Self Adaptive Overlay Network Innovating NGN Architecture

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Agenda

o   Practical Issues of Grid State of the art

o   Evolution of NGN requirements

o   Lacuna in the advancements

o   Overlay Vision

o   NGN, Grid and Overlay

o   Self Adaptive Overlay

o   Future Perspective for NGN and Grid

- o   Services not pervasive enough yet.

- o   Management of services and resources are too cumbersome.

- o   Users/Brokers manage both transport and service end-to-end.

- o   Diverse interoperability – Fora and Standards vision alignment required.

- o   Limiting the vision of Grid to Global resource management.

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Take advantage of changing lifestyles and evolving technologies
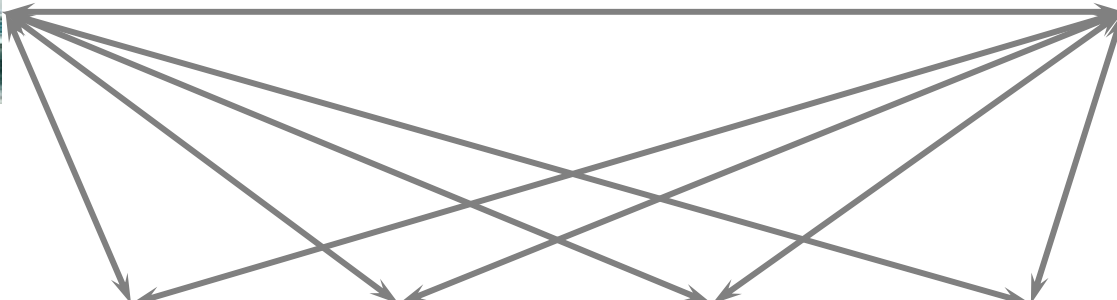
How to Fit with new styles of communication services

Mobile, instant, group & communities

Instant Messaging

Instant Video Telephony

Instant Push to Talk

Instant Audio Conferencing

Instant Gaming

Instant Content Sharing

Challenges of Heterogeneous Communication

Newer services evolve over time

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o NGN infrastructure is not intelligent to handle collaborative resource allocation and management.

o For NGN, it is required that the underlying resource management supports capabilities like blending of services (evolving services) and provisioning end to end QoS.

o End to end automation for SLS/SLAs.

o End to end management of network resources with distributed service aware control points to the edges of the network.

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o Formalization/Standardization of operation and maintenance work-flows. Creation of standard work-flows which can be instantiated across administrative boundaries. Dynamic instantiation of these workflows as per SLAs.

o Self Adaptation of the infrastructure to meet the service QoS requirements.

o Service providers do not require Grid. They need a solution for managing future requirements. Its important to identify whether the solution is Grid technologies.

o What is Overlay?

- A P2P based network concept which enables robust discovery, connectivity, fault tolerance, self adaptation and virtualization of services/resources.

o Heterogeneous services/resources are brought under an uniform ID space, where they are spontaneously discovered, utilized and managed in a decentralized way.

o   P2P is very successful in business scenarios like file sharing, music sharing, VoIP, etc.

o   P2P has Powerful discovery and connectivity algorithms.

o   P2P totally respects autonomy of a site. Its popularity comes from the fact that it is easy to participate in P2P.

o   Need to incorporate efficiencies of orchestration and choreography methods of P2P.
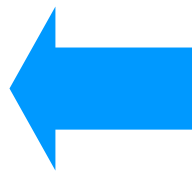
o   And many more...

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## Overlays are dynamically composed networks.
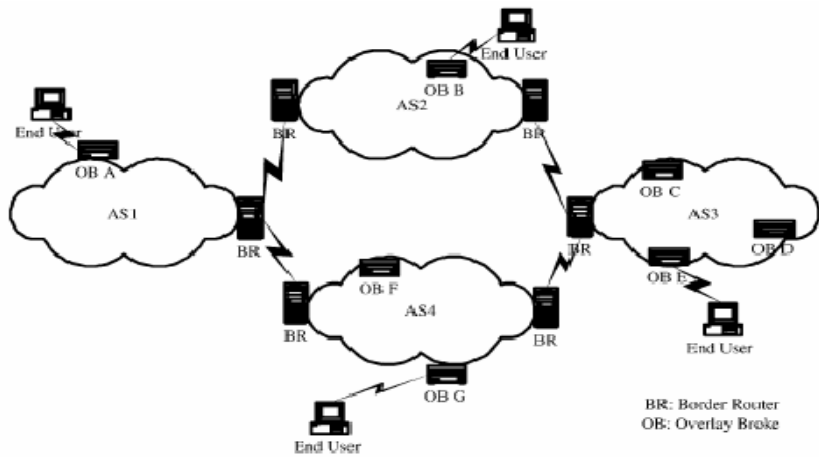
Dynamic Selection
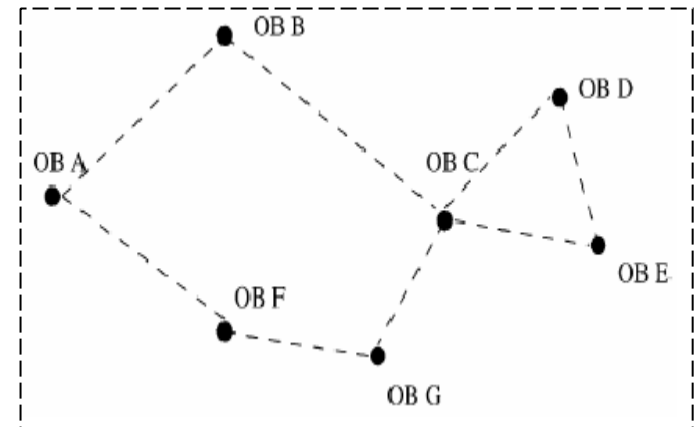
o **Self Managed Resource**

o **Ready for composition into other overlays**

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o **Requirements**

- Robust Underlay monitoring techniques.
- Addressing in Heterogeneous resources.
- Usage and Cost Management.
- Horizontal and Vertical Composition.
- Security.
- QoS, QoE -> End to End.
- Adaptation.
- E2R
- Knowledge based Pervasive Network (EU FP7).

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Overlay evolves Grid to form a robust infrastructure and NGN to provide better services

Evolution of Grid and NGN
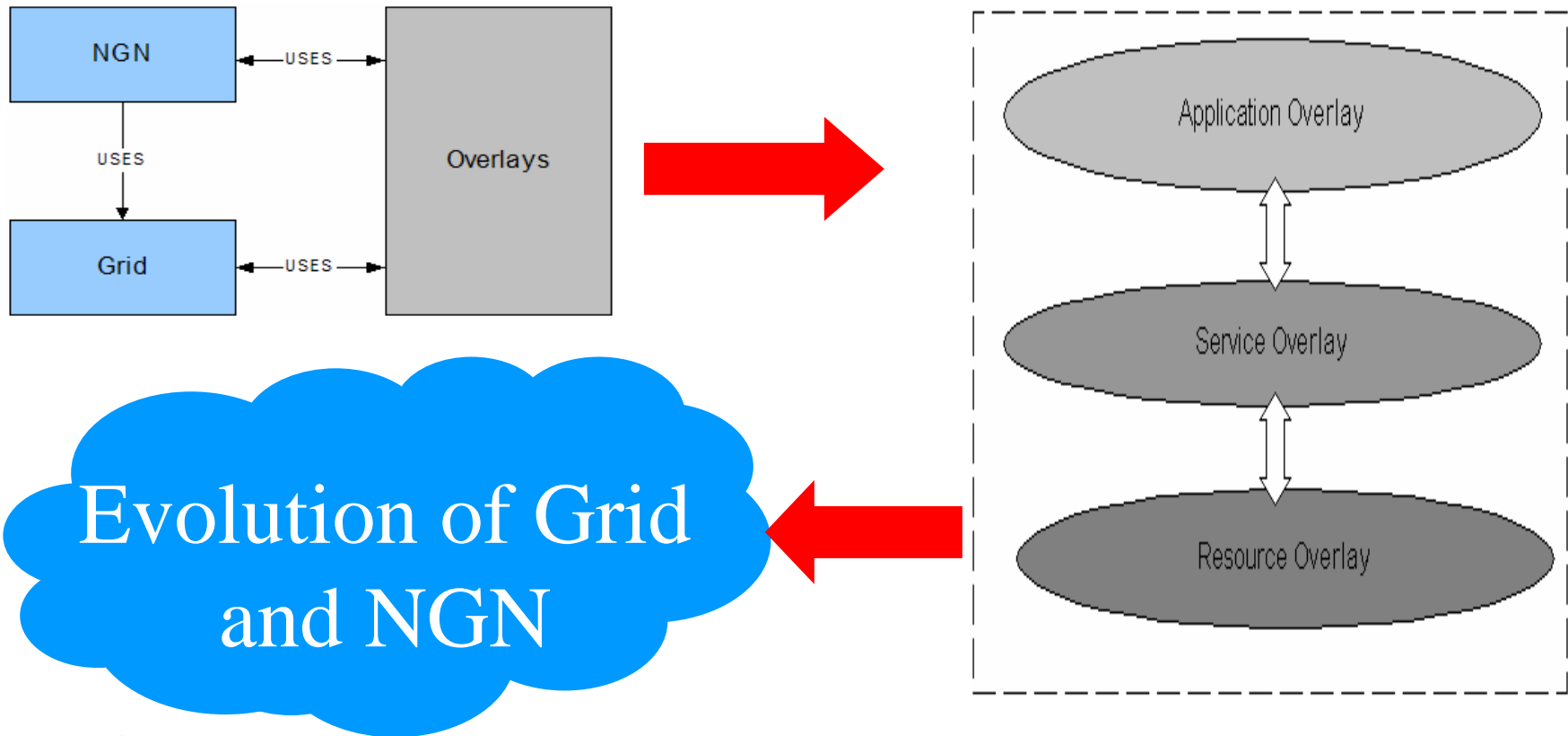
o NGN decouples Services and Transport

o Overlay decouples Services and Resources. It also enhances Services robustness.

Self Adaptive Overlay
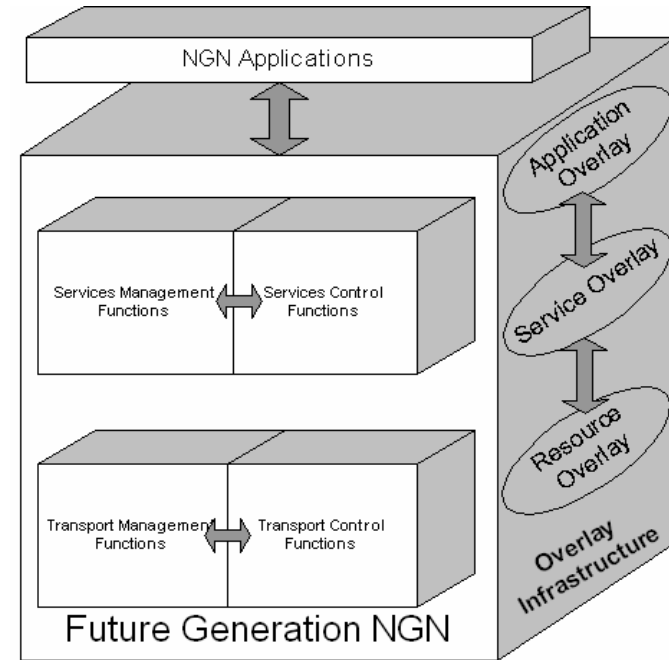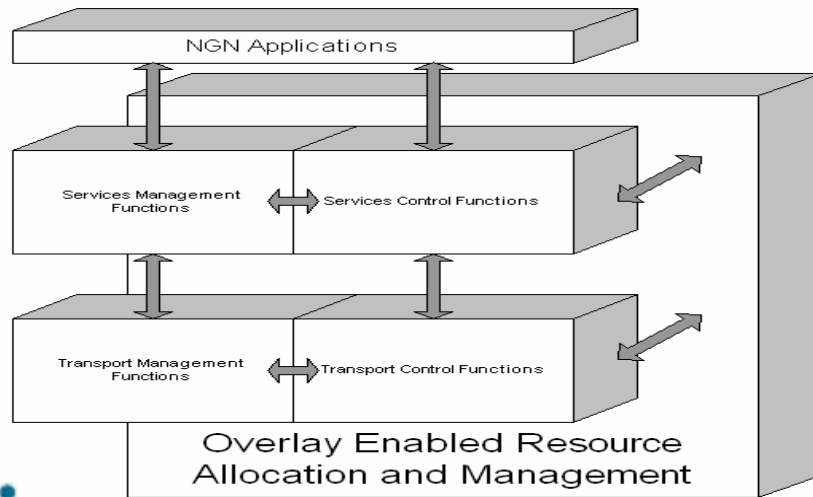
o   Features of Self Adaptive Overlay

- Self Awareness
- Self Configuration
- Self Optimizing
- Self Healing
- Self Protecting
- Context Aware
- Anticipatory
- Open

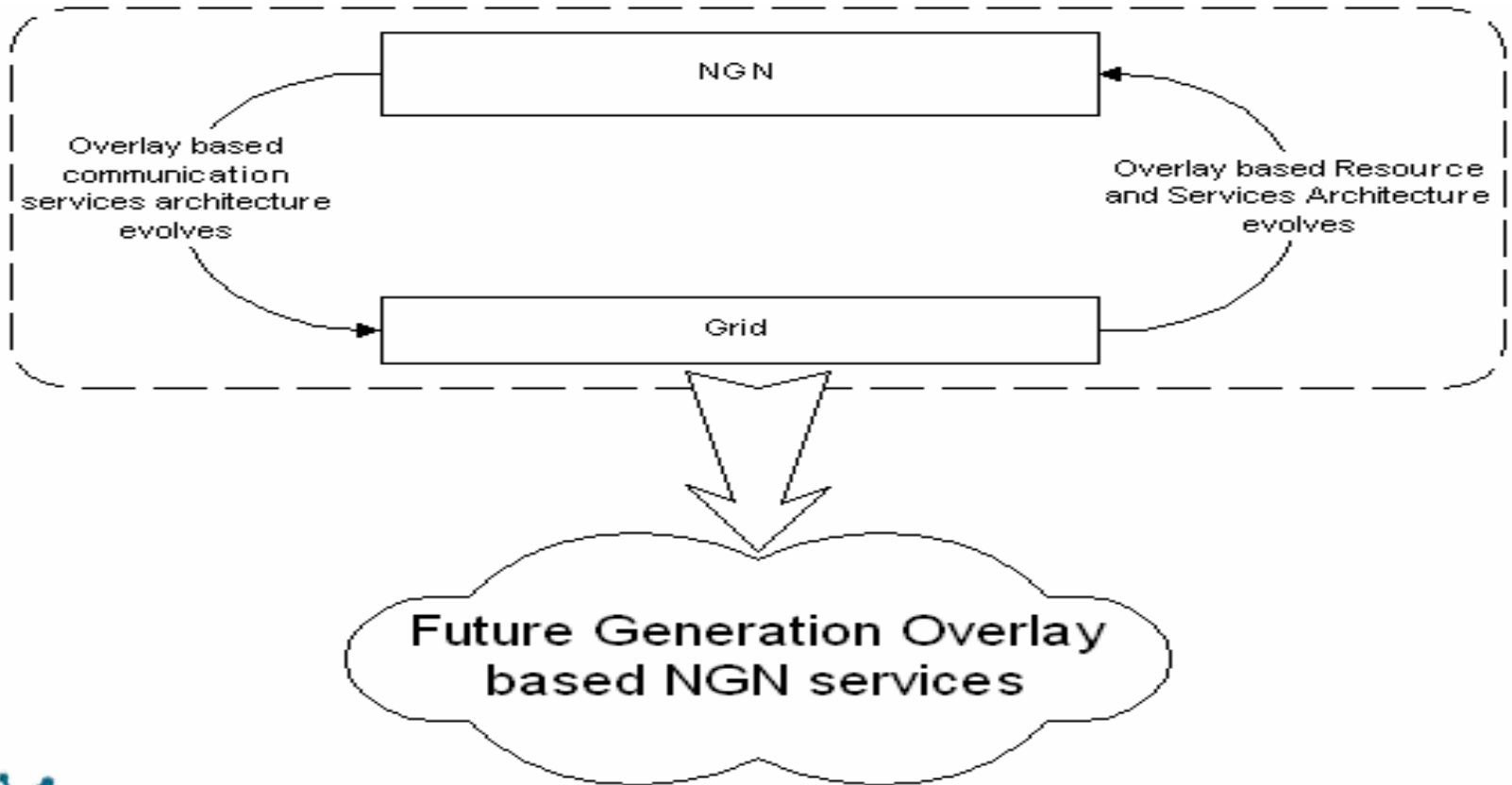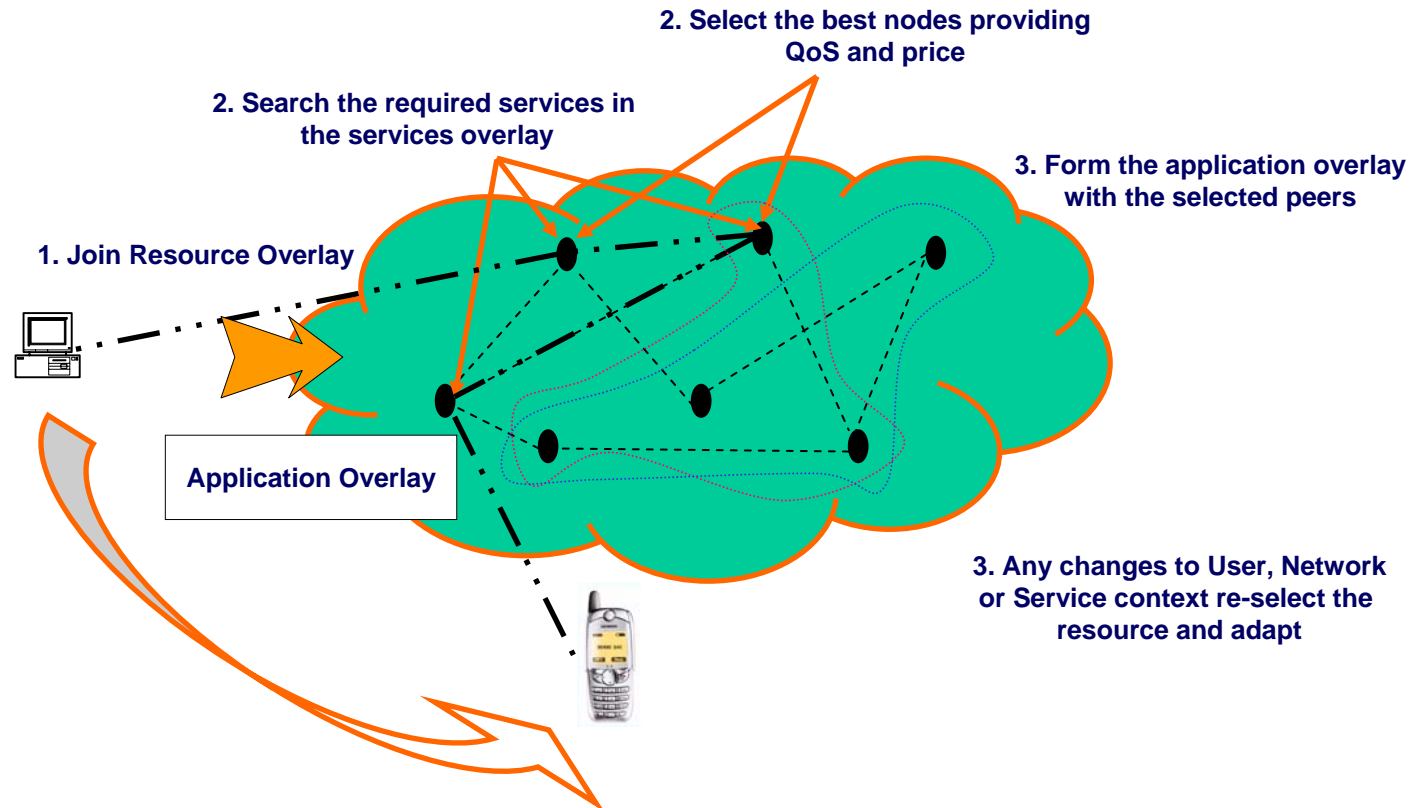o   These features supplement the overlay intelligence and provide advanced robustness.

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o   Evolve the definition of Grid and NGN to incorporate the vision of ubiquity of services.

o   NGN services merge with Grid Services. NGN can be provided through Overlay. Overlay is the enabler of a robust infrastructure.

o   NGN requirements contribute to create better Grids.

o   Future applications to be more collaborative through the use of communication services based on NGN requirements and Overlay infrastructure techniques.

First NGN based on Overlay enabled Grid, then evolve Overlay architecture to encompass NGN.
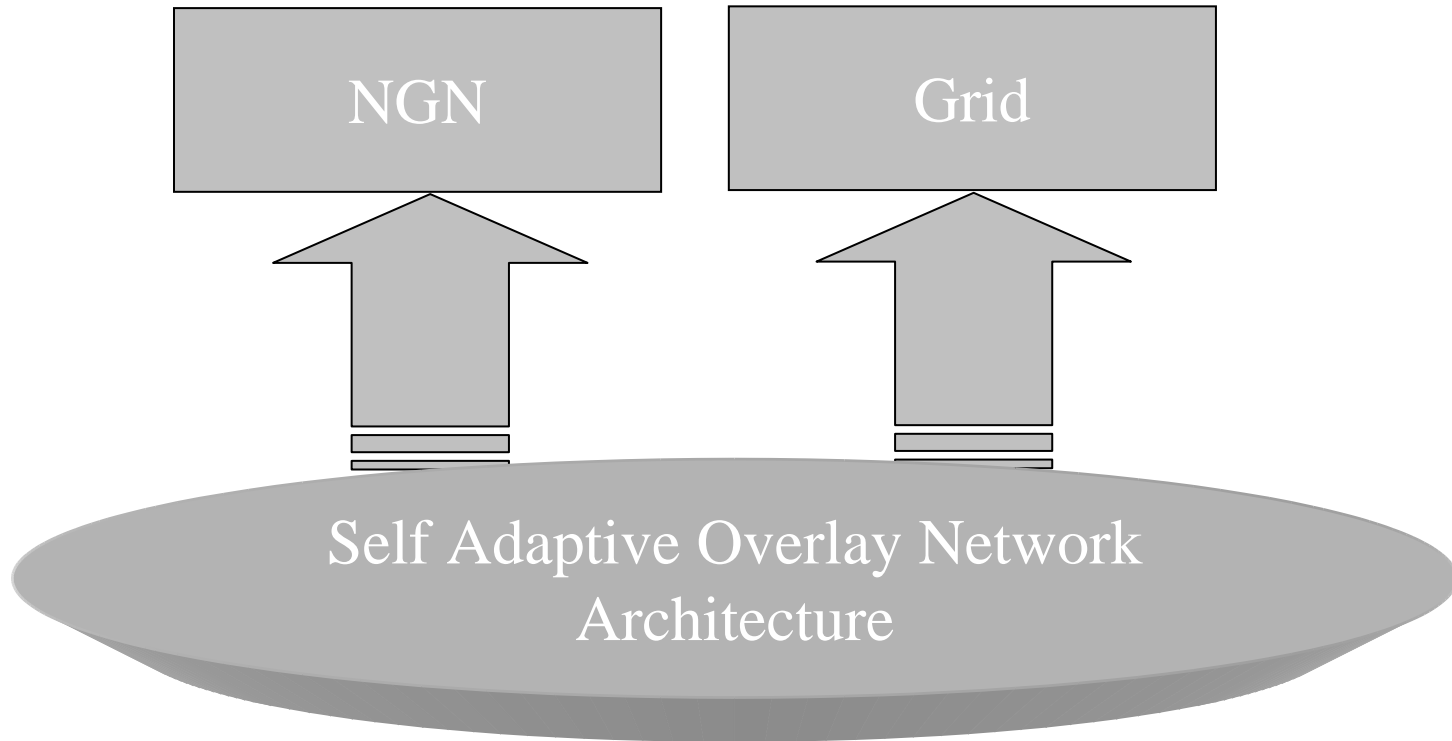
2. Select the best nodes providing QoS and price

2. Search the required services in the services overlay

3. Form the application overlay with the selected peers

1. Join Resource Overlay

Application Overlay

3. Any changes to User, Network or Service context re-select the resource and adapt

NGN

Grid

Self Adaptive Overlay Network Architecture

Enabling Innovative Communication Services through Self Adaptive Overlays

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