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DOLFIN Project

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Overview of DOLFIN Project

DOLFIN General

THE GREEN GRID EMEA FORUM
28-29 October 2014

Data centres **O**ptimization for energy-efficient and environmental**L**y **F**riendly **IN**ternet

Optimize Data Centre energy consumption in three levels/contexts:

Level 1 ⇨ Intra-DC optimisation
Level 2 ⇨ Inter-DC optimisation
Level 3 ⇨ Offer Smart Grid/Smart City stabilisation services

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DOLFIN Objectives

1. Improve the efficiency of the energy system
2. Stimulate the adoption of green energy
3. Increase the availability, reliability and sustainability of federations of DCs
4. Reduce DC operational costs
5. Increase the performance of the offered DC services
6. Increase customer satisfaction

DOLFIN DC Optimisation

Optimisation targets

1. Absolute energy reduction
2. Smart Energy stabilisation
3. Greenify the energy mix of DC services

Intra-DC optimisation

- Continuous Monitoring
- Automated DC Management
  - Optimal server distribution
  - Optimal load management per server
  - Dynamic management of IT equipment power states
  - Active HVAC Control
- Heat Absorption
- SLA Management

Inter-DC optimisation

- Aggregate DC optimisation
  - Same/Different administrative domains

- Exploit
  - Multi-tariffs from Utility companies
  - Local REN generation
  - Flexible contracts/SLAs

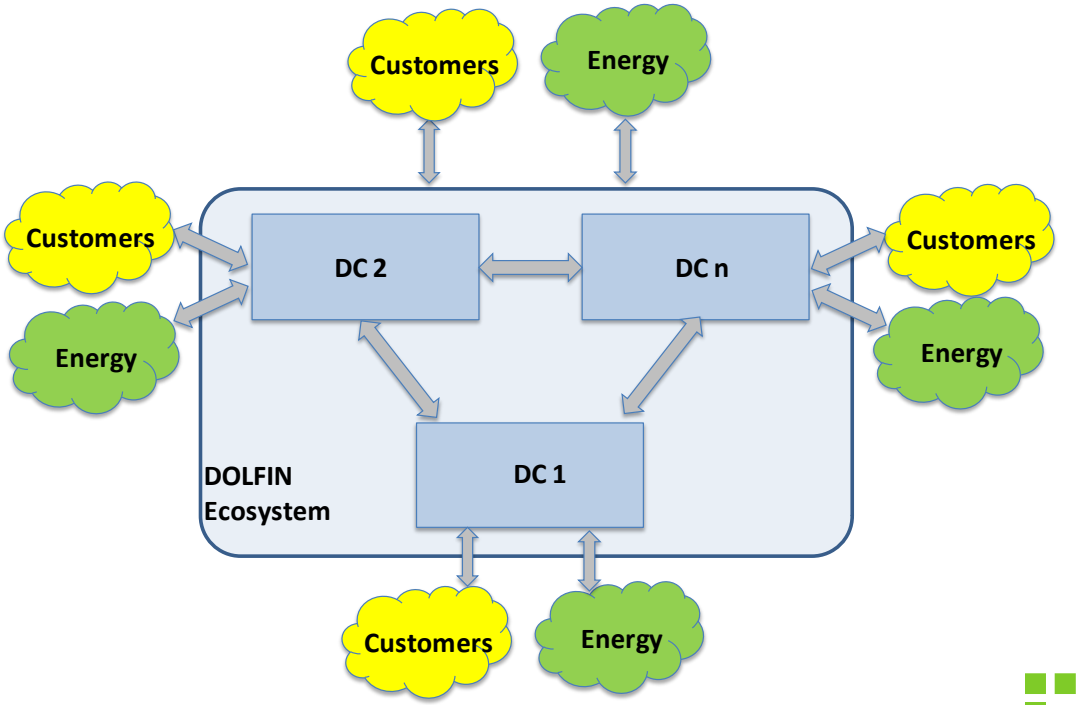
Smart Grid / Smart City Integration

Support for Demand/Response plans

- Load shifting
- Load relocation
- Flexible contracts with customers
- Heat exchange from the cooling system
- Electric power generation from renewable sources
- Electric power absorption modulation

DOLFIN Architectures

DOLFIN high level Architecture



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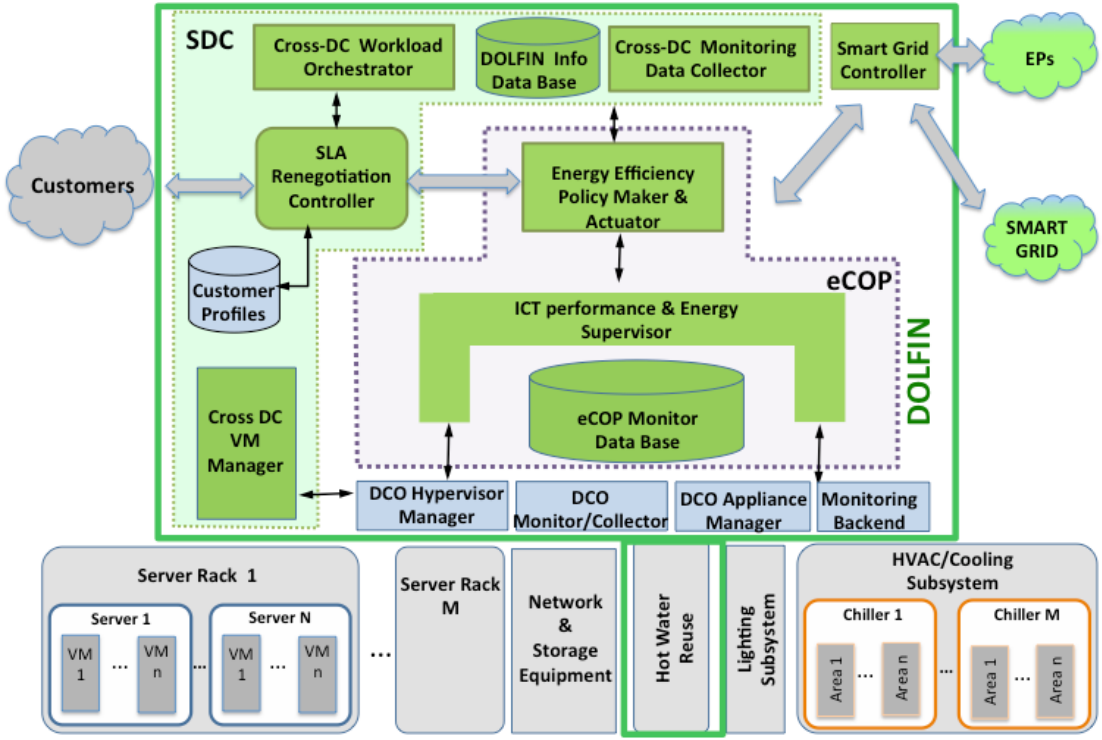
DOLFIN Functional Architecture



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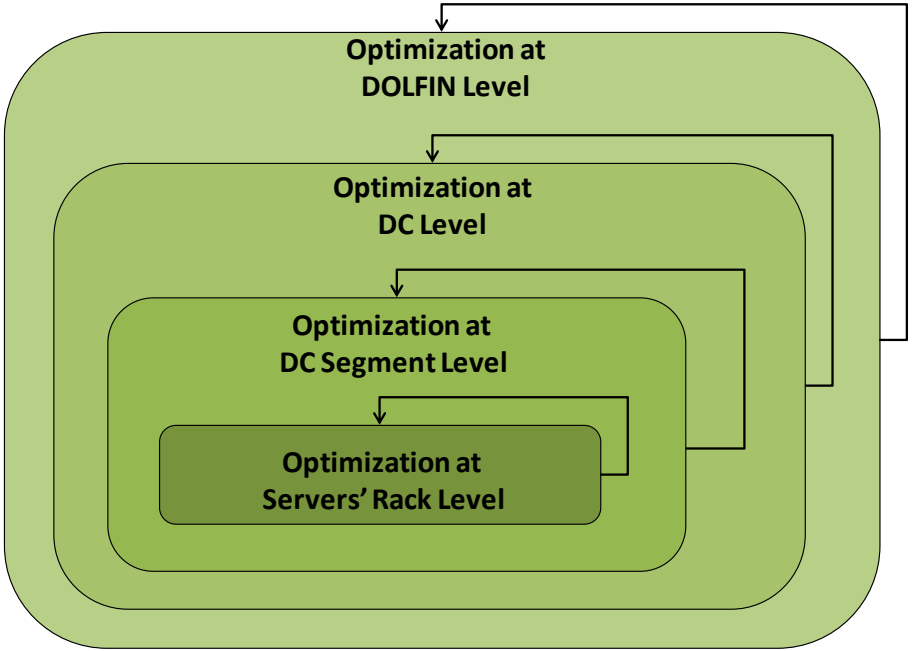
General Optimisation Architecture



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DC Cluster Collaboration

DOLFIN in the Cluster

- Leaders of Tasks 2, 4
- Contribution in Tasks 1, 3

⇨Feed the Cluster back with trial data

⇨Participate to the Standardisation efforts

Final thoughts

DOLFIN: Sustainability & Evolution

- The expansion of DCs is rapid
  - Increased Energy consumption
  - Sustainability depending on operational efficiency
- Coalitions of DCs have greater aggregate value than islanding DCs
  - Exploit time/weather differentiations among DCs
  - Clouds of clouds
- Towards Software-Defined DCs
- Make Energy really Smart
  - Exchange energy for services

Questions?

Thank you for your attention

Details available at http://www.dolfin-fp7.eu/

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