Provision of self-x functionalities in IEEE 802.16 networks

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Purpose:

Call for discussion on provision of self-x functionalities in IEEE 802.16 networks

Provision of self-x functionalities in IEEE 802.16 networks

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Outline.

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- Background
- Benefits
- Basic self-x cycle
- Example 1: Self-configuration
- Example 2: Self-optimization
- Scope
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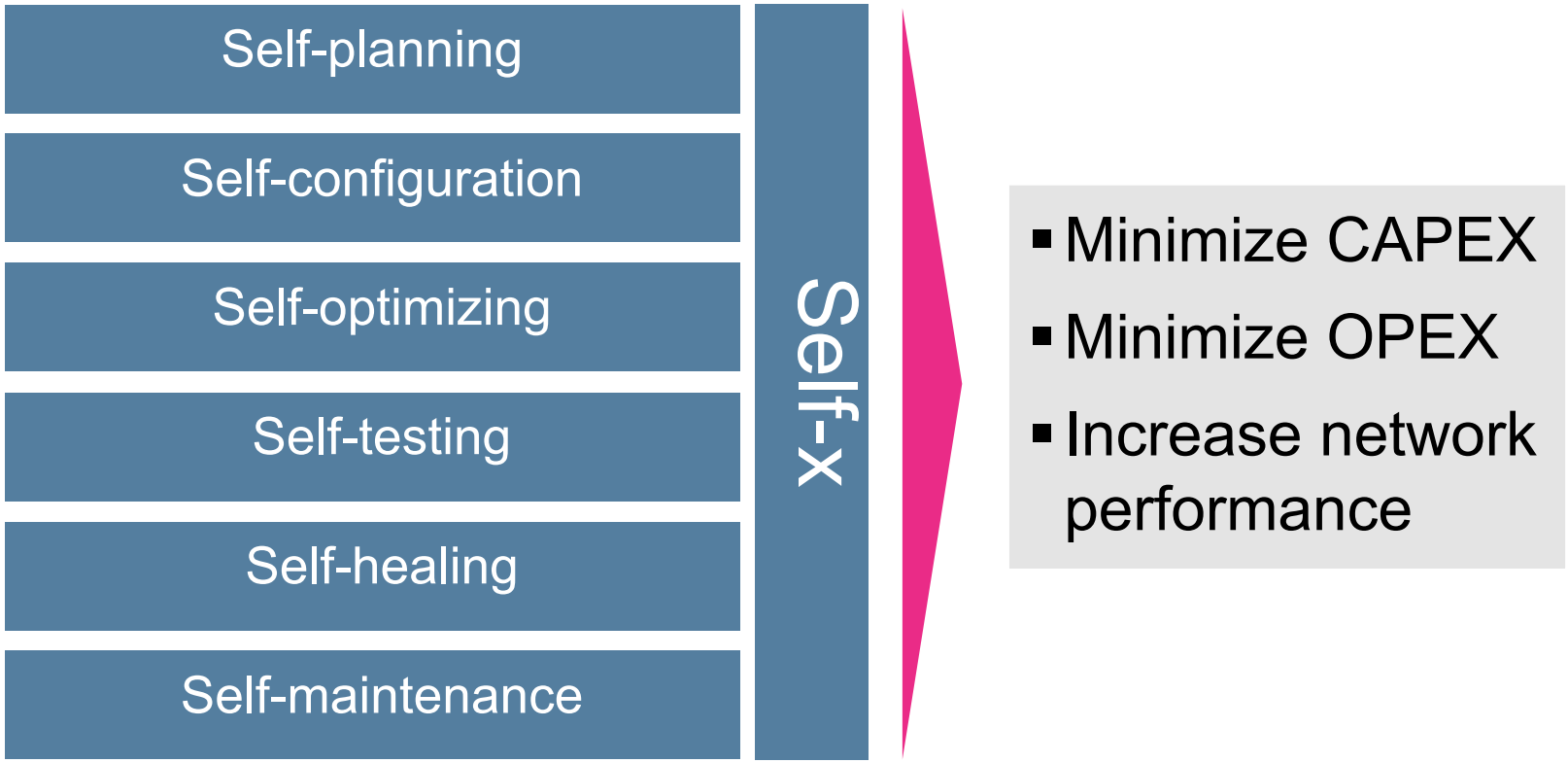
Introduction.

Business challenges lead to the requirement of self-x functionalities.

- Complexity and heterogeneity of radio access networks is constantly increasing.
- Introduction and deployment of new wireless services and systems should be accelerated.
- Changing customer demands (e.g. customer density, traffic loads, …) require adaptation of radio network configurations to optimally fulfil the customer needs.
- High pressure on CAPEX and OPEX
  - requires optimization of available resources.
  - requires **self-x functionalities** in radio access network infrastructures. The goal is to operate the network with a minimum number of operating staff.

Background.

Overview of self-x functionalities.

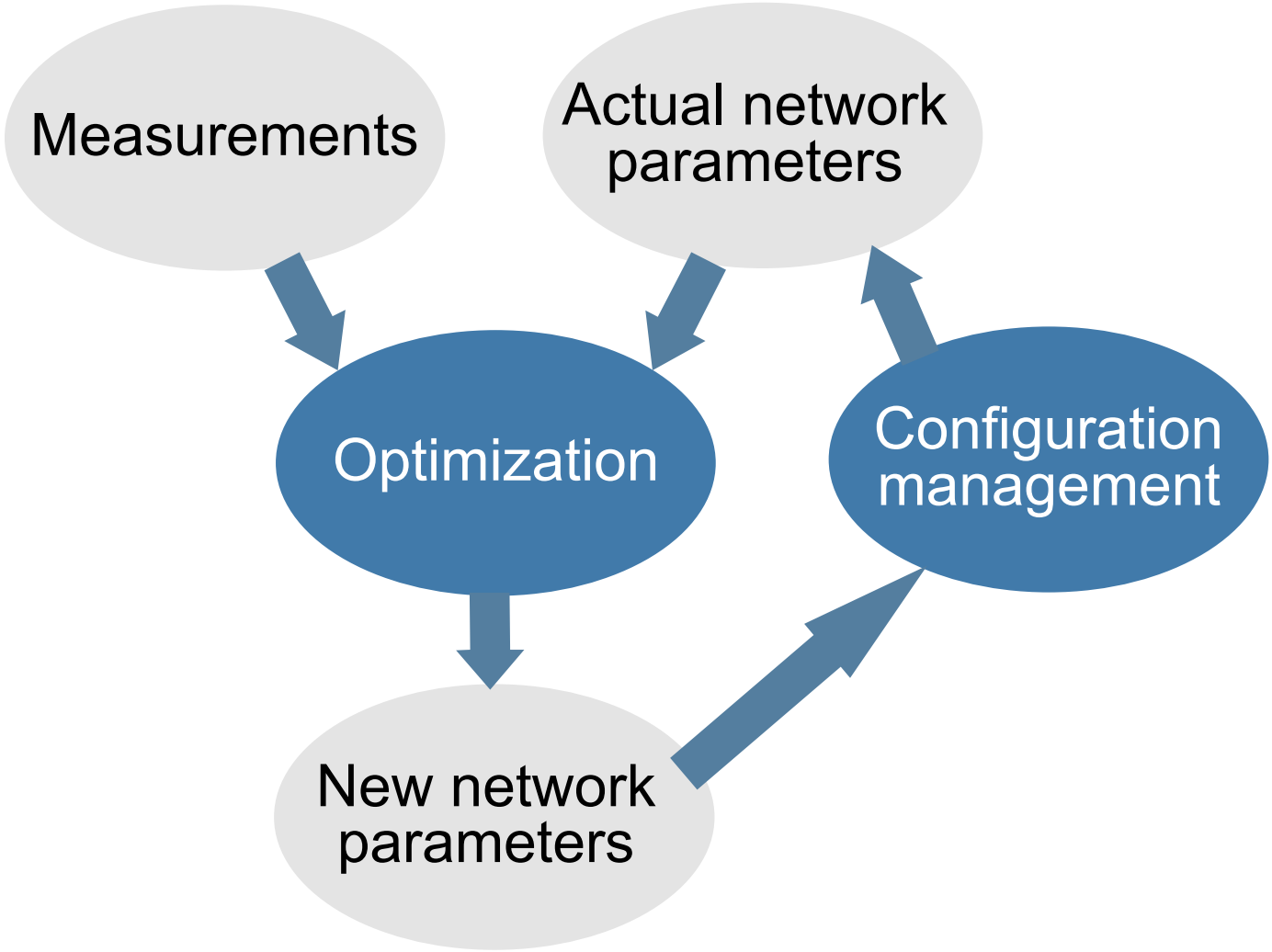


Benefits.

Self-x functionalities are required.

- Reduce installation and integration time and effort.
  (e.g. fast integration of new infrastructure elements by self configuring “plug & play” base stations or relay stations).
- Reduce infrastructure cost.
- Reduce effort and time cycles for “in operation” network adaptation & optimization.
- Increase coverage, performance and reliability.

Basic self-x cycle.



Example 1: self-configuration.

Self-configuration can be defined as the process where a newly deployed BS is configured by automatic installation procedures to get the necessary basic configuration for system operation.

Initial setup

- Discovery of other 802.16 entities and authentication,
- Attachment to the NCMS,
- Downloading of initial configuration SW,
- IP address configuration,
- etc.

Radio configuration

- Neighbor BS list and further handover parameters,
- OFDM sub-tones and power control,
- Uplink and downlink parameters,
- Antenna tilting angle,
- etc.

Example 2: self-optimization.

Self-optimization implies the self-tuning of relevant parameters during operation in order to adapt to the environmental changes.

Measurement collection

Signal strength and QoS reports, capacity measurements, throughput measurement reports, etc.

Data processing

- Algorithmic computation to process the collected data,
- Derivation of key performance indicators,
- Computation of optimized parameters, etc.

Configuration management

- Provide the interface to configure parameters,
- Perform parameter cross-checks before actual configuration is activated, etc.

Scope.

- Architecture discussion on self-x functionalities in IEEE 802.16 (centralized or decentralized).
- Provision of new self-x related measurements e.g. network initiated measurements, position information, etc.
- Provision of self-x related interfaces between IEEE 802.16 entities e.g. due to compatibility in multi-vendor environments.

Summary.

- Related document: IEEE C802.16-06/027
- Self-x functionalities
  - reduce effort (CAPEX and OPEX).
  - increase coverage, performance and reliability.
- Need to discuss the provision of self-x functionalities in IEEE 802.16 networks.
- Let's start this discussion.