Moving Ambient Networks and Mobile Clusters

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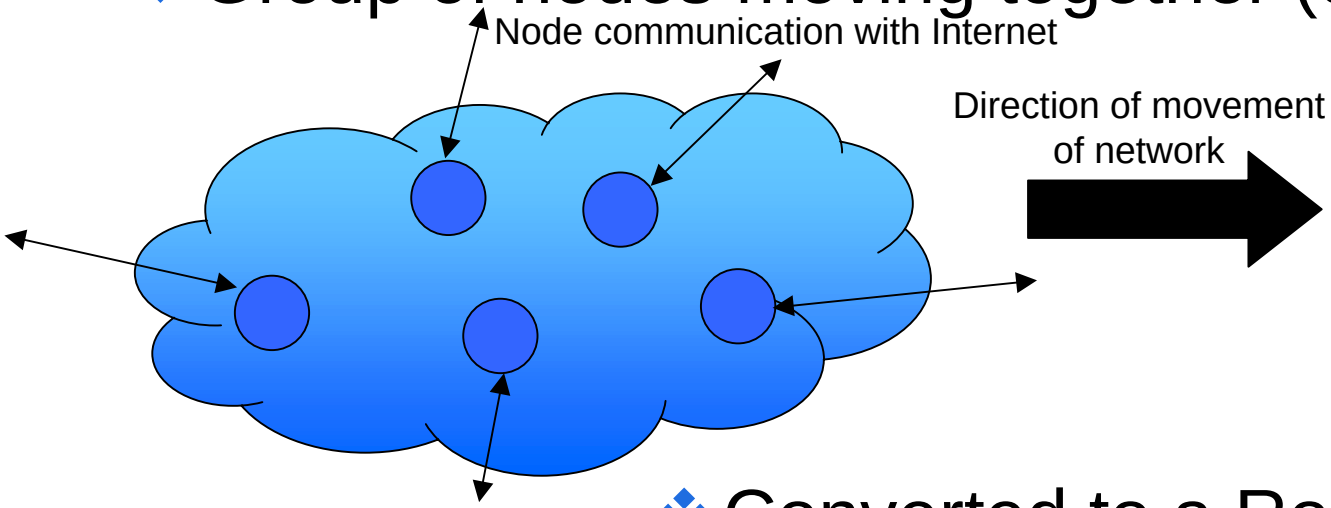
Research Goals

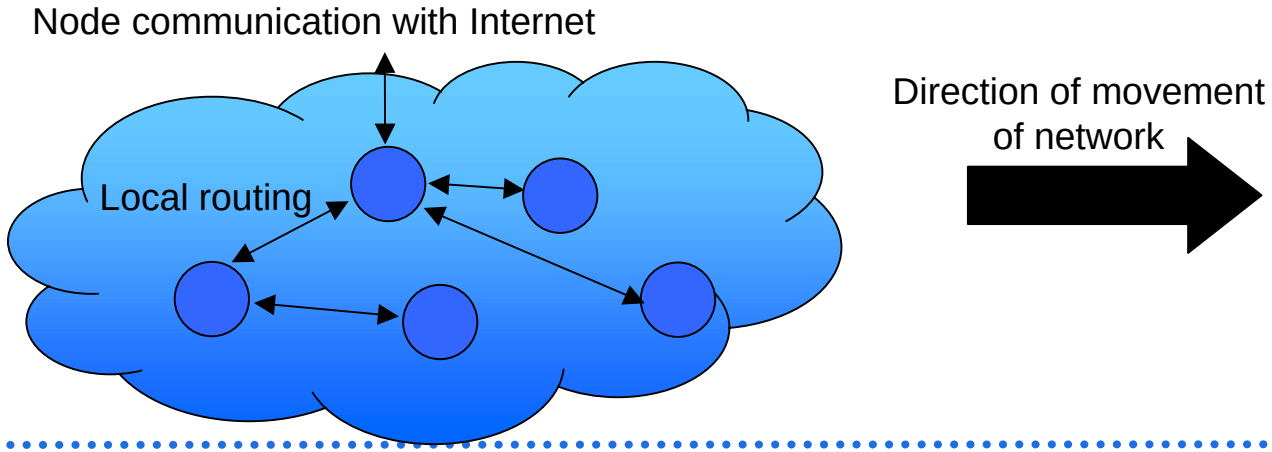
- Moving Networks consist of multiple devices in close proximity moving together
  - We can take advantage of this characteristic to provide performance optimisations
  - We can also achieve new capabilities, e.g. disconnected operation and local service provision
- Moving Network support consists of:
  - Formation Algorithms
  - Mobility Management optimisations
  - Routing optimisations

Concepts

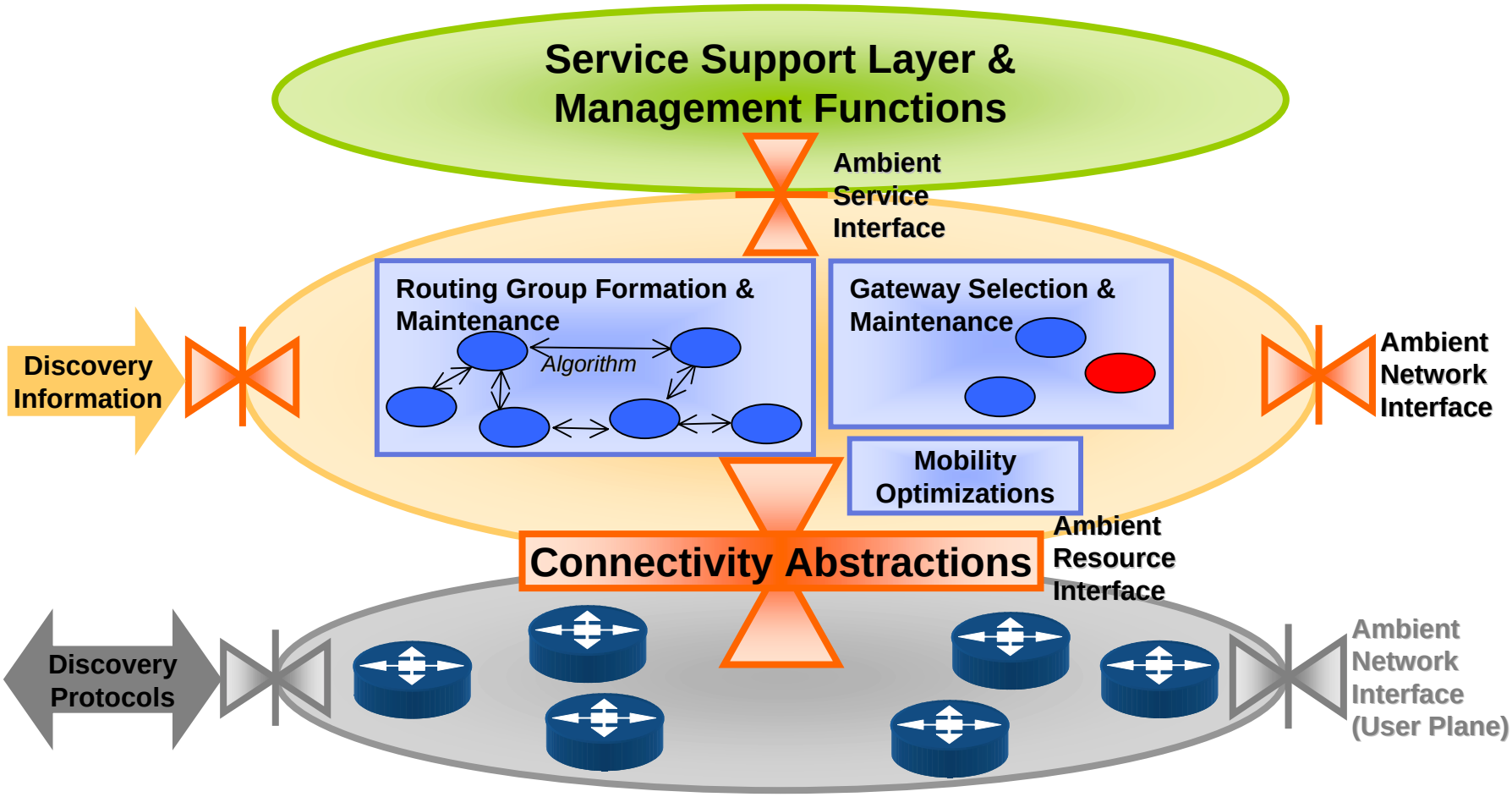
- Group of nodes moving together (cluster)



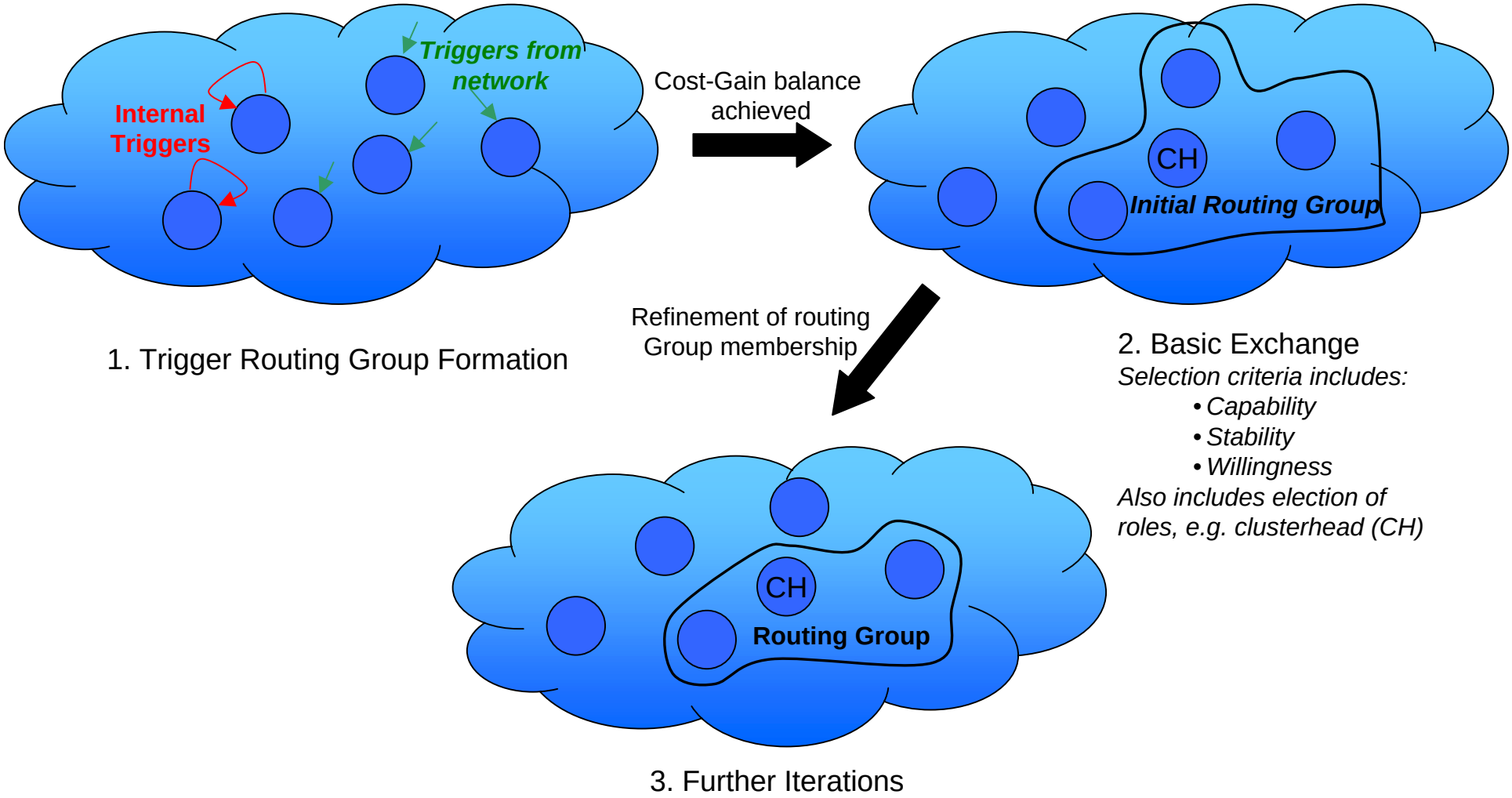
- Converted to a Routing Group



Problem Scope



Execution of Formation Process



1. Trigger Routing Group Formation

2. Basic Exchange

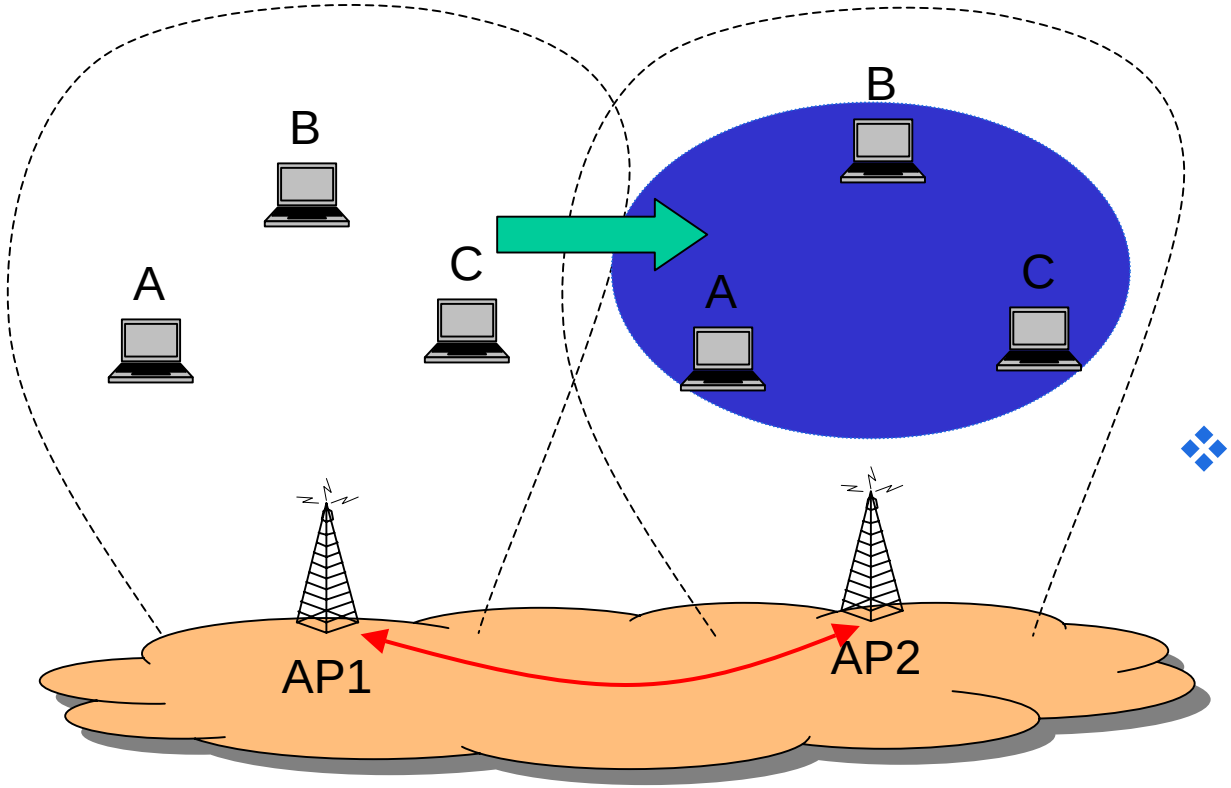
Selection criteria includes:

- *Capability*
- *Stability*
- *Willingness*

Also includes election of roles, e.g. clusterhead (CH)

3. Further Iterations

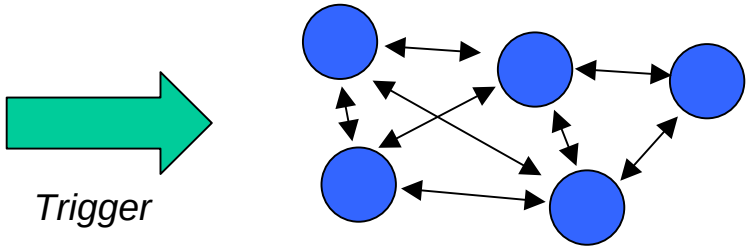
Cell-Based Triggering: Supported by APs



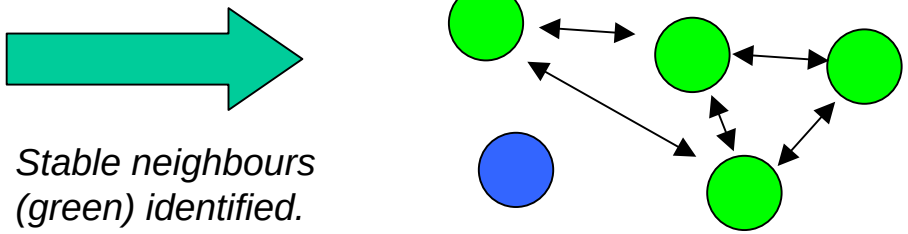
- Adjacent APs discover moving groups based on cell associations

- AP2 communicates with AP1 if the same set of nodes are passing by
- ... and triggers RG formation only at the respected nodes

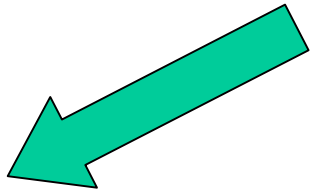
Candidate Set Algorithm Option #1

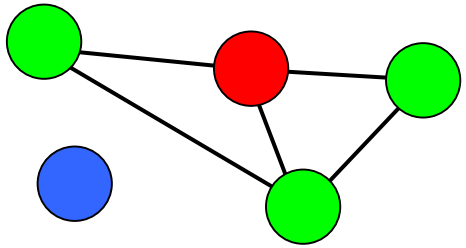


1. Exchange of Hello messages.
The stability estimate is based on
- Number of received Hellos
- Packet-error-rate of the link

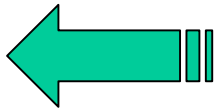


2. Exchange of Role Advertisement messages to select the clusterhead.
The CH selection criteria includes:
- Degree of connectivity
- Stability
- Remaining battery level





3. Routing group formed



Next Steps

- Refinement of Algorithms
  - Further develop other aspects, such as maintenance
  - Define the further iterations in more detail, and integrate with overall composition process
- Further develop interactions with the user plane routing
  - Will support concrete mobility management and routing optimisations
- Continue simulation work
  - Evaluate different algorithm options
  - Determine what parameter configurations are most suitable for different scenarios
  - Evaluate benefit of routing and mobility management optimisations