

# Experimental COgnitive Distributed Engine

## ECODE STREP Project

FP7-ICT-2007 Call 2 - ICT-2007-1.6

New Paradigms and Experimental Facilities

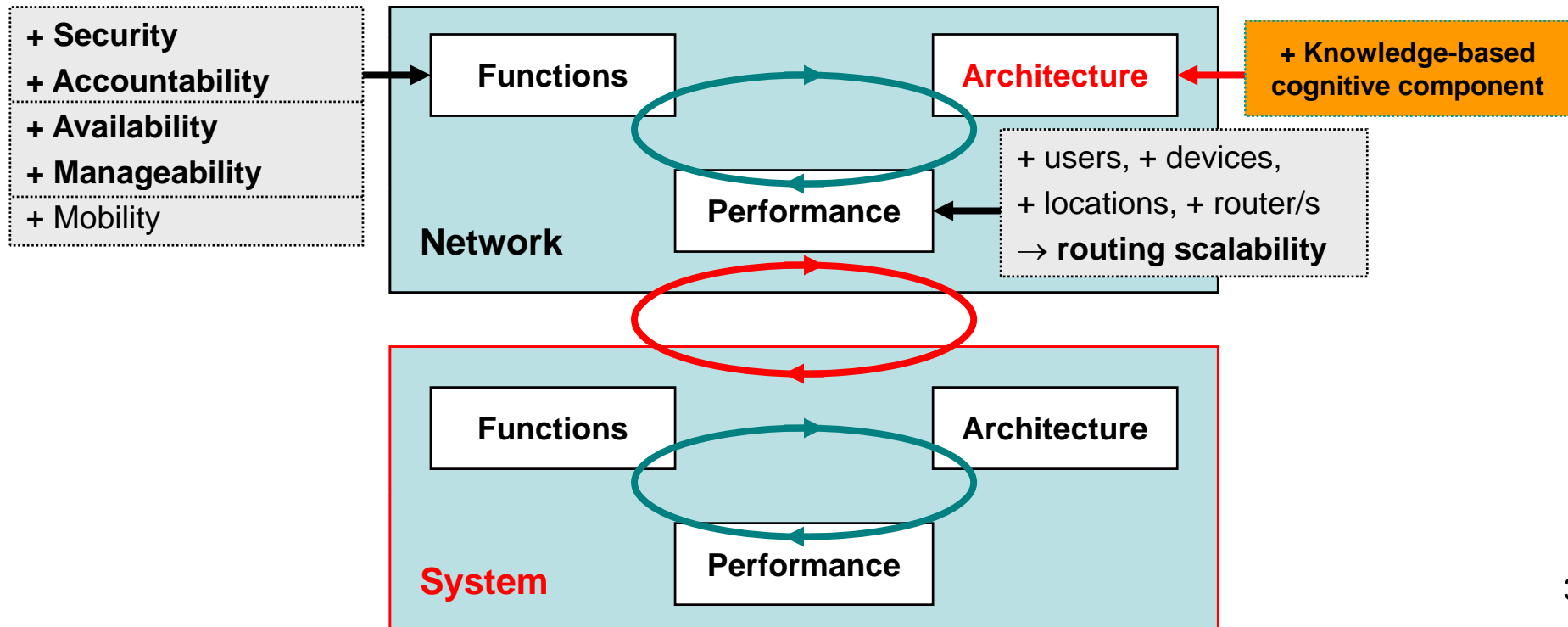
# Overall objectives

- **New architectural component** to sustain Internet growth performing in accordance to
    - what it is expected to deliver to the end-user
    - growing end-user basis and expectations
  - **Experimentally-driven research** project to determine
    - If Internet high-level goals - societal, economical, etc. can be translated into lower-level objectives (in terms of functionality and performance) & constraints (both technical and non-technical) that can be enforced via **cognitive component**
    - If introducing this cognitive component, will improve and extend Internet functionality (controllability, manageability, security, accountability, etc.) and performance while reducing resulting cost & complexity
- ⇒ Limiting cost & complexity of Internet infrastructure growth while provide for adequate solution to existing and foreseeable Internet challenges

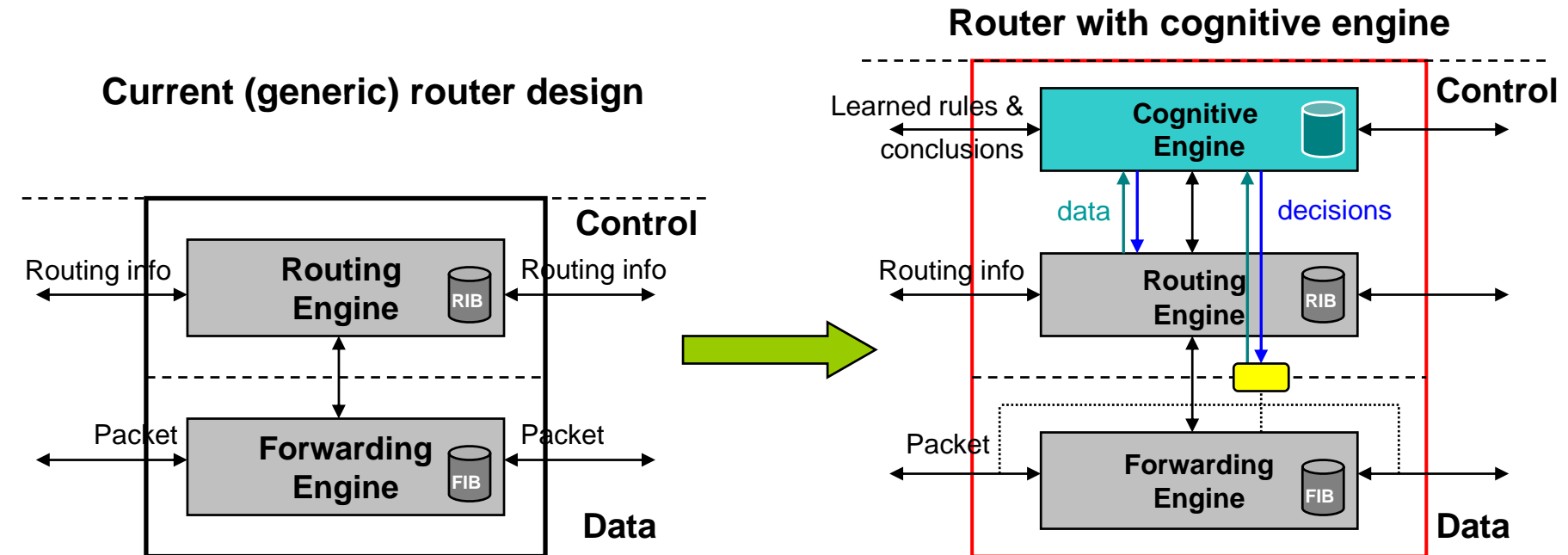
# S&T objectives

## Develop a **cognitive routing system**

- **Addressing future Internet challenges:** security, accountability, availability/resiliency, scalability, and complexity/ manageability  
note: preserves original valuable Internet design principles
- **By combining existing routing system x machine learning methods**  
(implemented by knowledge-based cognitive component)



# Main concept(s) & idea(s)



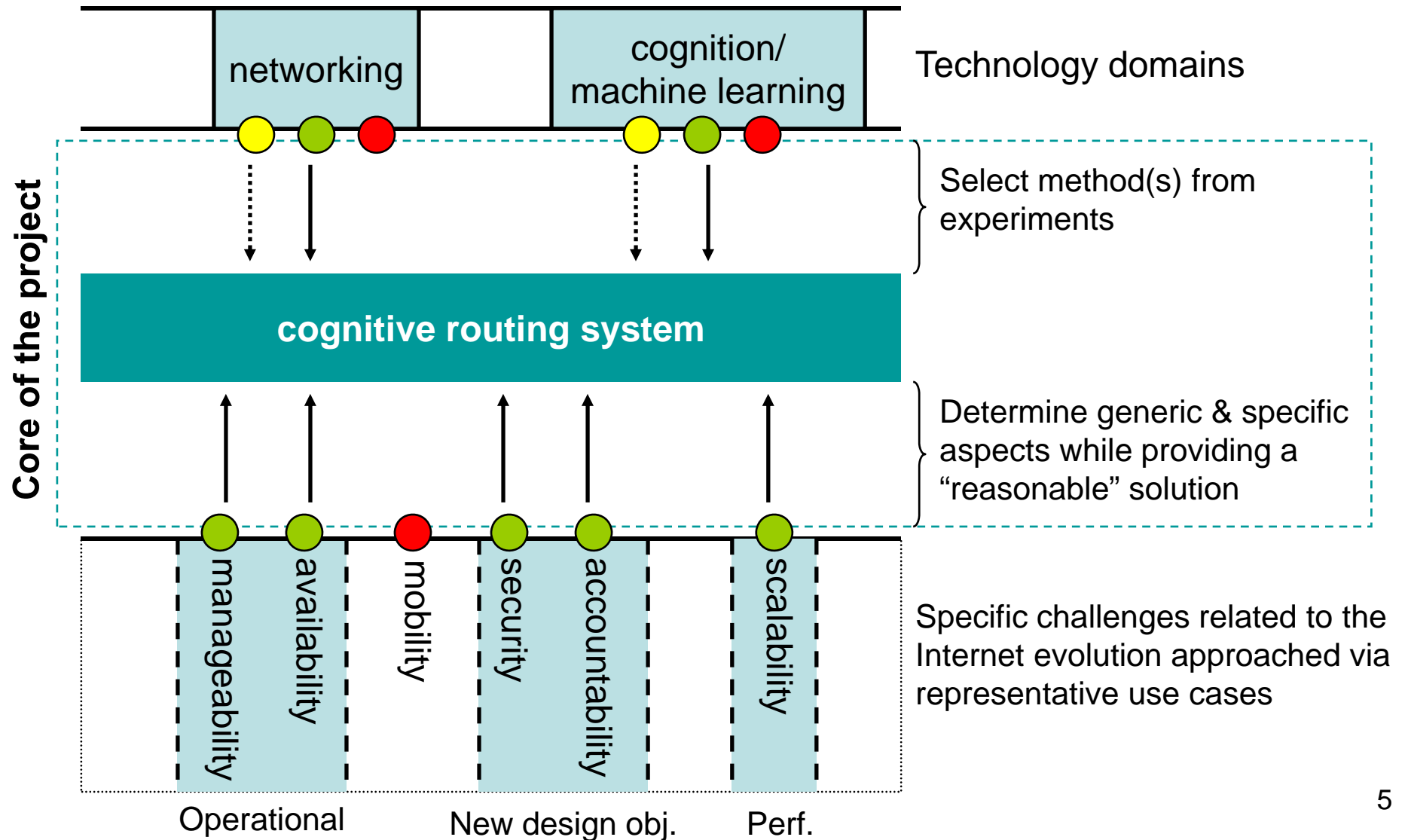
Driving concept:

Augment existing control paradigm of (system and network) lower-level data collection and decision making, with a cognitive/machine-learning component

- Enables system and network to learn about its own behavior and environment over time
- Ability to analyze problems, tune its operation and increase its functionality (controllability/manageability, security, etc.) and performance

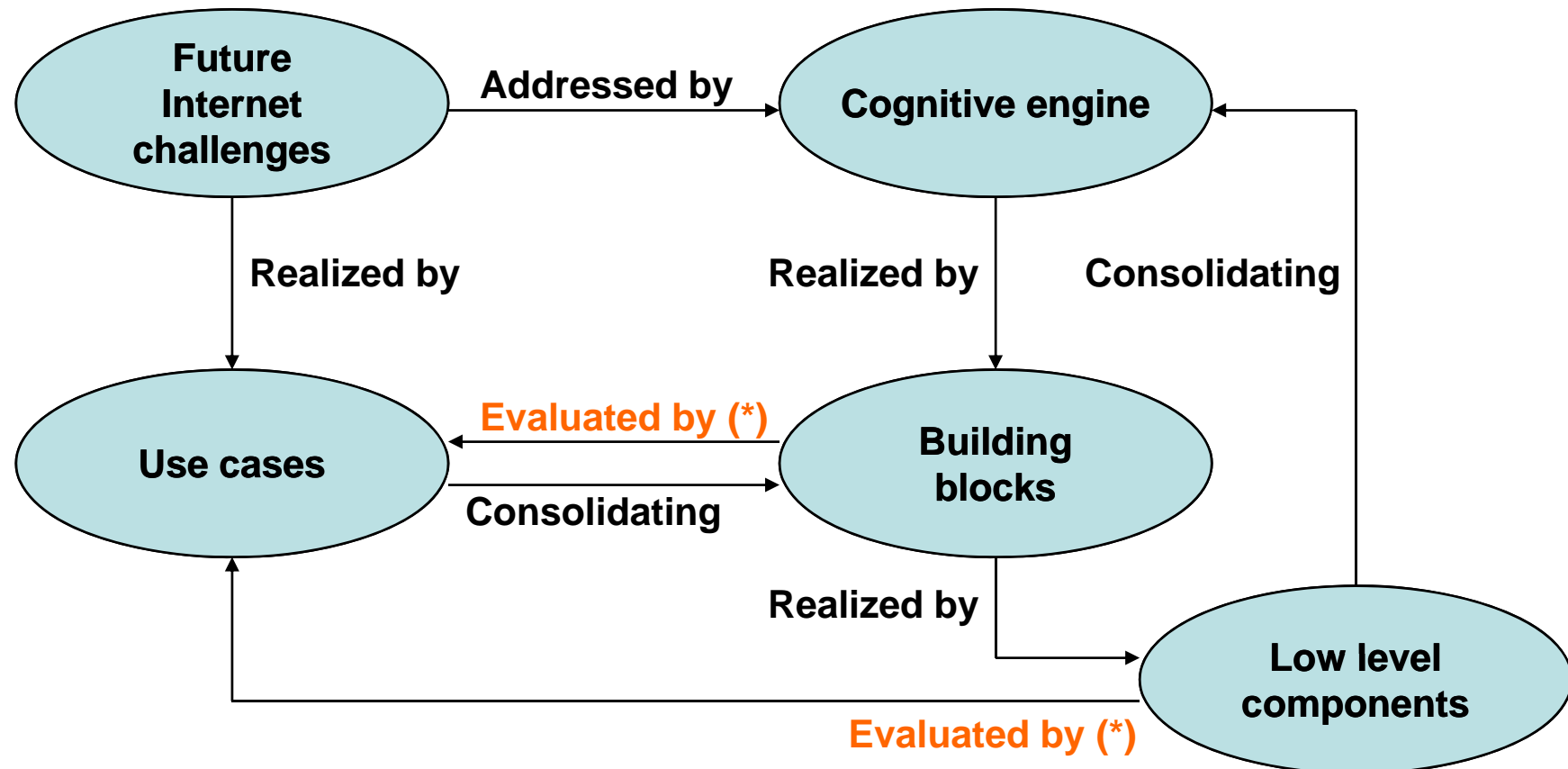
# Approach

**inter-disciplinary experimental approach:** cross-fertilization between networking and cognition/ machine learning domains and experimentation



# Methodology

- Set of networking use cases representative of future Internet challenges
- Applying machine-learning methods (using cognitive engine designed as set of functional blocks) to these use cases
- Experimental evaluation (physical: iLAB Virtual Wall, virtual: OneLab)



# Technical objectives

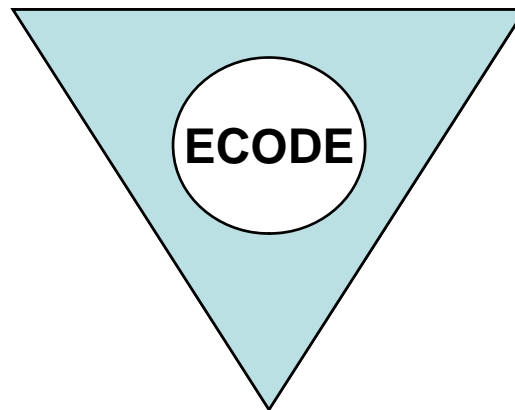
Technical Objective	Ref.	Use Case
<b>TO1:</b> Adaptive traffic sampling and management, path performance monitoring, and intrusion and attack/anomaly detection	a1	Adaptive traffic sampling and management
	a2	Path performance monitoring
	a3	Cooperative intrusion and attack/anomaly detection
<b>TO2:</b> Path availability, network recovery and resiliency, and profile-based accountability	b1	Path availability
	b2	Network recovery and resiliency
	b3	Profile-based accountability
<b>TO3:</b> Routing system scalability and quality	c1	Routing system scalability and routing system quality (convergence, stability/robustness, and stretch)

# FIRE co-operation

- ECODE actively co-operate with other IST/ICT projects in the framework of FIRE clustering activities

## FP6 Projects

- OneLab: UCL, INRIA
- SAC/ANA: ULG
- RING (CA): TBD



## FP7 Projects - Future Networks

- TRILOGY: UCL
- 4WARD: ULANC

## FP7 Projects - FIRE

- OneLab2: INRIA
- ResumeNet: ULG
- Other inline with objectives



# Project: fiche technique

- Name: ECODE (Experimental COgnitive Distributed Engine)
- STREP: FP7-ICT-2007 Call 2
- Duration: 36 months (3 years)
- Number of partners: 7 (A-LBELL, UCL, ULG, IBBT, INRIA, ULANC, and CNRS)
- EU countries: BE, UK, FR
- Manpower:
  - Total: 498 PM
  - RTD Activity: 486 PM
- Requested Funding:
  - Total: 3.070M Euros (including MGT costs)
  - RTD Activity: 2.932M Euros (about 1M per year)