

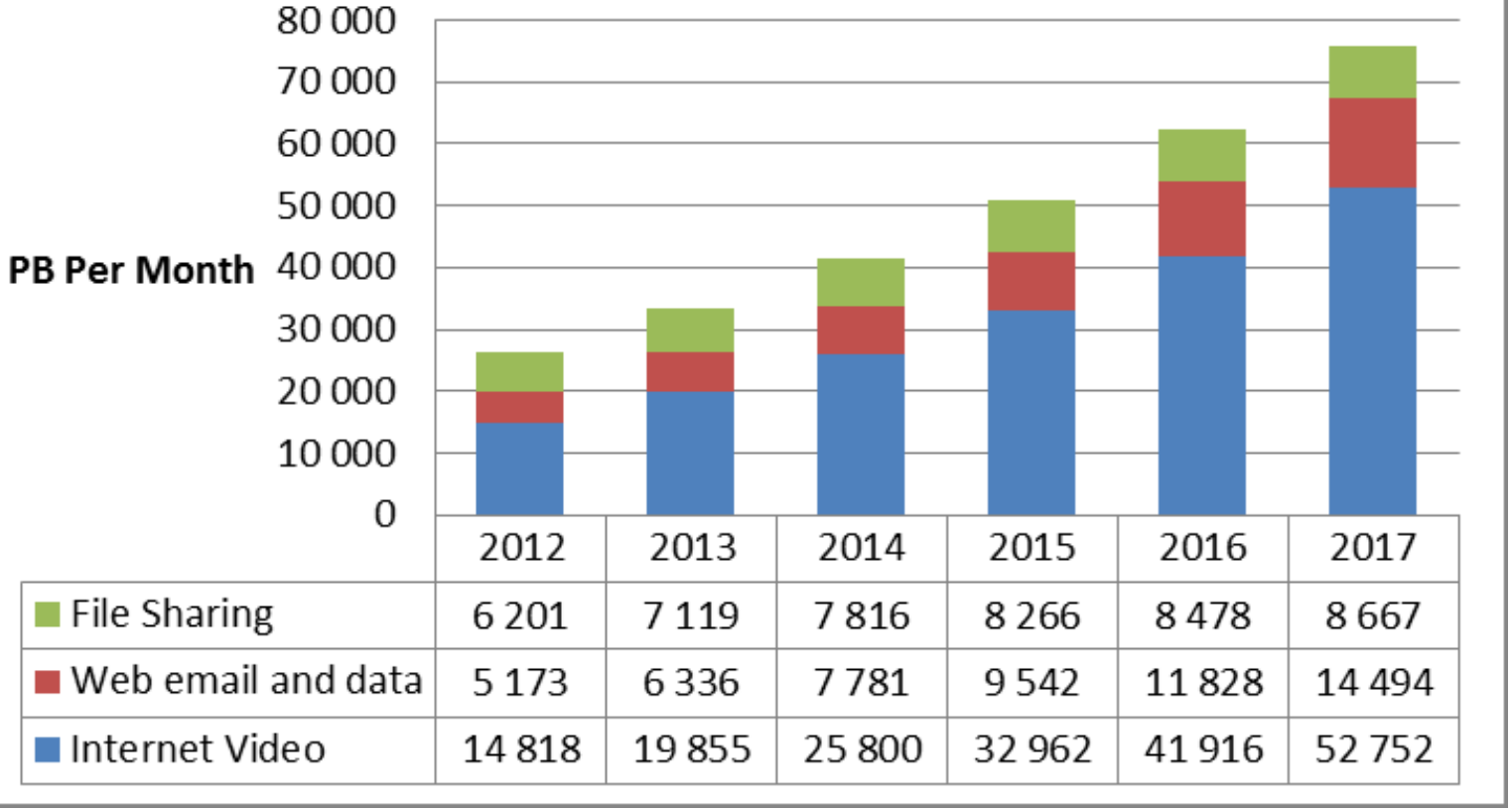
SERVICE AND USER-BASED DISTRIBUTED SELECTION OF CONTENT STREAMING SOURCE AND DUAL ADAPTATION

DISEDAN PROJECT

Jordi Mongay Batalla

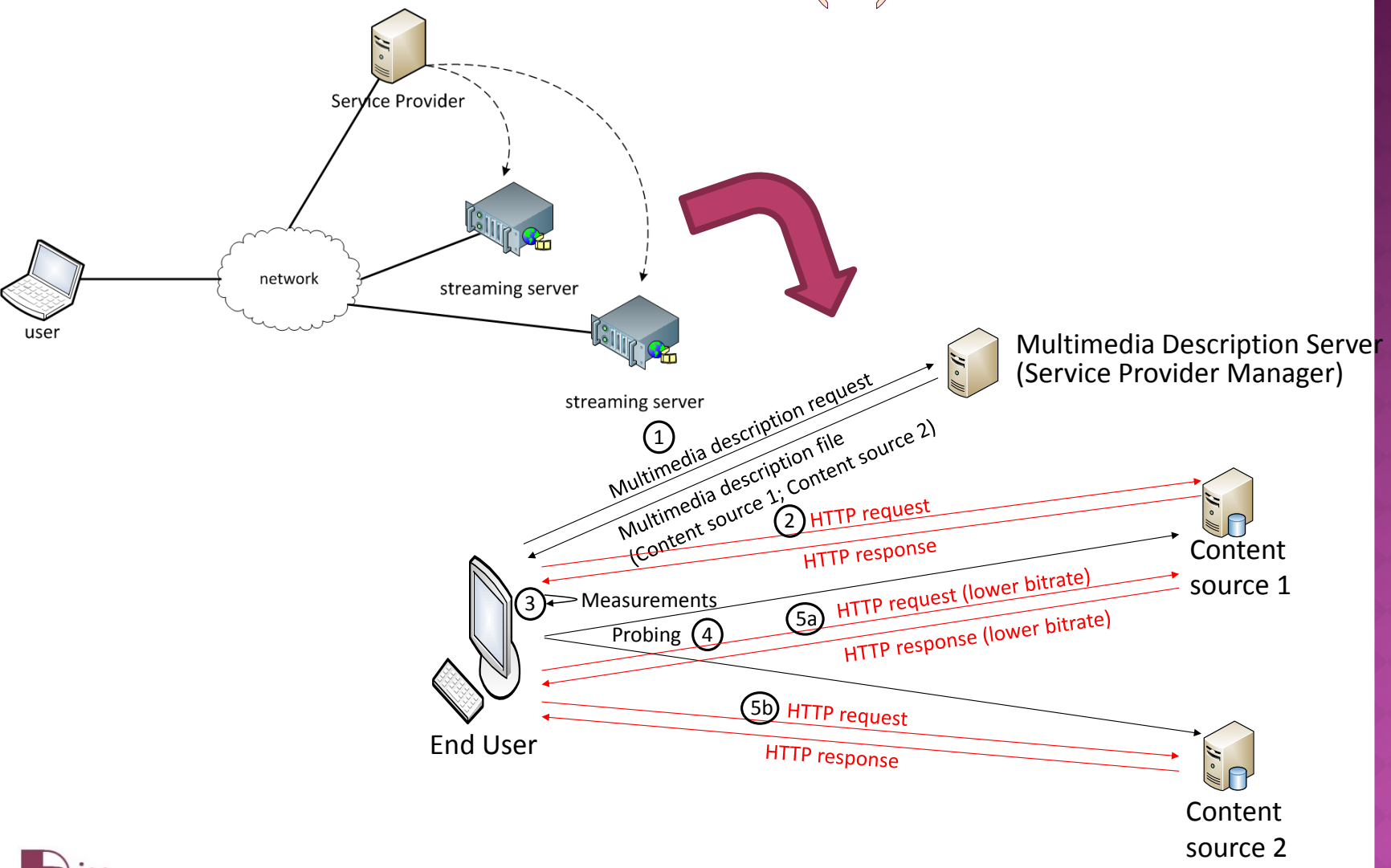
(Warsaw University of Technology – Poland)

MOTIVATION



	2012	2013	2014	2015	2016	2017
File Sharing	6 201	7 119	7 816	8 266	8 478	8 667
Web email and data	5 173	6 336	7 781	9 542	11 828	14 494
Internet Video	14 818	19 855	25 800	32 962	41 916	52 752

DISEDAN: OBJECTIVES (1)



DISEDAN: OBJECTIVES (2)

- DISEDAN will research on an effective solution for the multi-criteria hard problem of best content source selection, considering user context, servers availability and distribution mode. The new concept will be based on:
  - a two-step server selection mechanism (at Service Provider and at End User) making use of innovative algorithms that consider context- and content-awareness
  - a dual adaptation mechanism consisting of Media adaptation (also called media flow adaptation) and content source adaptation (by switching the streaming server) when the transmission suffers degradation.

→ DISEDAN proposes a solution that can be rapidly deployed in the market since it does not require complex architecture

PARTNERS

- Warsaw University of Technology
  - Jordi Mongay Batalla, Andrzej Bęben, Piotr Krawiec
- CNRS-LaBRI - University of Bordeaux
  - Daniel Négru, David Bromberg, Joachim Bruneau
- University “Politehnica” Bucharest
  - Eugen Borcoci, Sorin Zoican, Cristian Cernat, Radu Badea…

MAIN RESEARCH CHALLENGES (1)

- Service Provider side:
  - Design **dynamic MPD creation method** to recommend clients the best content sources and representations
    - Gather information about content, context, server status and network conditions
    - Use Multicriteria Decision Analysis (MCDA), Evolutionary Multiobjective Optimization (EMO) or other AI algorithms to rank recommended candidates

MAIN RESEARCH CHALLENGES (2)

- Client side:
  - Design **content source selection method** to select the best content server (or servers) from the set of candidates recommended by SP
    - use measurements at client side
    - exploit MCDA
  - Design **dual adaptation mechanism** for smooth content playout under changing server/network conditions
    - content source adaptation
    - media adaptation

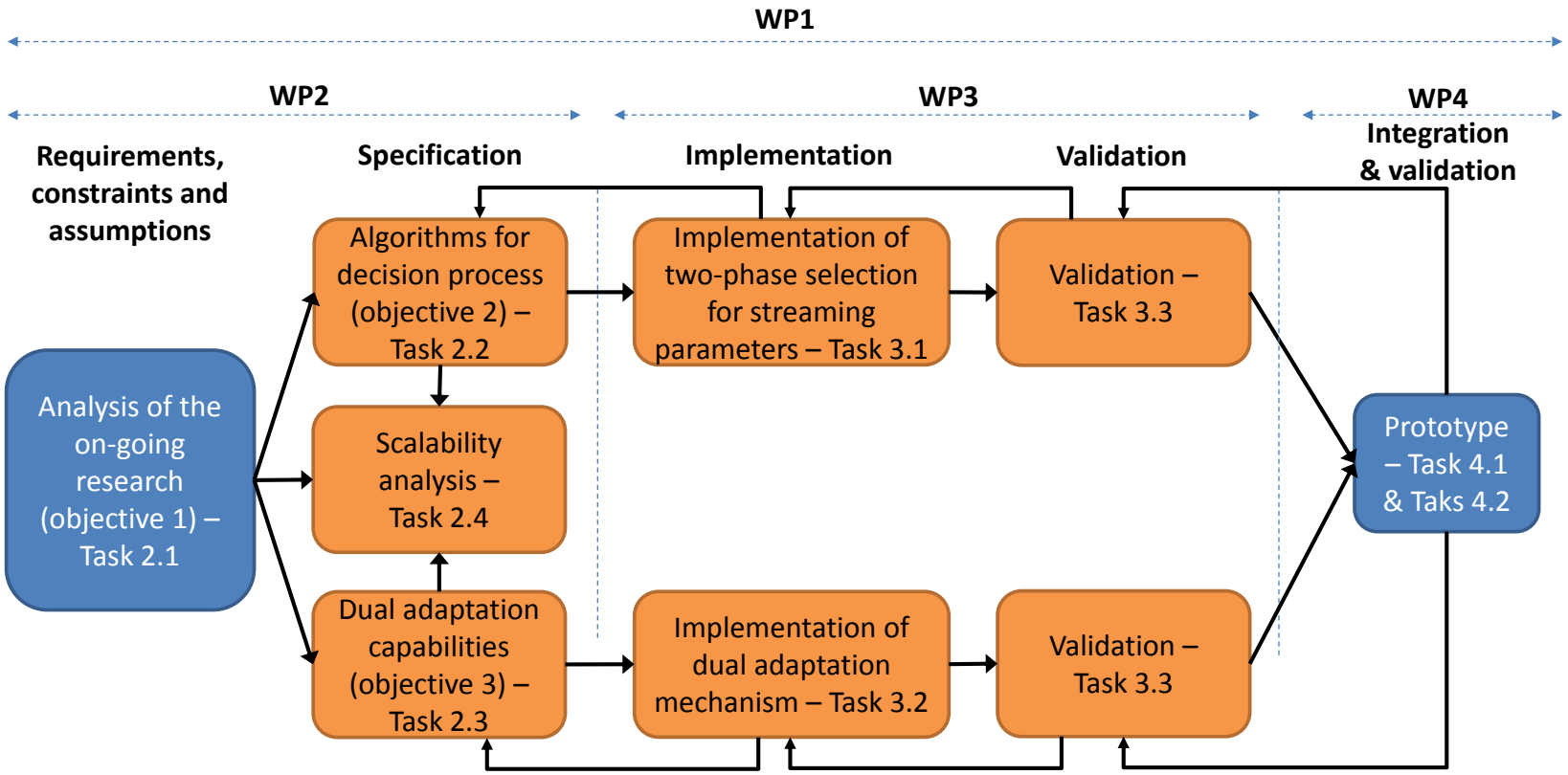
MAIN RESEARCH CHALLENGES (3)

- Design **measurement methods** for client to monitor changing network/server conditions
  - Rate (average, instantaneous, variation, ...)
  - Buffer size (thresholds, avg, differential, ...)
  - Jitter of packet arrivals
  - round trip time
- **Derive models** for:
  - Evaluation of decision algorithms at client and SP
  - Playout buffer dimensioning
  - Dual adaptation mechanisms

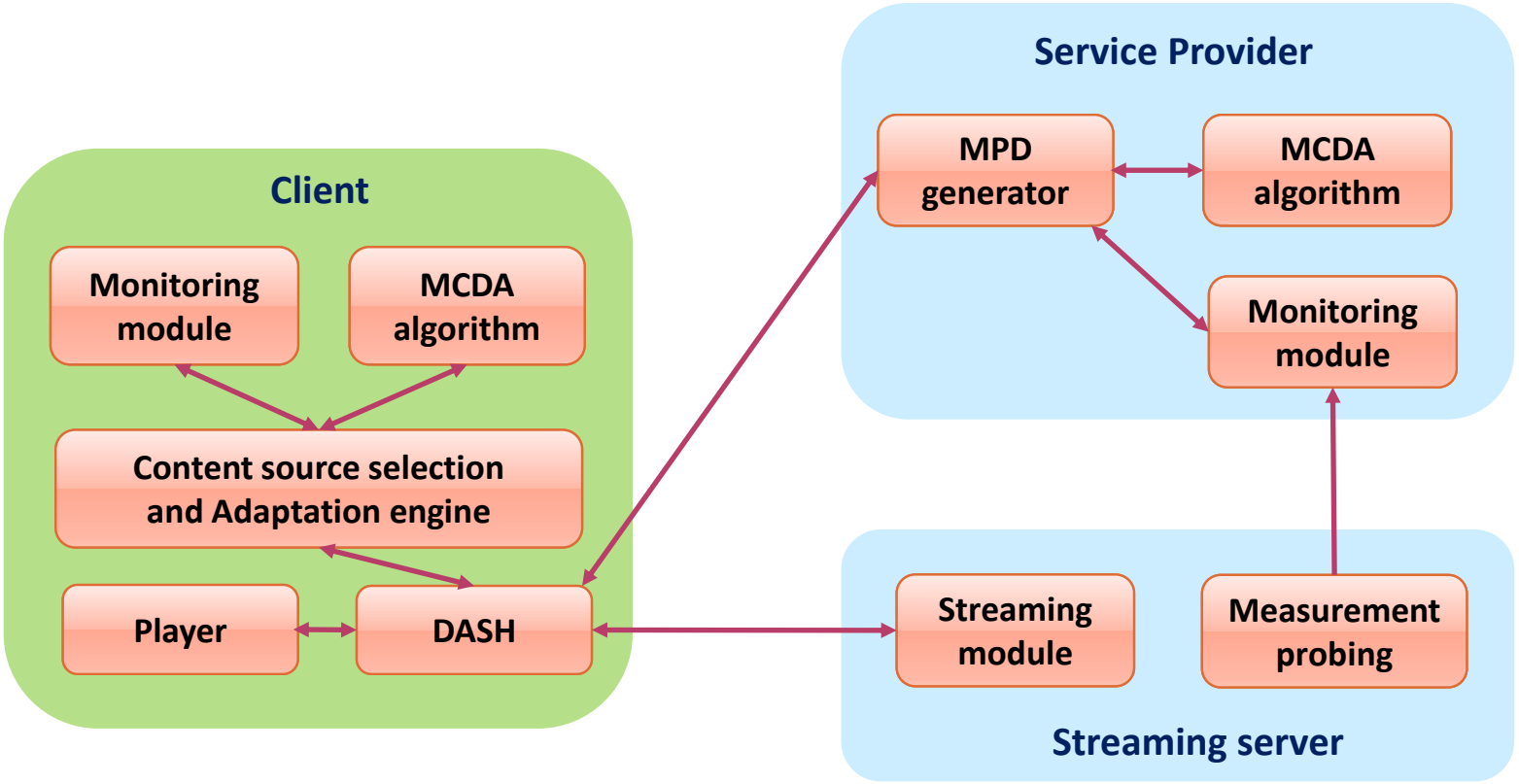
METHODOLOGY

WP1: Management and dissemination
T1.1: Management
T1.2: Dissemination
WP2: Specification of DISEDAN System
T2.1: System requirements identification and analysis of existing solutions at the SP side and user side
T2.2: Multi-criteria decision process algorithm
T2.3: Specification of Dual adaptation mechanism
T2.4: Media content servers selection and dual adaptation algorithms validation in large scale context
WP3: Implementation and validation
T3.1: Two-phase server selection
T3.2: Dual adaptation mechanism
T3.3: Validation
WP4: Integration and validation
T4.1: Integration of the system
T4.2: Final validation of the system

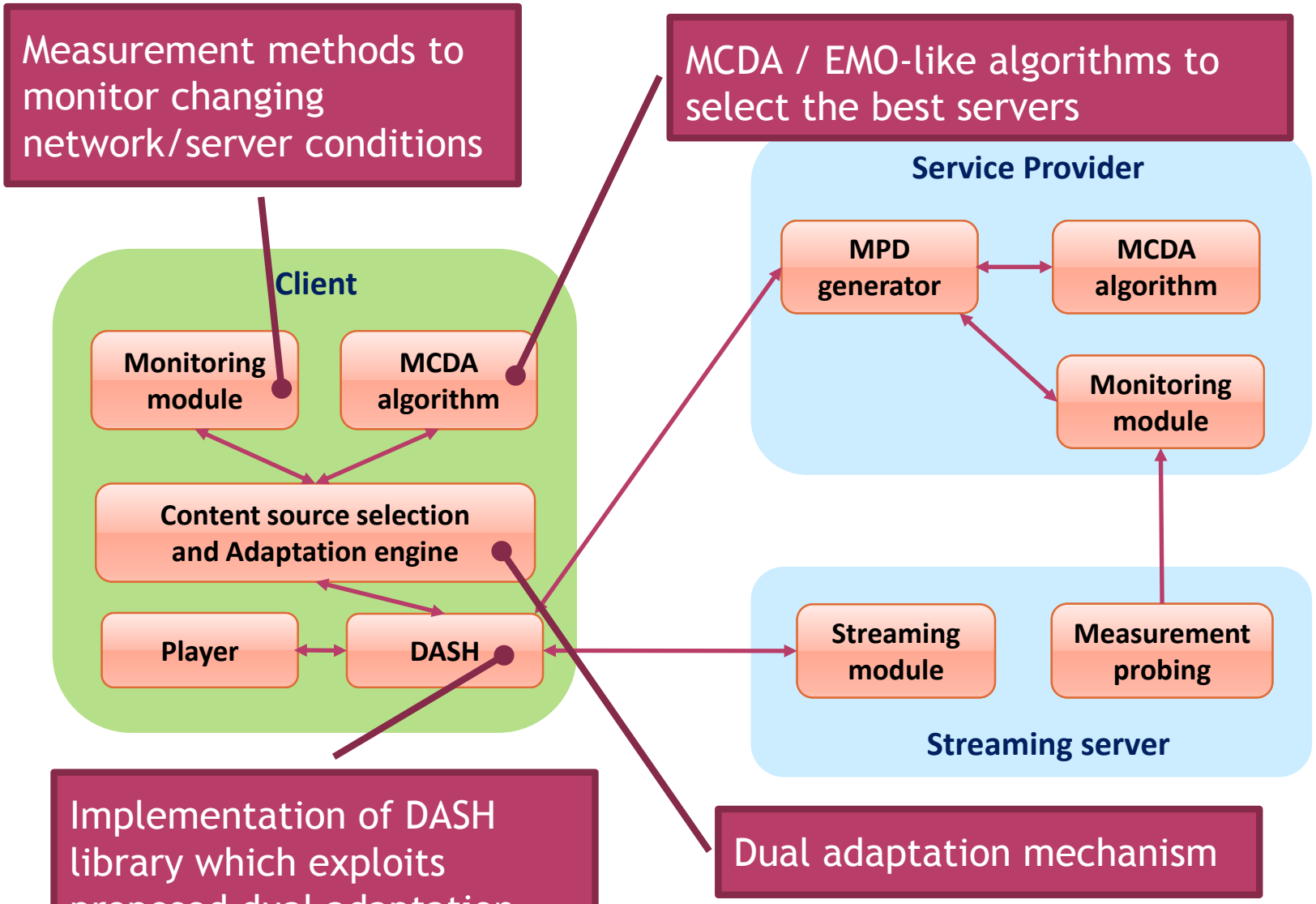
METHODOLOGY



FUNCTIONAL BLOCKS

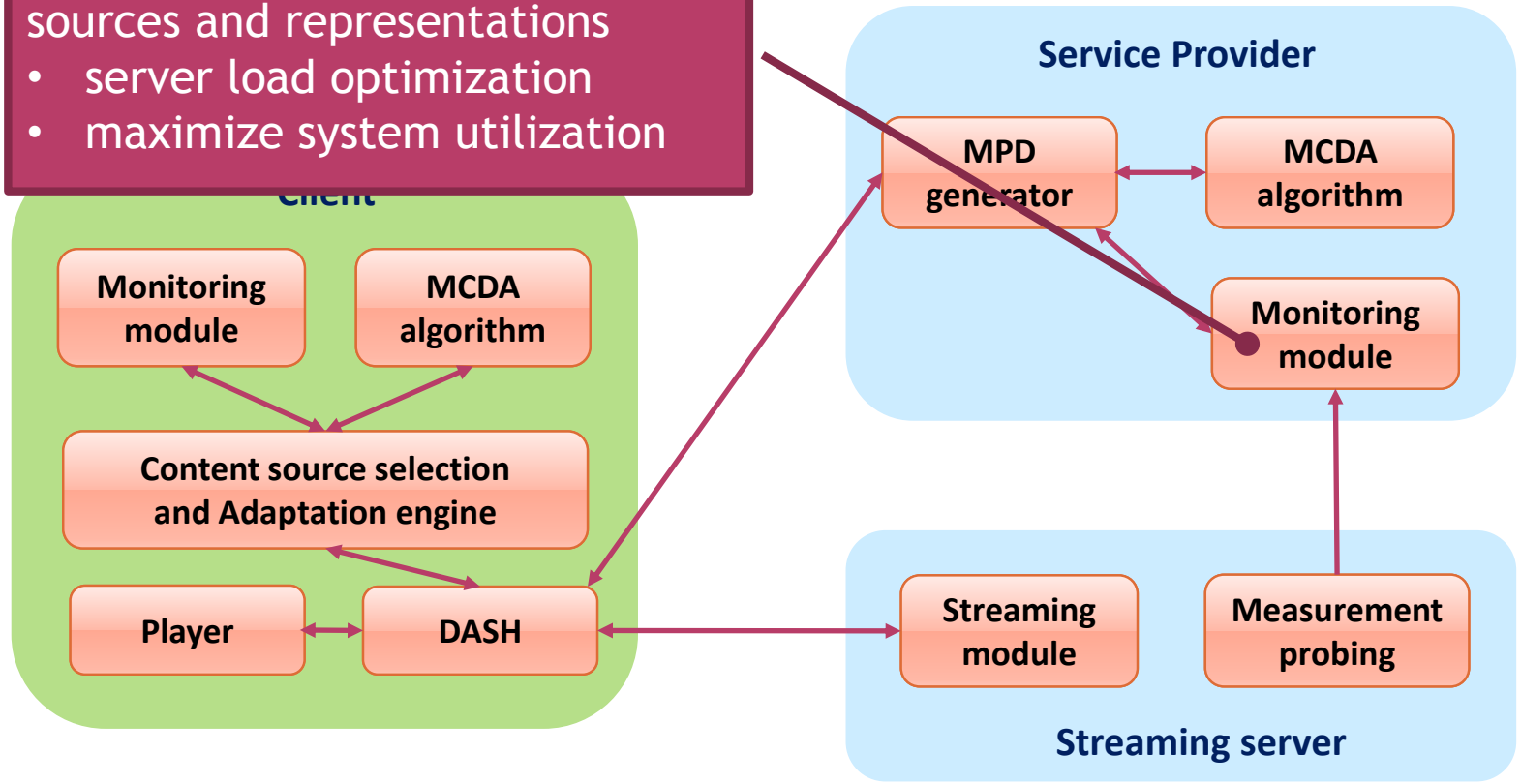


WUT CONTRIBUTION – CLIENT SIDE

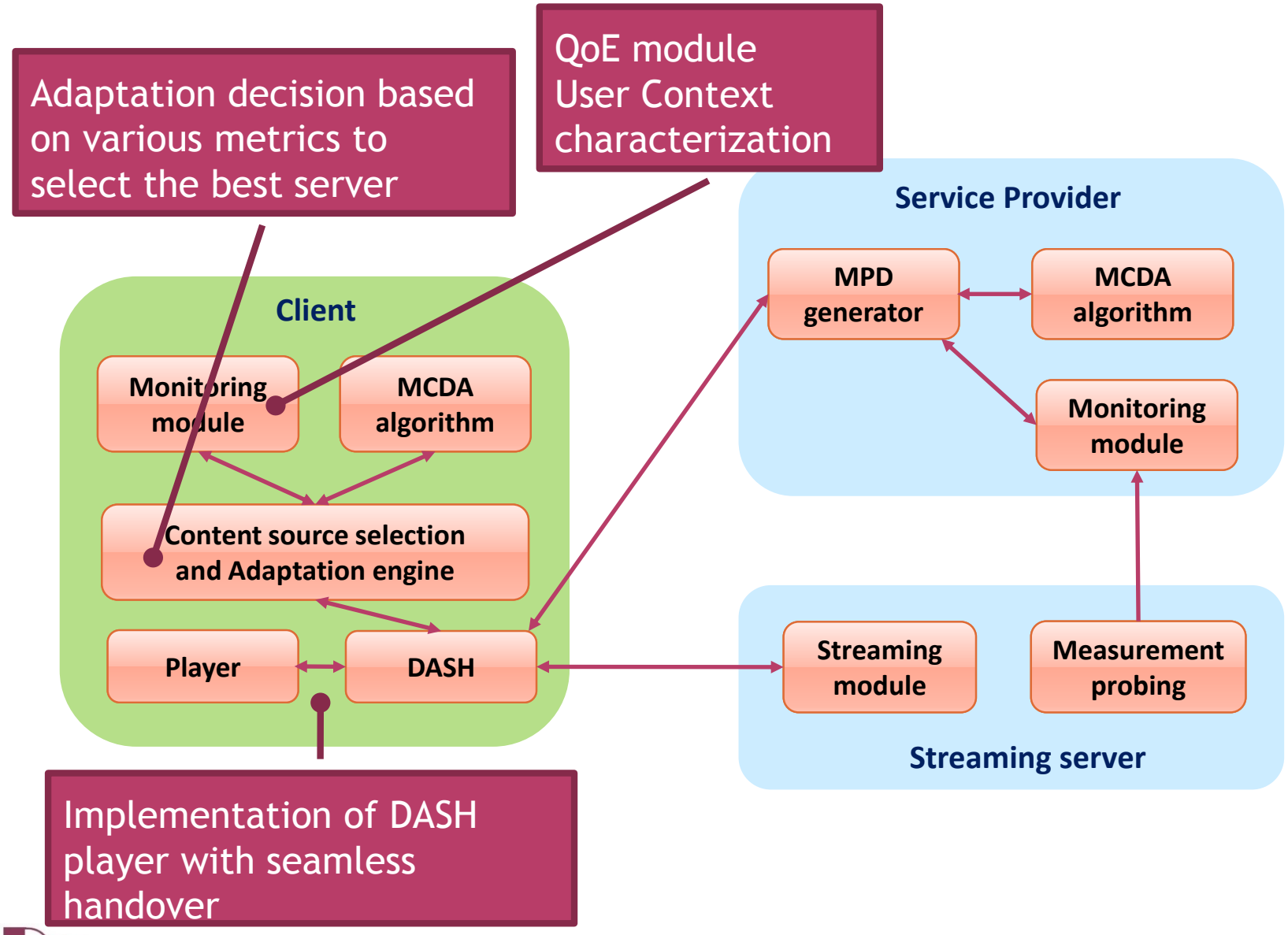


WUT CONTRIBUTION - SP SIDE

MCDA / EMO-like algorithms to recommend the best content sources and representations
- server load optimization
- maximize system utilization

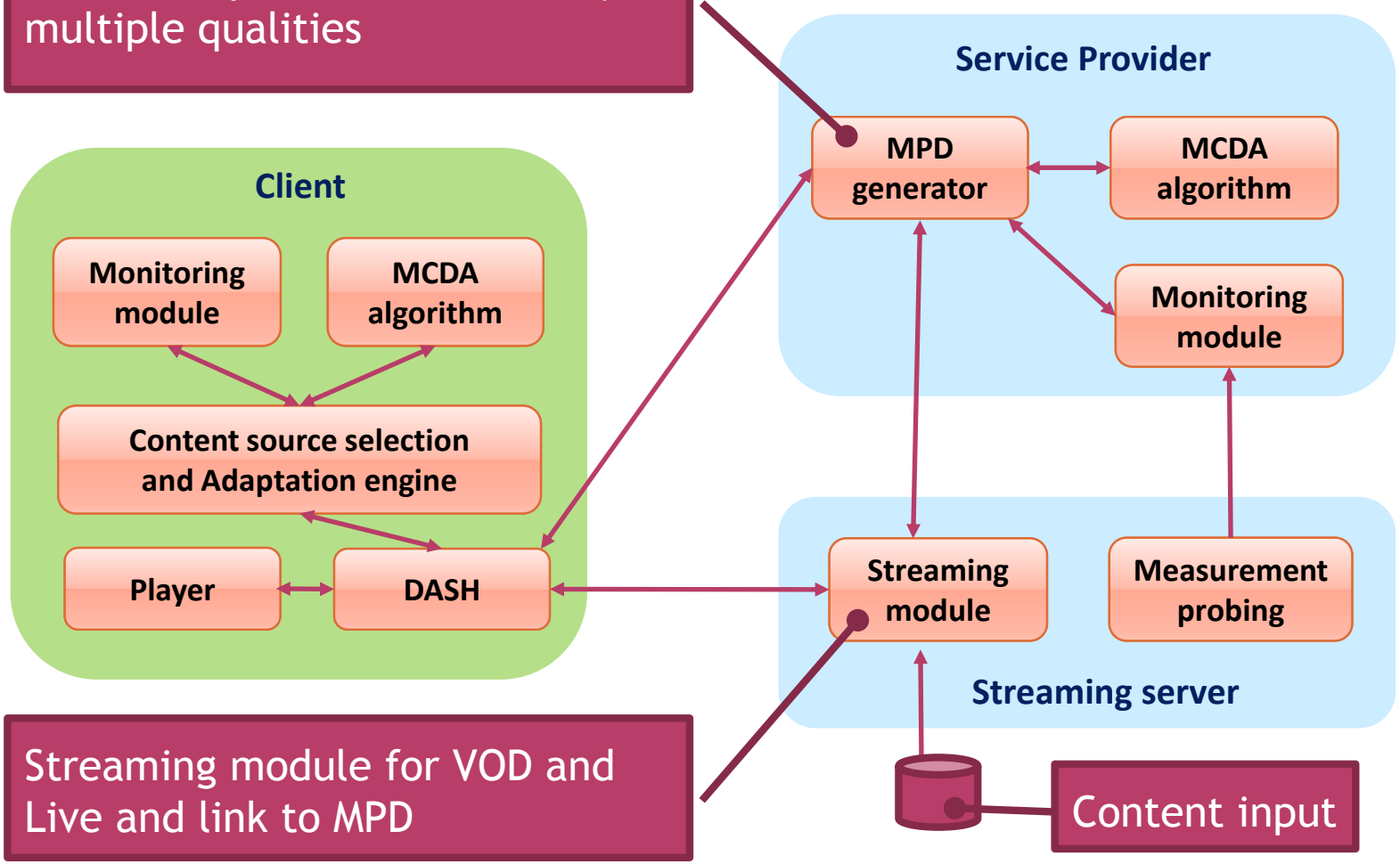


LABRI CONTRIBUTION - CLIENT SIDE



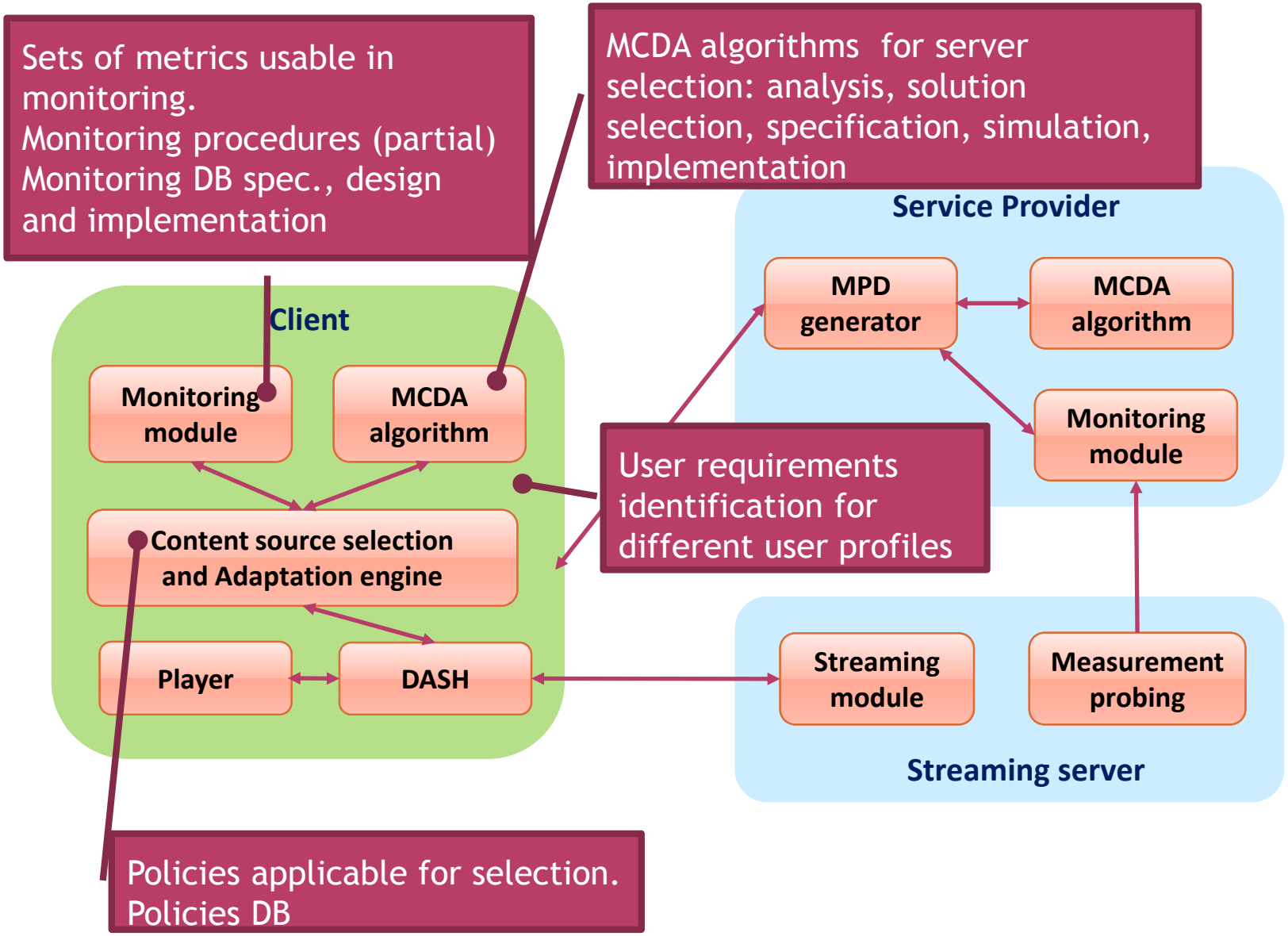
LABRI CONTRIBUTION - SP SIDE

MPD generator considering inputs from multiple servers, not only multiple qualities



Streaming module for VOD and Live and link to MPD

UPB CONTRIBUTION - CLIENT SIDE

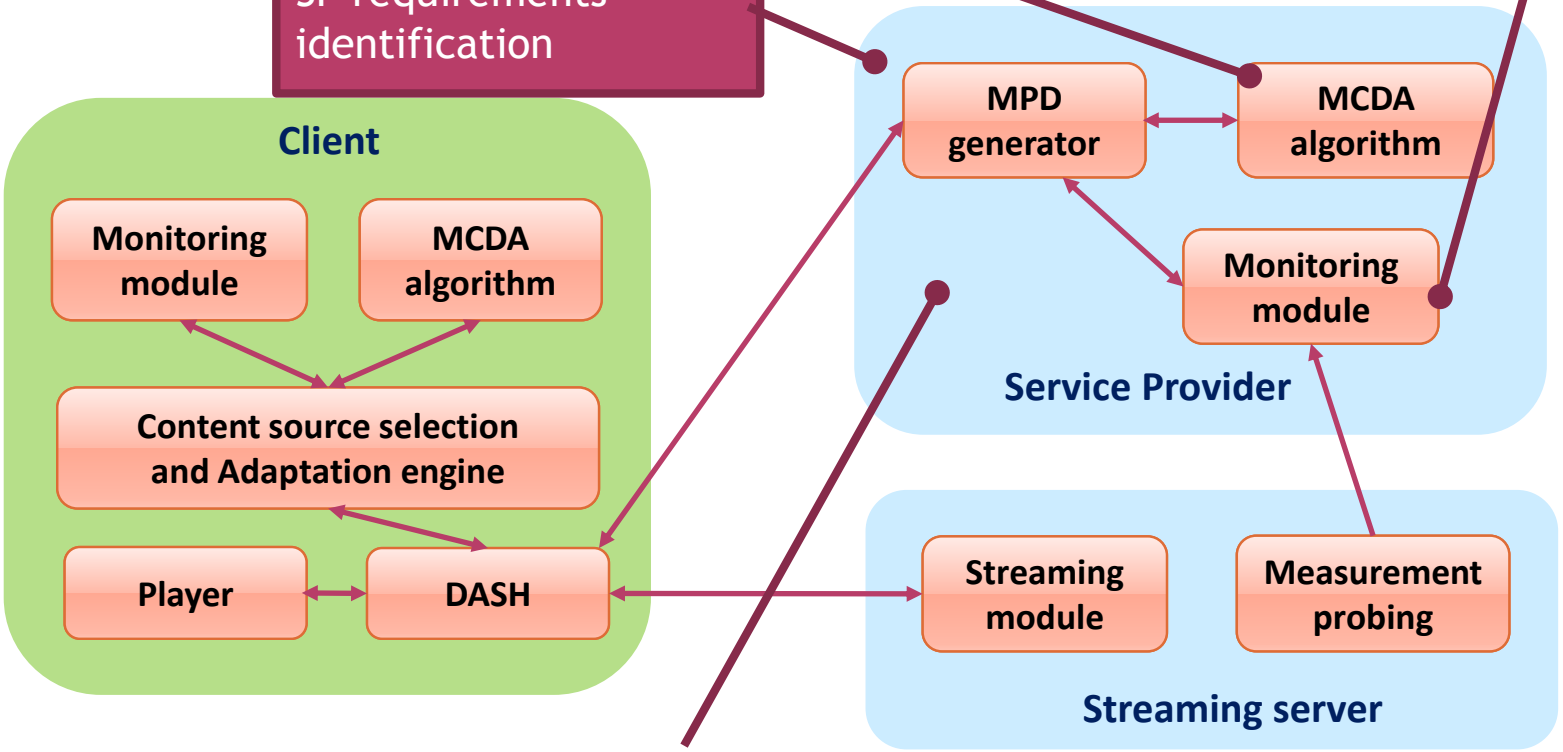


UPB CONTRIBUTION - S

MCDA, EMO , etc. Algorithms for server selection

Sets of monitoring metrics
Monitoring procedures
Monitoring DB spec., design and implementation

SP requirements identification

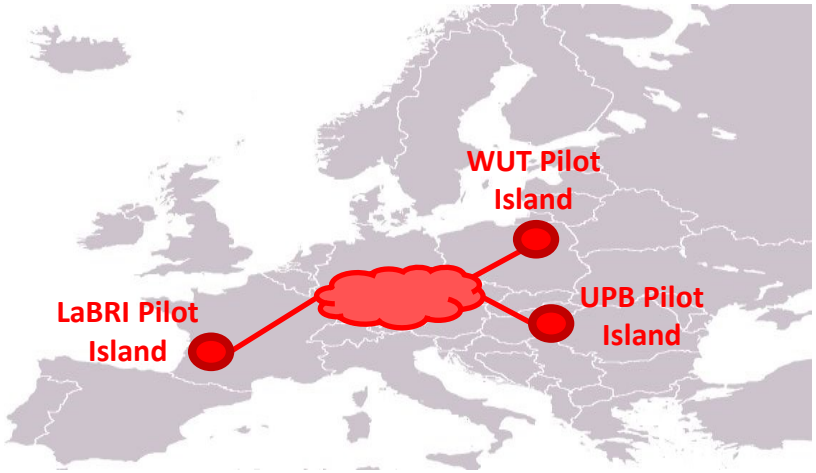


Policies applicable at SP for server selection.
Policies DB@SP

EVALUATION

Project's results will by validated through:

- Simulative tests
  - assuming large scale scenarios
- Trials
  - in controlled environment (inside pilot island)
  - using Internet (between pilot islands)



DISSEMINATION

- **Conferences and journals: More than 10 Rank A/B planned during the project**
- **Cooperation with other projects, specially with CONCERT and MACACO projects, which is in the same thematic:**
  - Common workshop (tentative)
- Two PhD:
  - UPB – Radu Badea
  - LaBRI – Joachim Bruneau
- Training courses in academic academies
- Presentation to industry: Orange, Vodafone, Cosmote, RomTelecom
- Standardisation follow-up:
  - IRTF
  - DASH

THANK YOU!