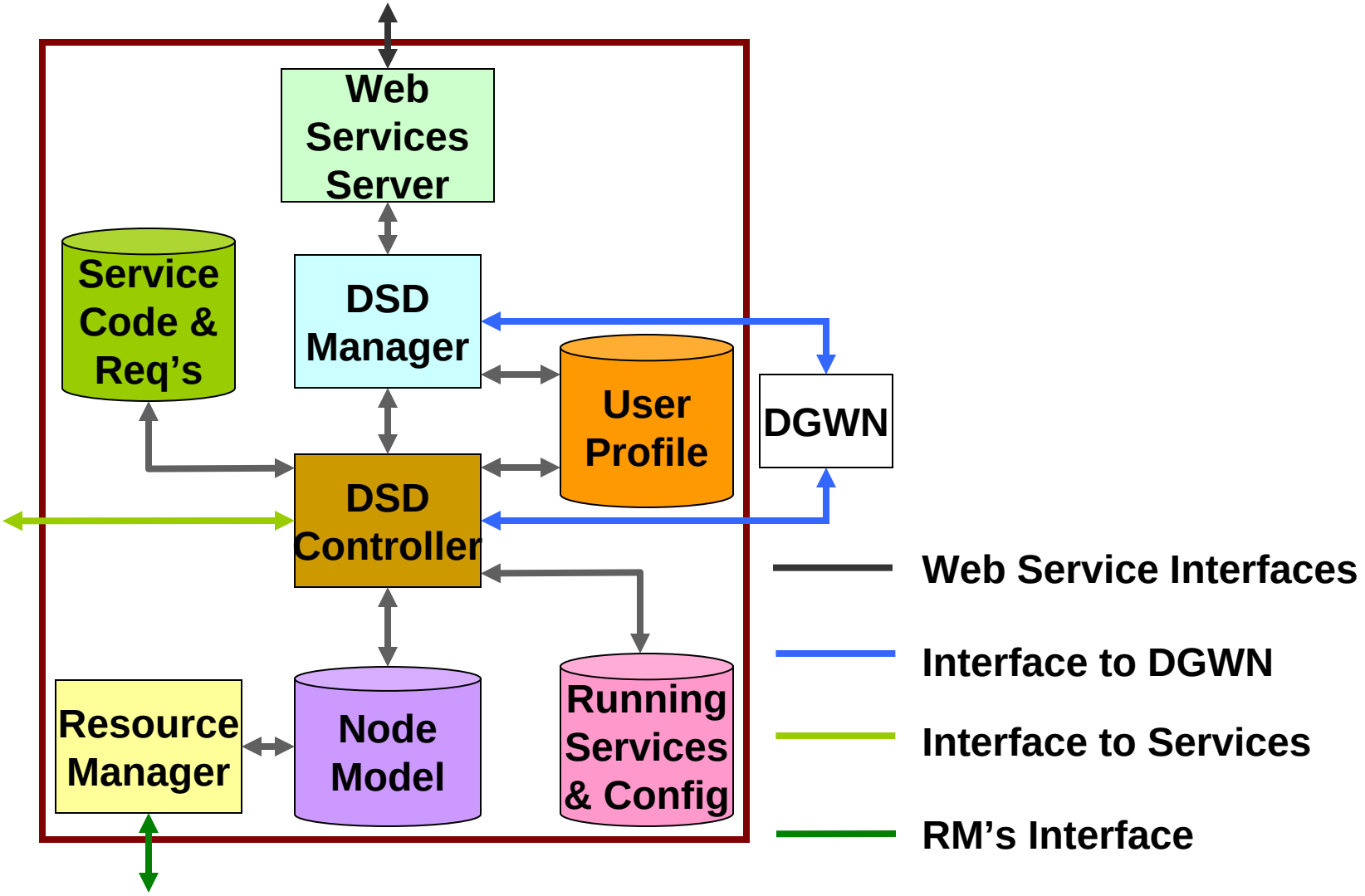


DSD Requirements

- Router Model.
- Service Model.
- Matchmaking Algorithms.



DSD Architecture



DSD Architecture (con.)

- Web Services server

The Web Services Server sub-component hosts the interfaces with the AAA Proxy and the Bootstrap Process. This server is responsible for:

- *exchanging messages between the DSD Module and the AAA Proxy Module and the Bootstrap Process,*
- *registering a Web Service in a UDDI directory, therefore it has the necessary functionality,*
- *finding other Web Service Interfaces.*

- DSD Manager

The DSD Manager sub-component has two functions depending on whether the user's profile is required:

- *In the case of the AAA Proxy communicates with the DGWN, the DSD Manager must download the user profile, in order to find, which services must be deployed , and provides the request to the DSD Controller.*
- *In the case of Bootstrap Process, the DSD Manager passes the bootstrap services required for deployment to the DSD Controller.*

The DSD Manager is responsible to check if a user has terminated the connection and undo the user's personal configuration.

DSD Architecture (con.)

- ## DSD Controller

The DSD Controller sub-component is assigned to:

- *to communicate with the DGWN in order to download the service code and the service requirements,*
- *to retrieve from the Node Model the available resources,*
- *to perform the Matchmaking Algorithm in order to find the most suitable resources,*
- *and finally to deploy the service.*

The DSD Controller is responsible for the Services, in 3 dimensions: Download, Deploy, and Configure.

- ## Resource Manager

The Resource Manager sub-component is assigned to:

- *do the discovery and monitoring of the resources.*
- *It collects information, with the help of the Resource Manager Interface, from all the components of the Node model, and also from the DSD Controller.*
- *Only the necessary information is passed to the Node Model*

DSD Architecture (con.)

- Node Model

  The Node Model is responsible for keeping all the information about FWAN. It provides us with a complete view regarding the FWAN. The node model contains information regarding physical resources available and used, and data about running services.

- User Profile

  User Profile is the data–storage where the downloaded User Profile is stored. It is responsible for keeping the User Profile.

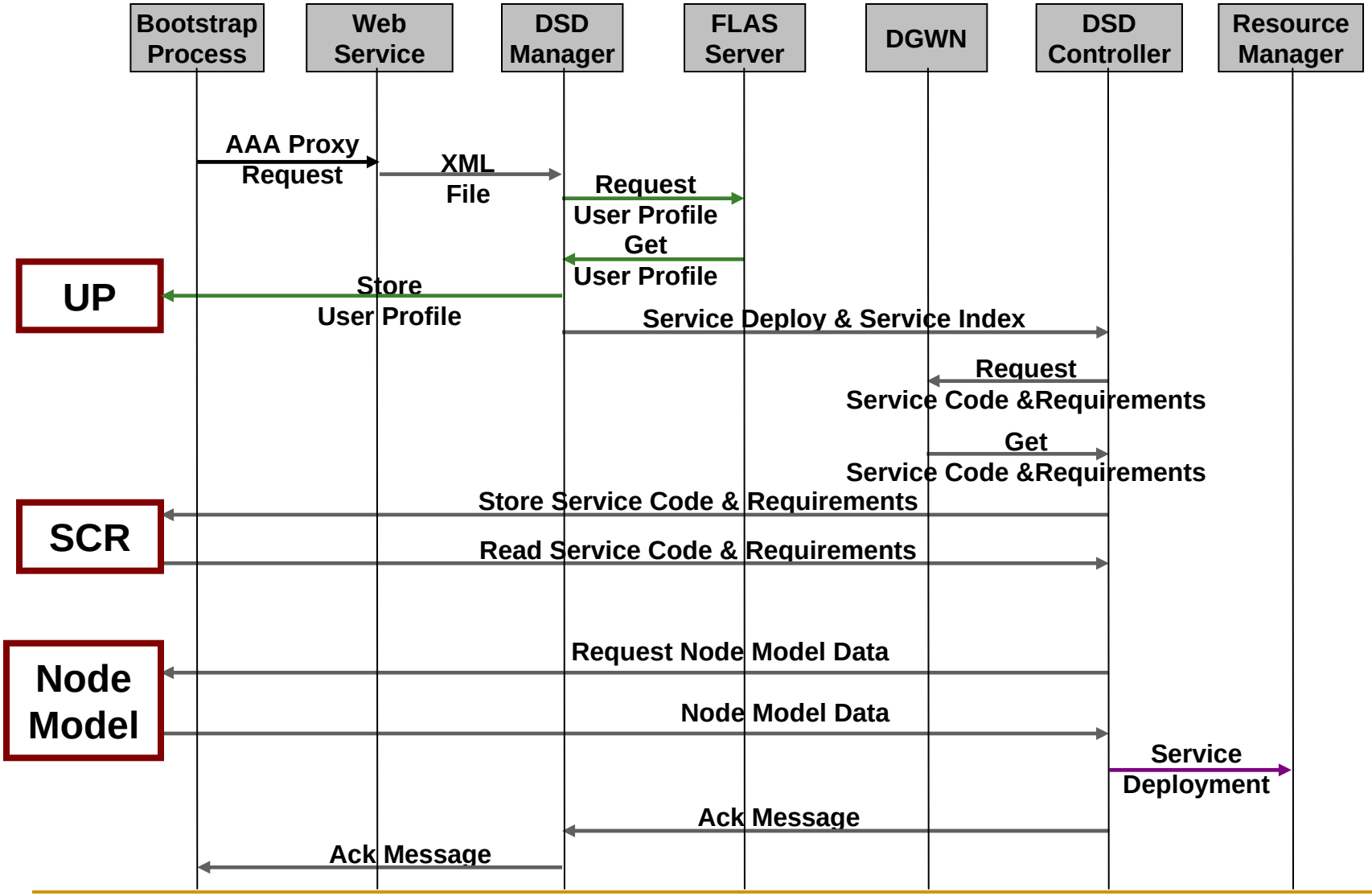
- Service code and Requirements

  The Service Code and Requirements data-storage is responsible for storing the downloaded code and the requirements (in terms of physical resources) that describe a service.

- Running Services and Configuration

  The Running Services and Configuration data-storage is responsible for storing data about running services and their current configuration.

DSD Use Case


Bootstrap Process
Web Service
DSD Manager
FLAS Server
DGWN
DSD Controller
Resource Manager
AAA Proxy Request
XML File
Request User Profile
Get User Profile
Store User Profile
UP
Service Deploy & Service Index
Request Service Code &Requirements
Get Service Code &Requirements
Store Service Code & Requirements
SCR
Read Service Code & Requirements
Request Node Model Data
Node Model
Node Model Data
Service Deployment
Ack Message
Ack Message

Conclusions

- The presented component-based model is addressing the issue regarding the dynamic deployment of new services in a distributed environment and the way they address themselves in that environment.

Questions?