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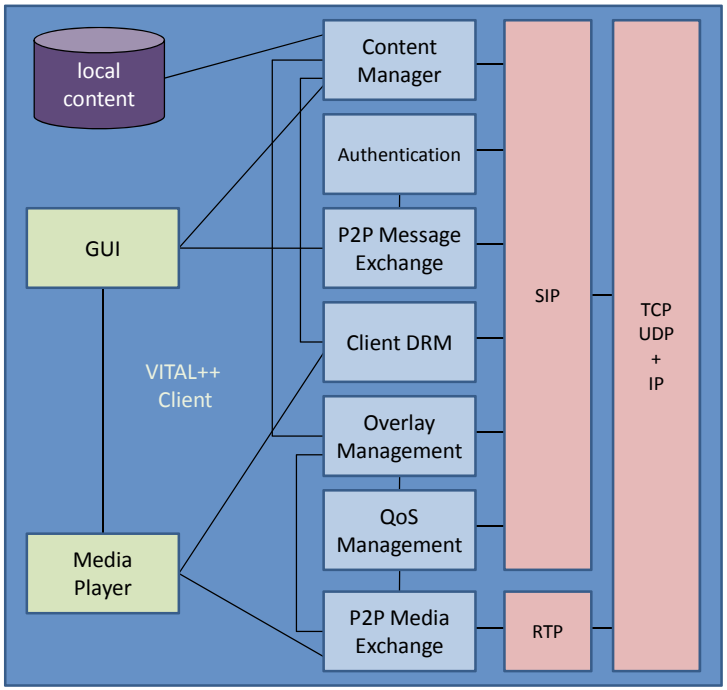
Deploying and experimenting with new control architectures: The VITAL++ case

Vital++ objective

- The test is towards the construction of a global scale network dependant Content Distribution Network CDN.
  - (file sharing (bit torrent), audio/video live streaming (TV), audio/video on demand (you tube))
- Motivation
  - CDNs introduce the majority of traffic in the internet.
  - Until now we have network agnostic CDNs.
  - Make them:
    - scalable(users and objects)
    - reliable
    - secure
    - high quality content
    - high performance (fast)
- We provide the environment and the libraries to test CDN architectures and which algorithms must run in their components.

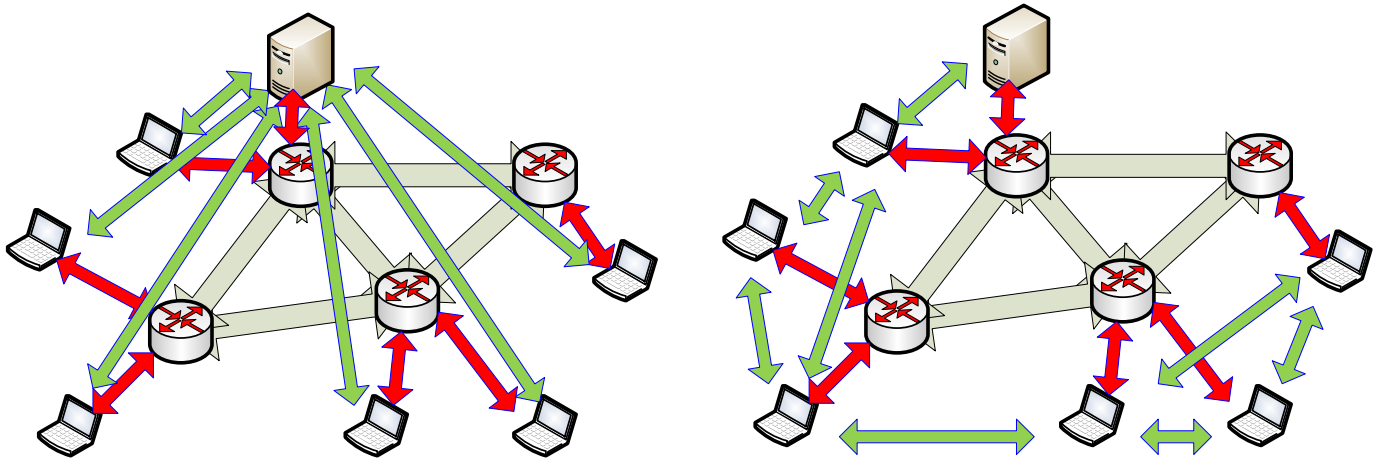
Vital++ architecture 1/3

- Content Index
  - How to store, manage retrieve and distribute content.
- DRM of each object
  - How to manage object rights and be able to charge users.
- P2P Authentication
  - How to create secure, scalable and with high performance user entrance in the system.



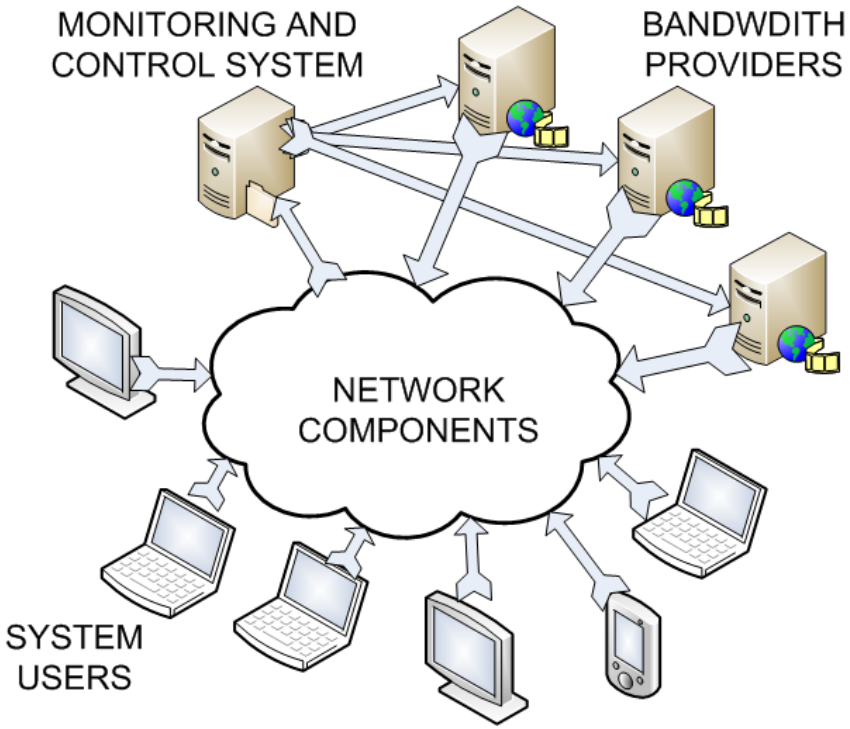
Vital++ architecture 2/3

- Overlay Management
  - Distributed (scalable) construct ion and management of a p2p graph between peers in order to distribute content:
    - fast
    - with high network resource utilization
    - avoid overloaded network links
    - minimize the load that system introduces in the underlying network



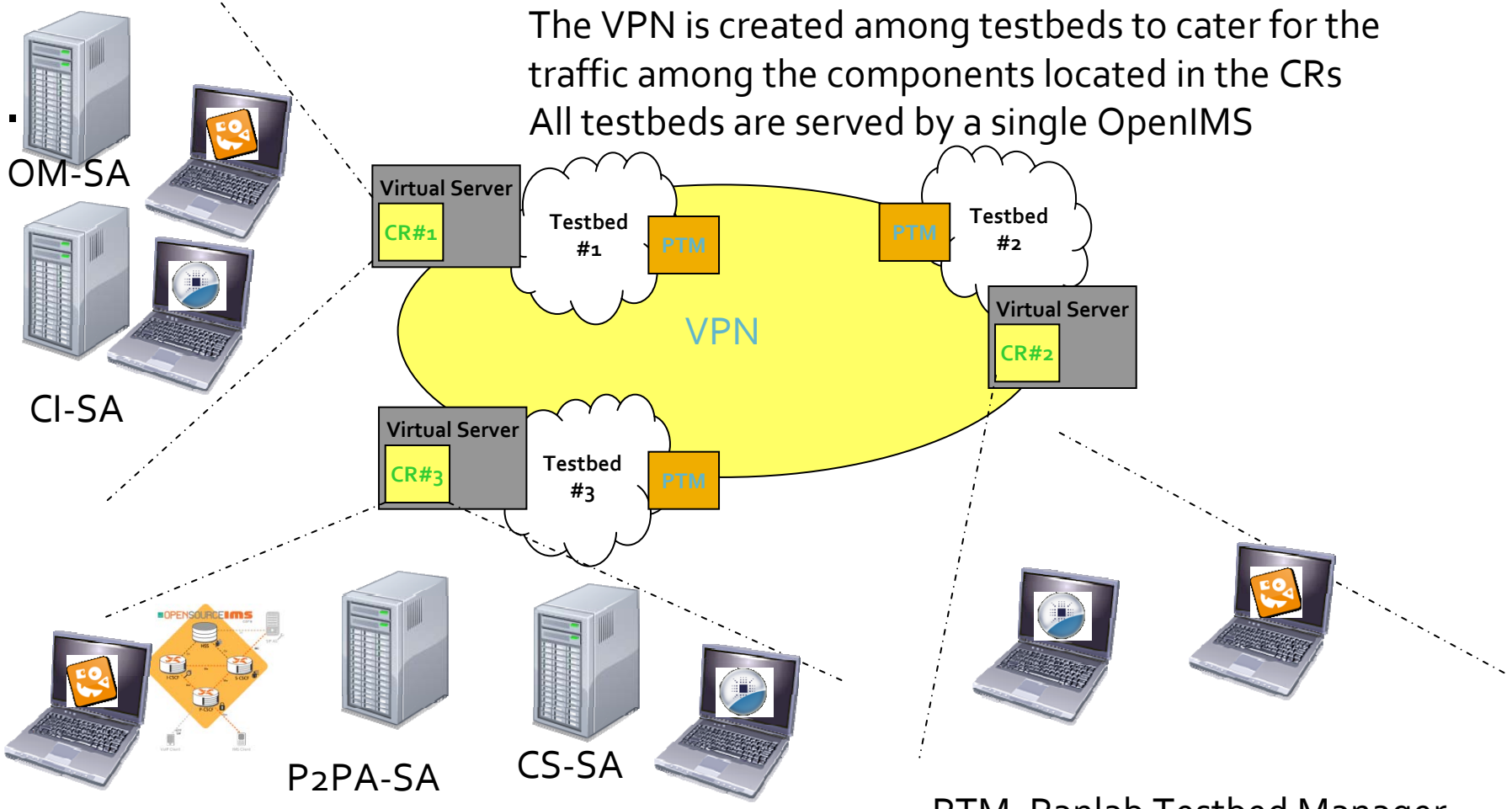
Vital++ architecture 3/3

- P2P Block Scheduler
  - Ensure the on time and stable delivery of content even in real time services.
- Network Resource Management
  - Dynamically monitor network resources in a scalable, accurate and stable fashion
  - Control the aggregate resources of the system in order to deliver stable CDN services (QoS)



Installing Vital++ Platform in PII

The VPN is created among testbeds to cater for the traffic among the components located in the CRs
All testbeds are served by a single OpenIMS



PTM: Panlab Testbed Manager
CR: Computing Resource

From proprietary systems to an open test bed.

- Which is the right architecture (you tube, bit torrent, akamai) for world class content distribution networks CDN (role of users, servers, network cases , network features)?

- CDNs generate the majority of traffic (p2p networks, you tube). How we can minimize the traffic and adapt (control) it dynamically to the network topology and conditions?

- Which functionalities we have to embed in the future internet in order to help CDNs (ex. auxiliary bandwidth providers, caches in routers)?

- Which distributed data scheduling mechanisms are effective and stable?

Future agenda

- Users demand quality and stability . 3D video will increase traffic .
- How social networks will help in content search/index ?(p2p searching and customized centralized databases partially failed)
- Future CDN will merge 4 network dependent functionalities:
  - Content Index - Search for content (social networks)
  - Object Management (storage cloud in the network)
  - Object Distribution (p2p data scheduler, p2p overlay graph)
  - Distributed Resource Management (bandwidth monitoring, allocation and control, adaptation of quality to available network resources)

End of Presentation

- Thank you for your attention.
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