Use Case 4: "SON and SON collaboration according to operator policies"

UNIVERSELF

2009
- Release 8 SON features:
  - –Intra-LTE/frequency Automatic Neighbour Relation (ANR) Function
  - –Automatic Physical Cell Identifier (PCI) selection
  - –Dynamic configuration of the S1-MME interface (transport network)
  - –Dynamic Configuration of the X2 interface (between eNodeBs)
  - –Inter-cell Interference Coordination (ICIC, beginning)
  - –Intra (LTE) system load balancing

2010
- Release 9 SON features:
  - –Inter-system load balancing (with 3G)
  - –Mobility Robustness Optimisation (beginning)
  - –Support for RACH Optimisation (beginning)
  - –Support for Energy Saving (beginning)

2011
- Release 10 SON features
  - –ANR for 3G
  - Mobility Robustness Optimisation (enhancement)
  - Mobility load balancing (enhancement)
  - –Cell outage compensation
  - –Optimization of parameters due to troubleshooting

2012
- Release 11 plans
  - –Further self-management advances

2013

Future RAN empowered by Self Organizing Network

to increase Performance

to reduce OPEX

- Compared to previous HSDPA (downlink) and HSUPA (Uplink):
  - – DL peak rate 100 Mbps (7 x HSDPA)
  - – UL peak rate 50 Mbps (5 x HSUPA)
  - – DL spectrum eff. per cell 2 bps/Hz (3 x HSDPA)
  - – UL spectrum eff. per cell1 bps/Hz (2 x HSUPA) User plane round trip latency 10 ms(1/5 x HSDPA)
  - – Broadcast spectrum eff. 1 bps/Hz
  - – Fast state transitions (50 ms dormant->active , 100 ms idle ->active)
  - – Optimized for low mobility (0 – 15 km/h), good performance at 120 km/h, functional at 350 km/h

such as LTE → LTE-A expected

Massive deployment In Europe in 2012

forecast

is heterogeneous

Pico
Femto
Relays

Operation, Optimization, [Deployment] during

- Mobility traffic balancing / off-loading SON entities
- Coverage capacity optimization
- Interference coordination
- Network topology control
- On-line conflict resolution

within

Unified Management Framework

- Network governance & assurance
- Coordinated operation of SON entities
- Conformance to operator policies

trigger coordinated SON entities for

High-level policies

with

addressed by **Operators**

explain

understand & solve

- **Designers** what are the
- **Problems** in a form of
- **Use Cases**

with **Concept Maps** that improve **Understanding** of how to

Traffic Peak

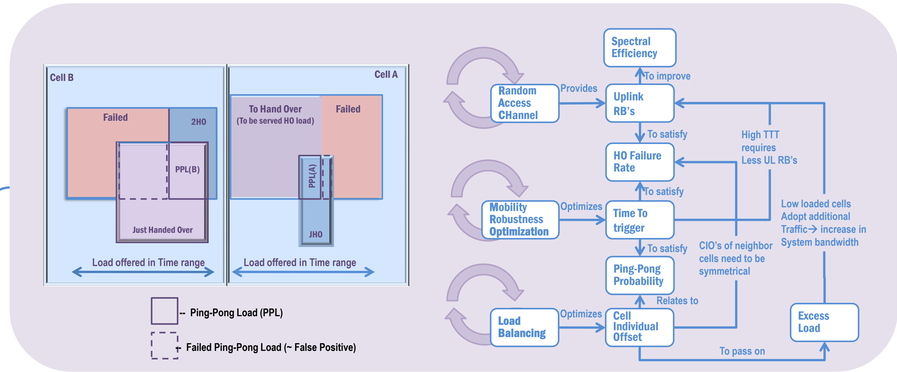
LTE Now

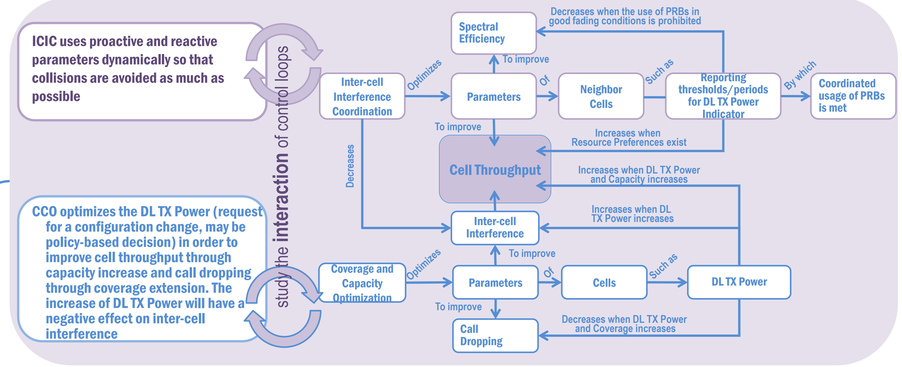
LTE Now

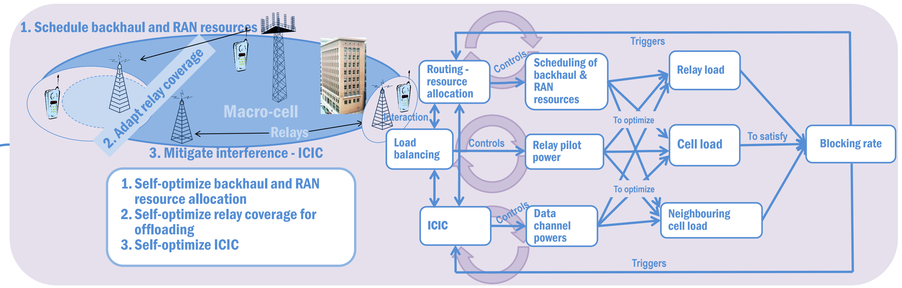
forecast

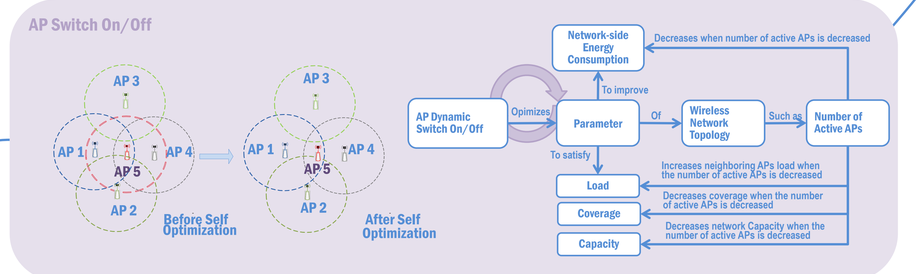
The problem

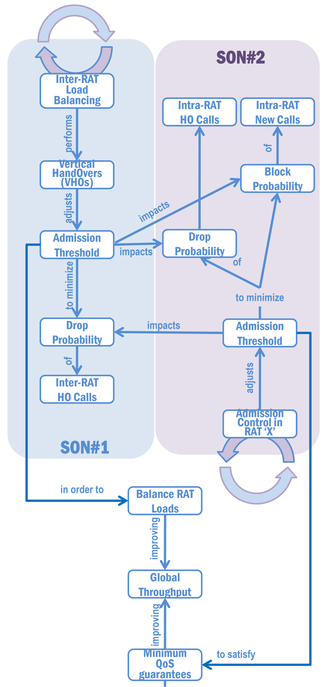
- Massive loss of served traffic
- Degradation of dashboard KPIs
- Loss of coverage due to excess of interference
- Excess of energy consumption











What's Next:

- Notation
- Model Maps
- Self-modeling
- Cell coding
- ...

Design for Self-management [Designer] studies Use Cases [Who can do What with System] to solve Problems [interact, influence, co-exist]