OPERA -
Building Your Next-Generation Multimedia WWW

Presented by

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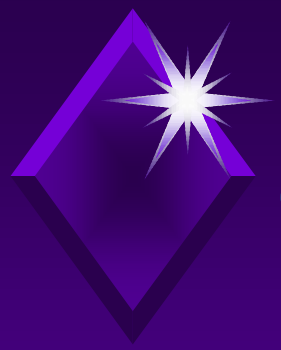
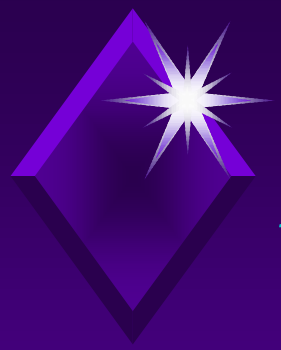
Co-Sponsored by

Area of Excellence in Information Technology



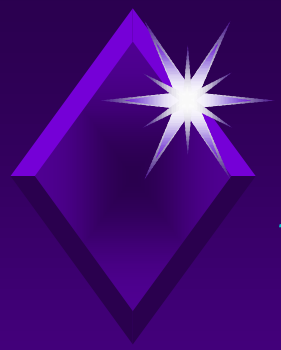
Outline

- Background
- Challenges
- The OPERA Platform
- OPERA Availability
- New Opportunities
- The Future
- Q&A



1. Background

- Today’ s WWW
  - Primary Text (HTML) supplemented by Images, Graphics, and Animations
  - Low bit-rate audio/video streaming
  - Usable content types are limited by the user-end bandwidth (norm: modem at 56kps)



1. Background

- Recent Developments
  - Residential Broadband Internet Access
    - Ranging from 1Mbps to over 10Mbps
  - Intelligent Commercial Buildings
    - Fiber-ready, bandwidth over 10Mbps
  - Convergence of TV and the Internet
    - Internet on the TV
    - Audio/Video on the Internet

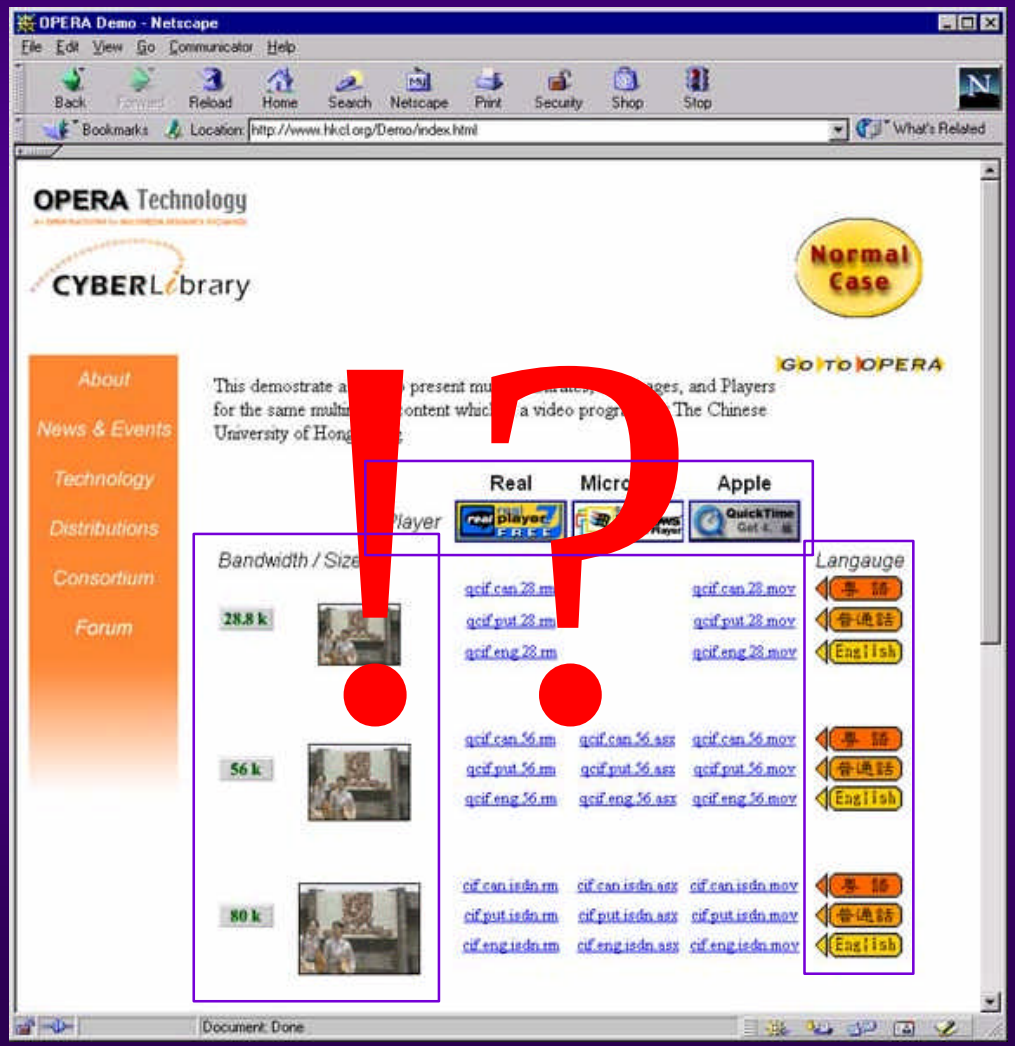
2. Challenges

- Enlarged market with more user diversity
  - Variety of Viewing Devices
    - Computer, TV Set-top-box, PDA, WAP phone, …
  - Variety of Connection Speeds
    - 28.8kbps, 56kbps, 384kbps, 512kbps, 1.5Mbps, etc.
  - Variety of Viewing Software
    - RealPlayer, Windows Media Player, QuickTime, …
  - Variety of Languages
    - Cantonese, English, Mandarin, Japanese, …

2. Challenges

- Content Providers
  - How to cope with the many different user requirements?
    - Lowest common denominator means lowest quality, even for users with broadband access.
    - High quality, high bit-rate contents will render the content inaccessible to many narrowband users.
    - Maximize market penetration -> cater for the majority of the user requirements.

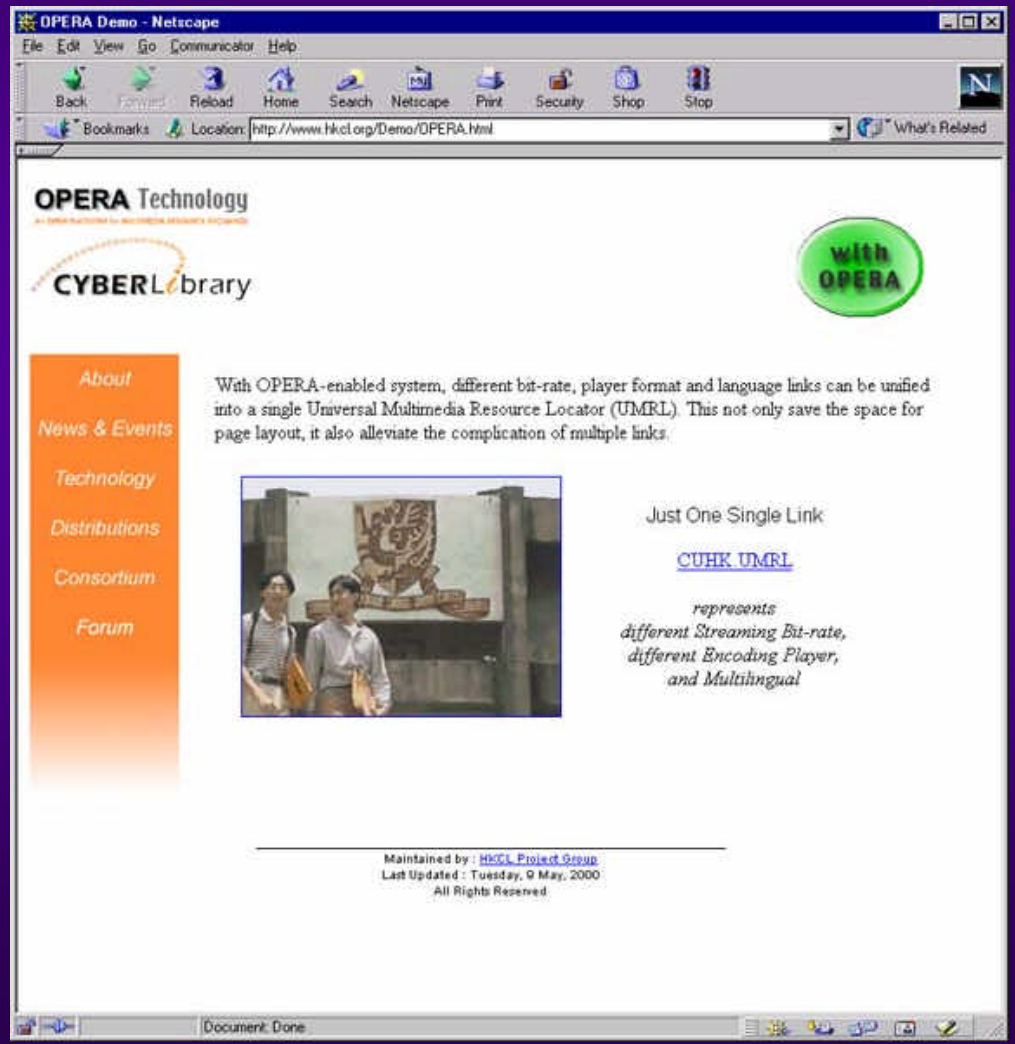
2. Challenges



2. Challenges

- Content Providers
  - Traditional Web Design
    - Confusing to the web users
    - Difficult to maintain
    - Destroys any good web design
  - What we really want is …

2. Challenges



2. Challenges

- Internet Service Providers
  - Complex content management
    - Which media version is located at which server?
    - Content updating, cycling, etc.
  - Complex server management and maintenance
    - How to perform server maintenance without disrupting service?
    - When to replicate media to more servers?
  - Higher cost and poor resource utilization

2. Challenges

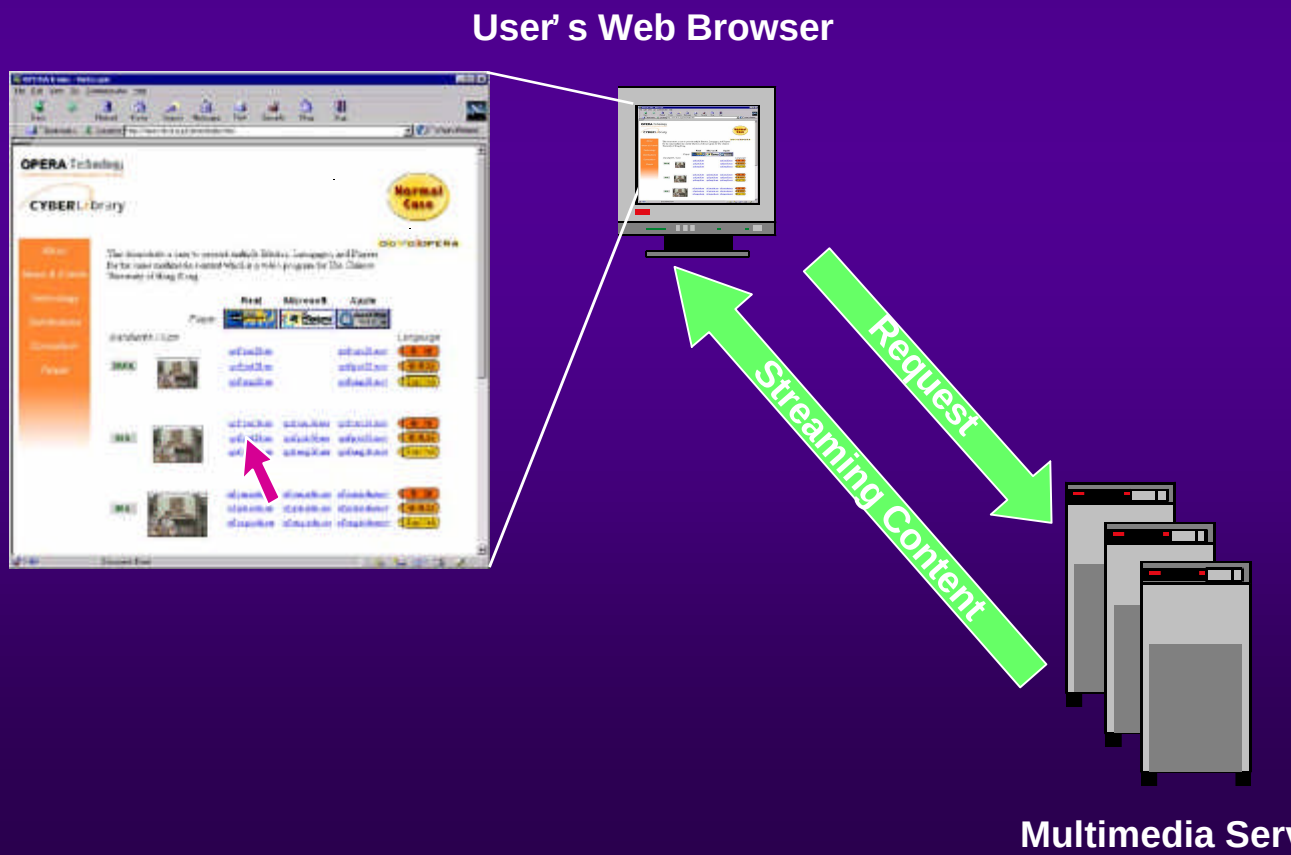
- Internet Service Providers
  - What we really want is …
    - Lower content management overhead
      - Automatic media upload, replication, etc.
    - More up time
      - Maintain media server without service disruption
      - Automatic failover in case of server failures
    - Better resource utilization
      - Optimized, automatic replication to multiple servers
      - Optimized, automatic redirecting of requests to local servers

3. The OPERA Platform

- OPERA
  - An Open Platform for Multimedia Resource Exchange
    - An open-source, software platform that solves **ALL** of the previous Challenges (and more)
    - Compatible with existing browsers and servers
    - Funded by the Innovation and Technology Commission of the HKSAR Government
    - **FREE** for all Hongkong-based Companies

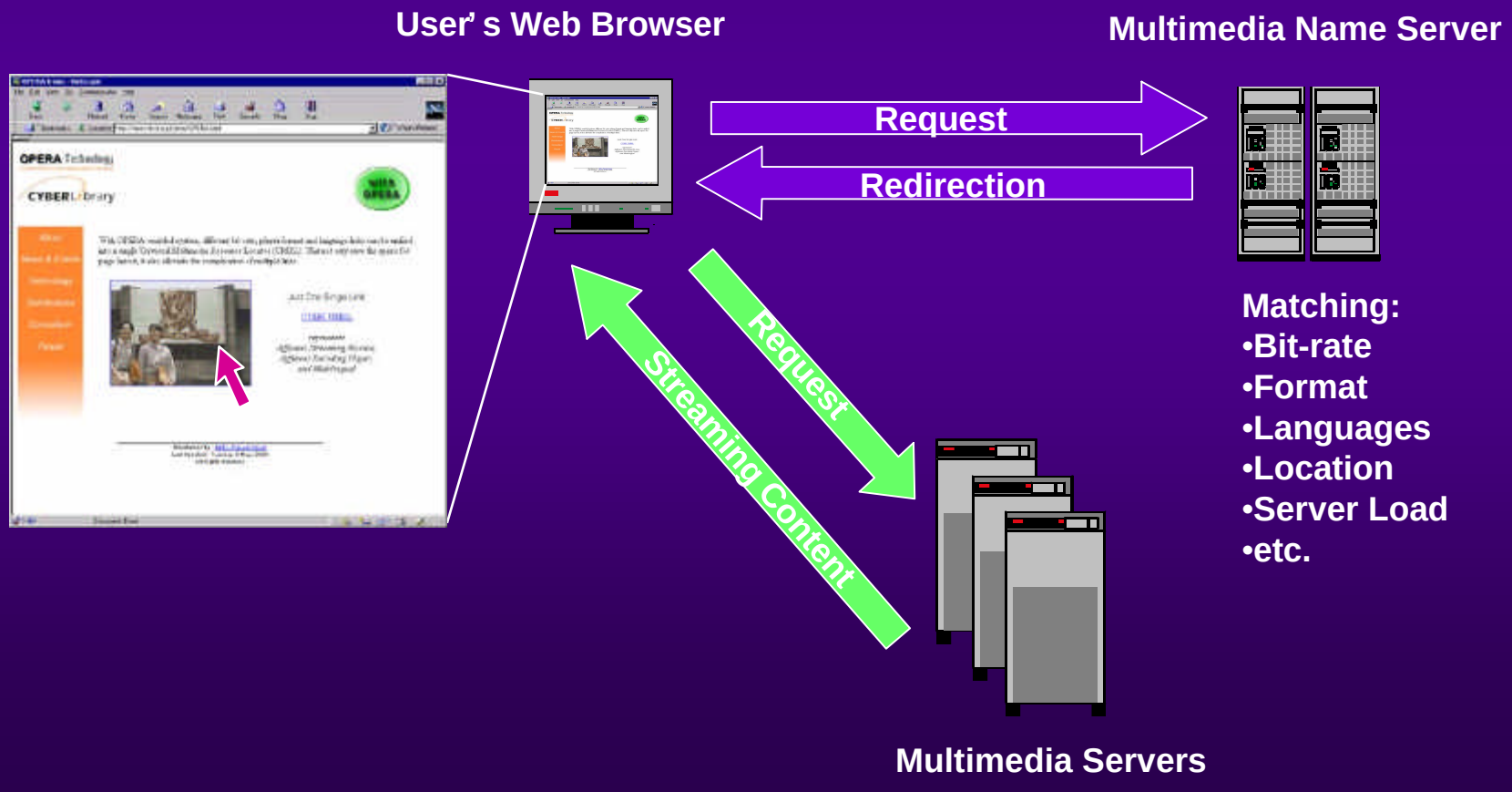
3. The OPERA Platform

- Traditional Media Streaming



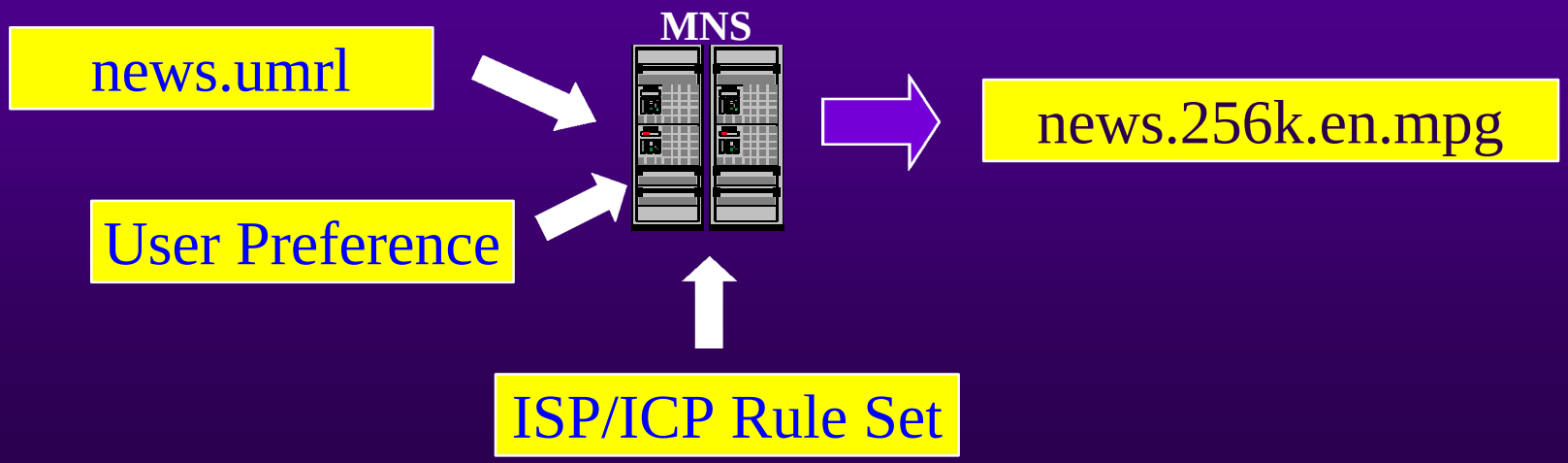
3. The OPERA Platform

- OPERA-based Media Streaming



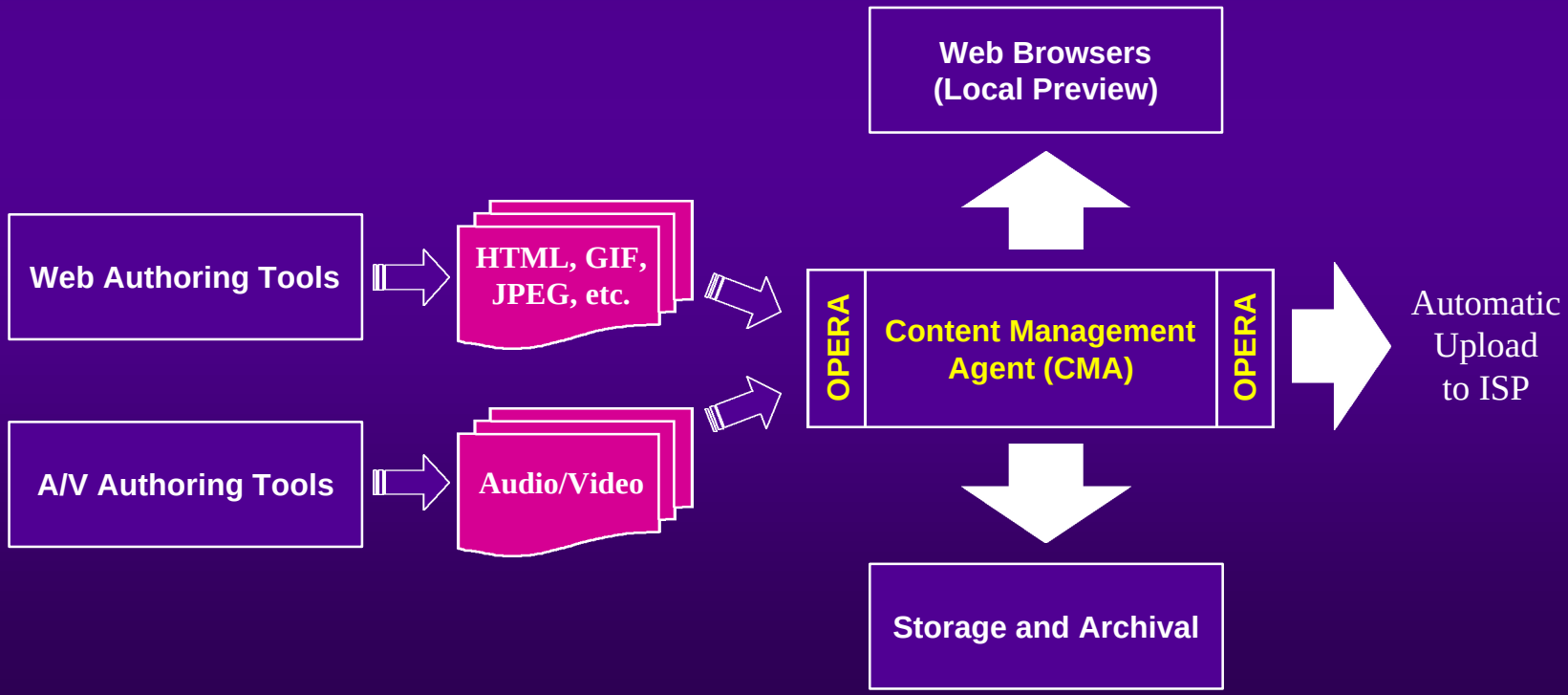
3. The OPERA Platform

- Universal Multimedia Resource Locator
  - A logical address for a media object
  - Independent of format, bit-rates, languages, etc.
- Dynamic Mapping to URL:



3. The OPERA Platform

- Content Authoring and Transfer



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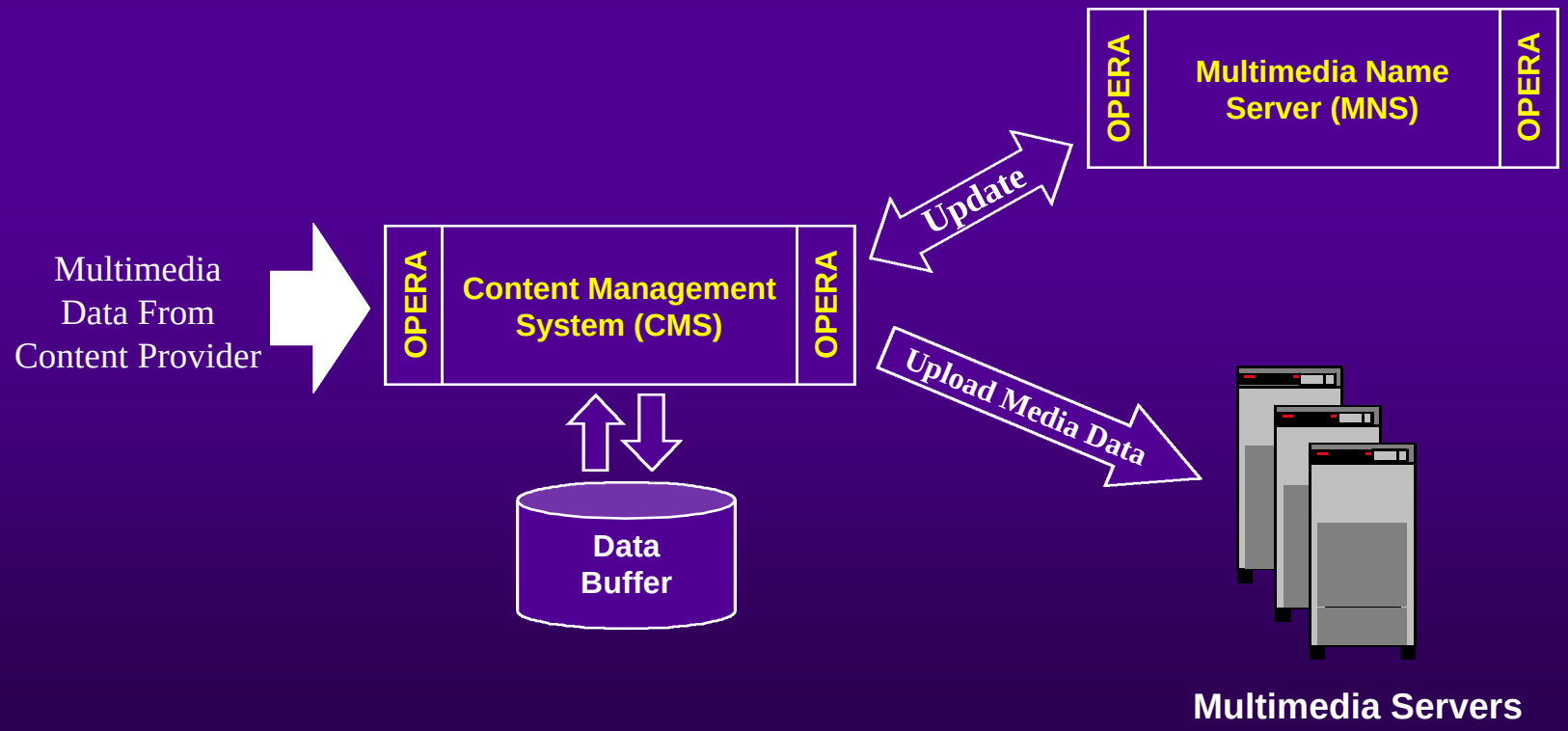
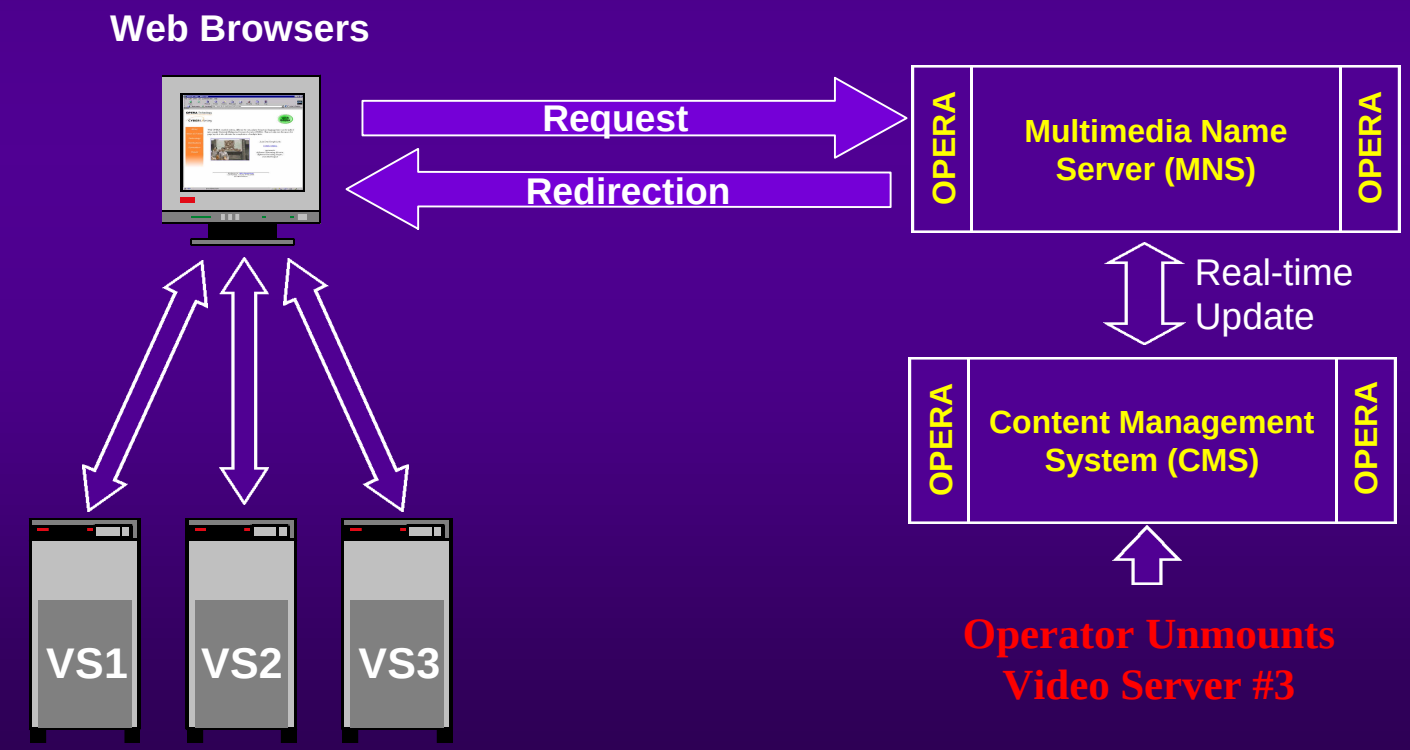
- Automated Content Management



3. The OPERA Platform

- Improved Server Maintenance



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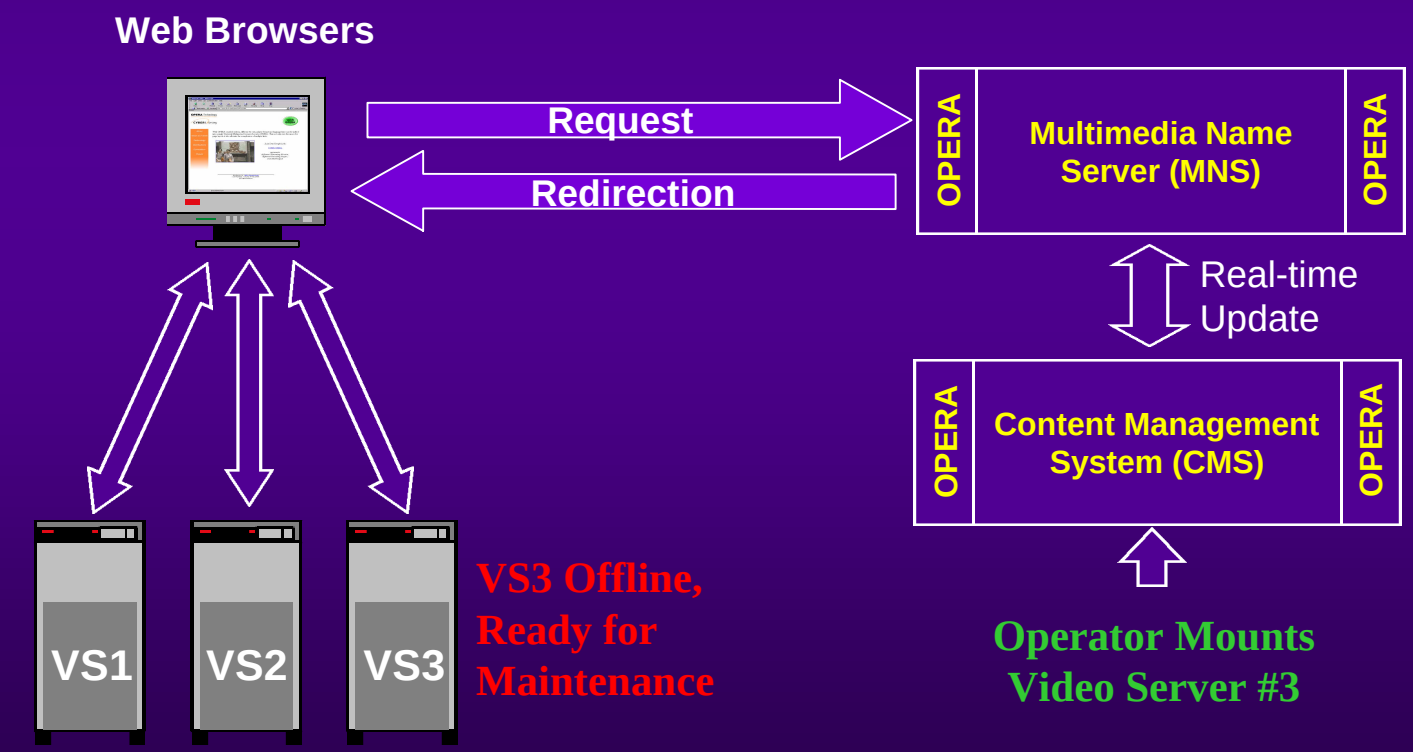

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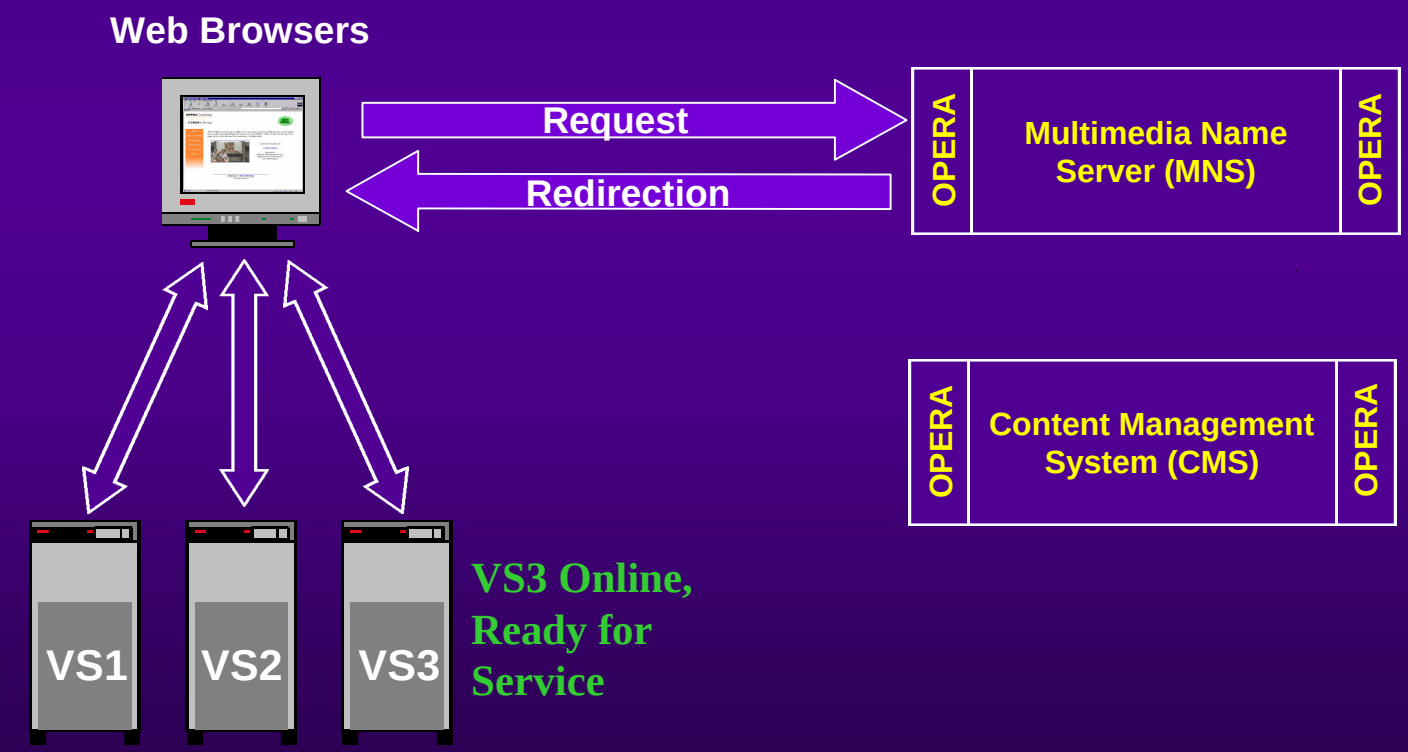
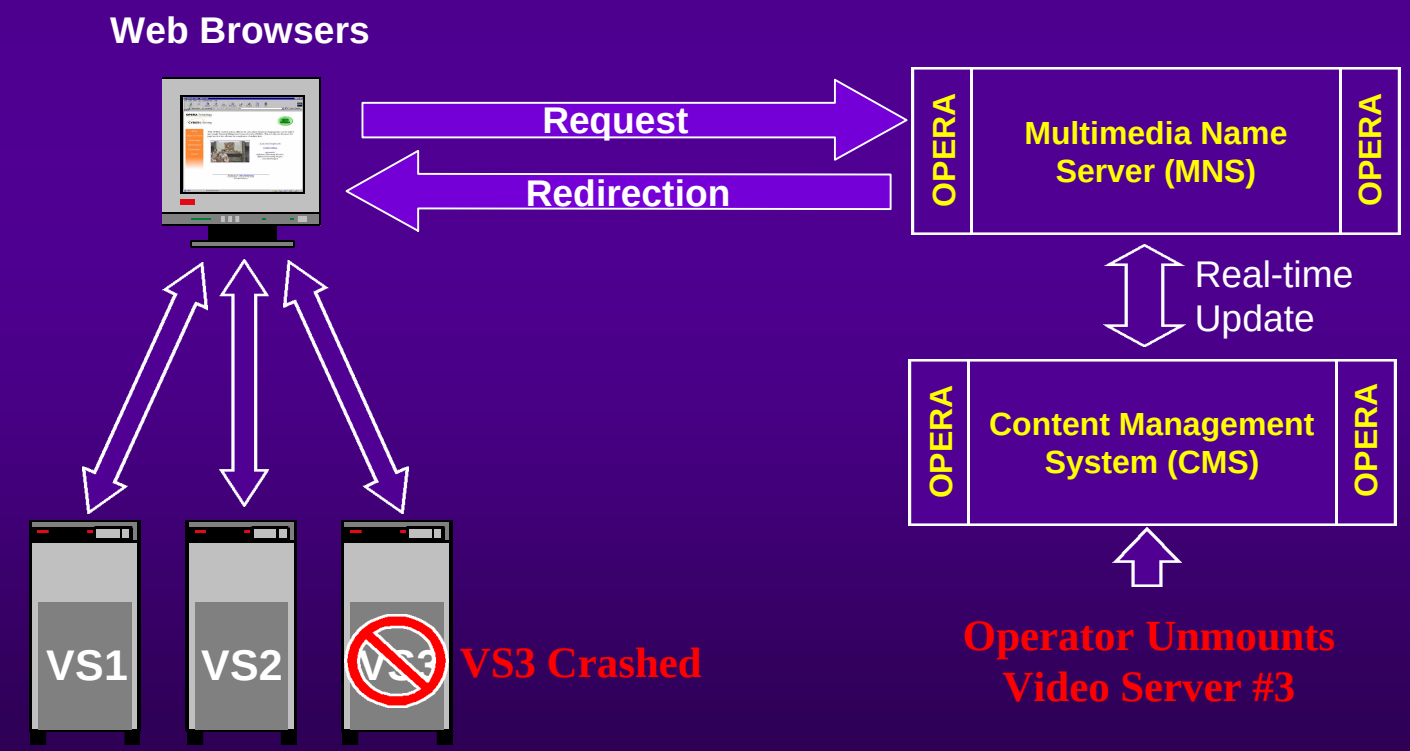


3. The OPERA Platform

- Transparent Server Failover



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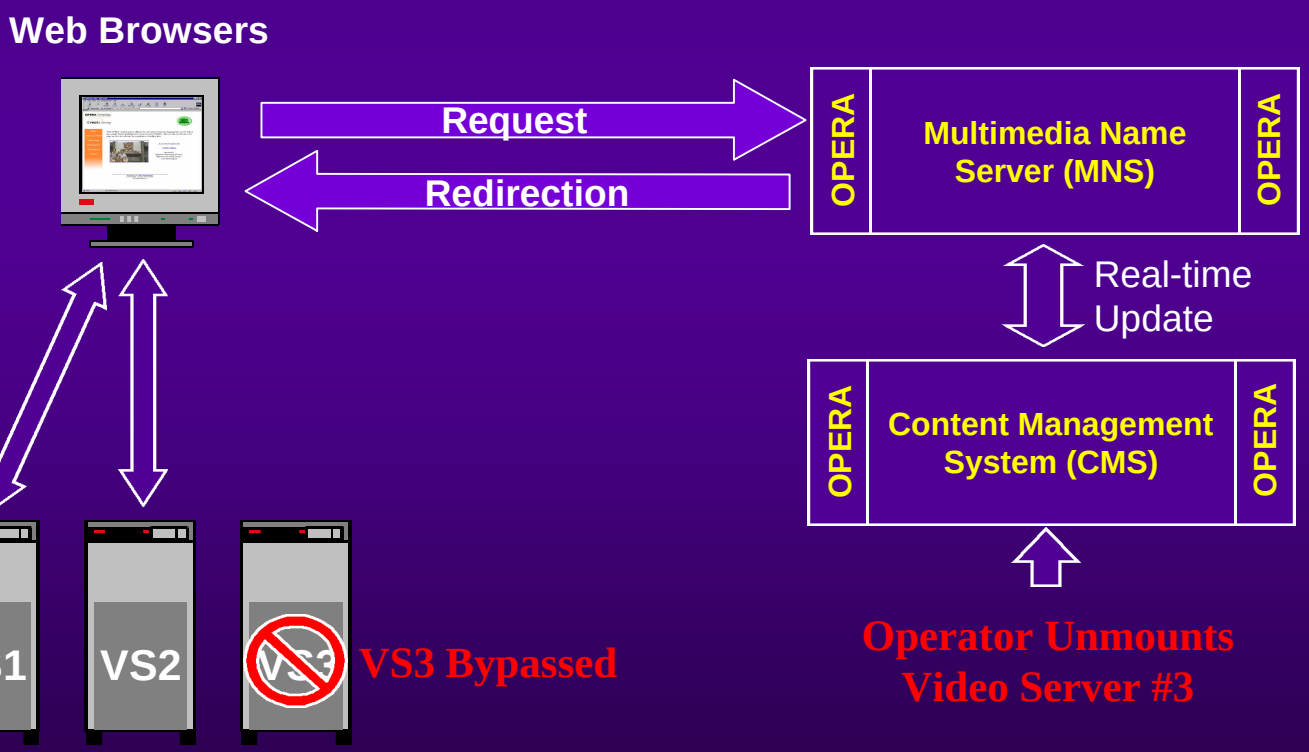
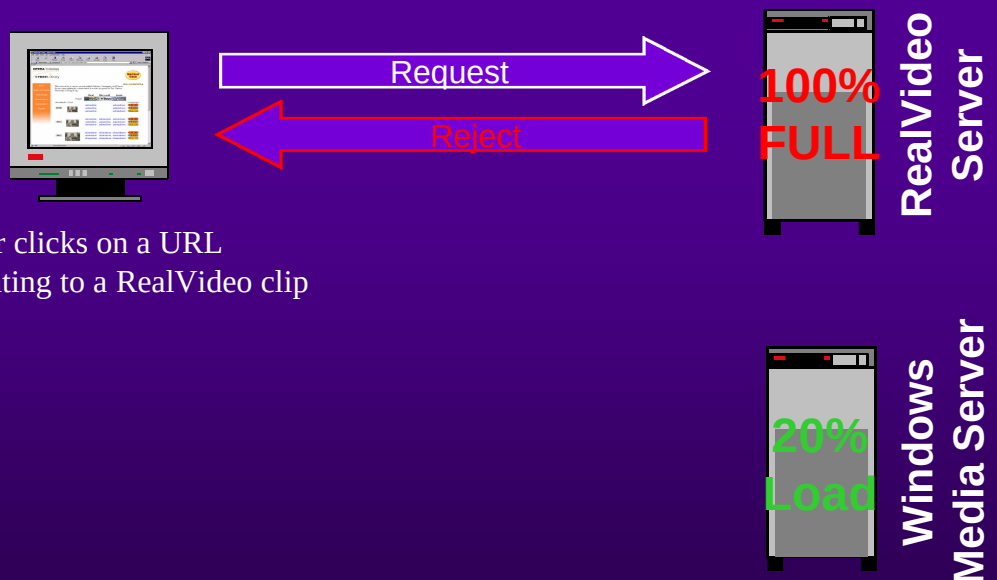


3. The OPERA Platform

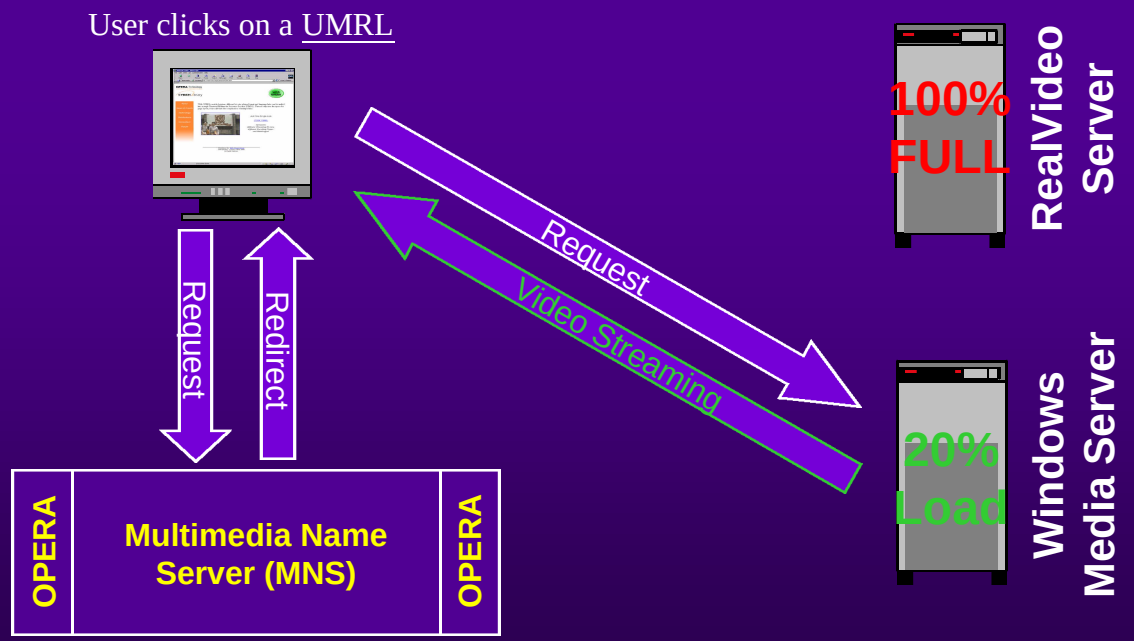
- Cross-Platform Load Balancing
  - Without OPERA:



User clicks on a URL
pointing to a RealVideo clip

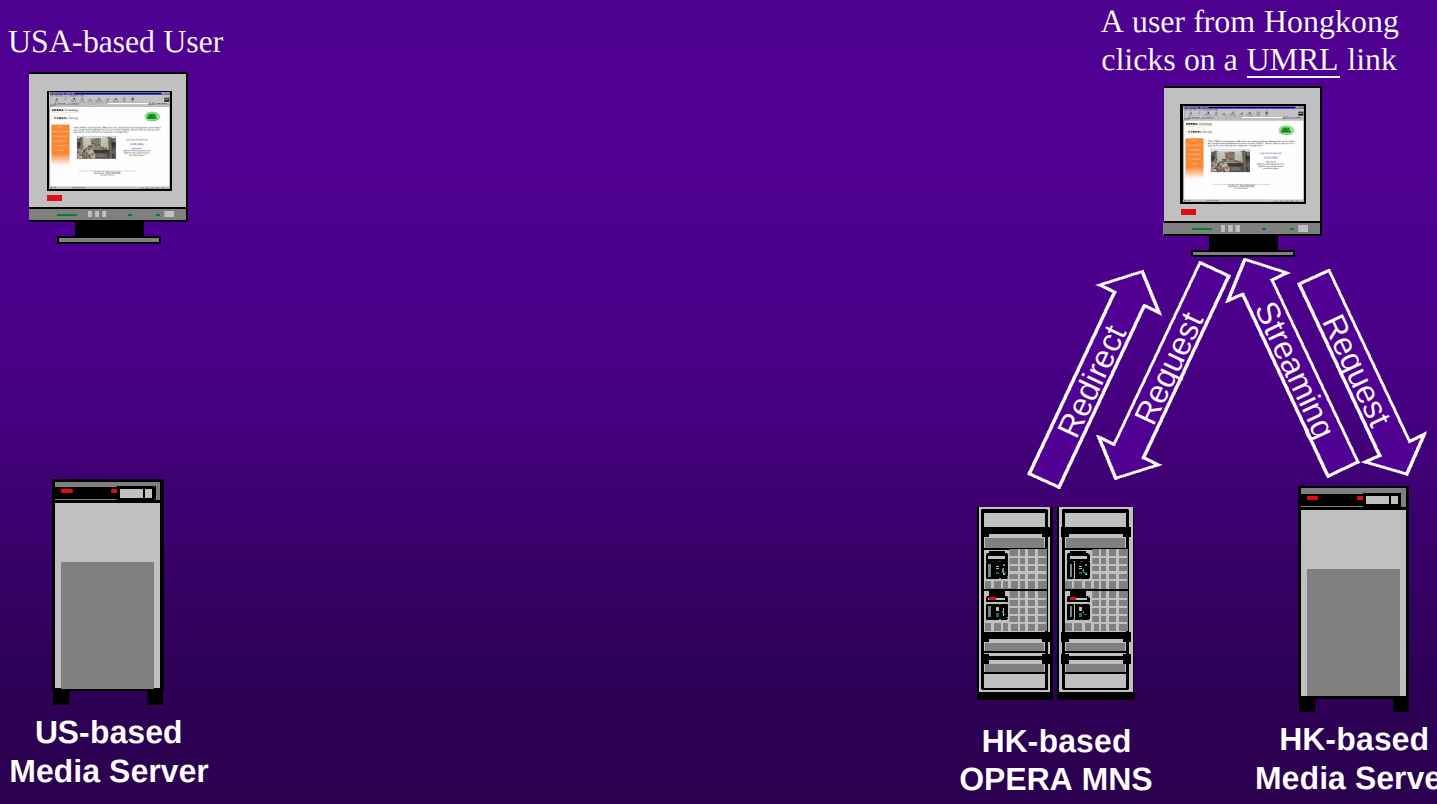
3. The OPERA Platform

- Cross-Platform Load Balancing
  - With OPERA:



3. The OPERA Platform

- Cross-Continent Redirection



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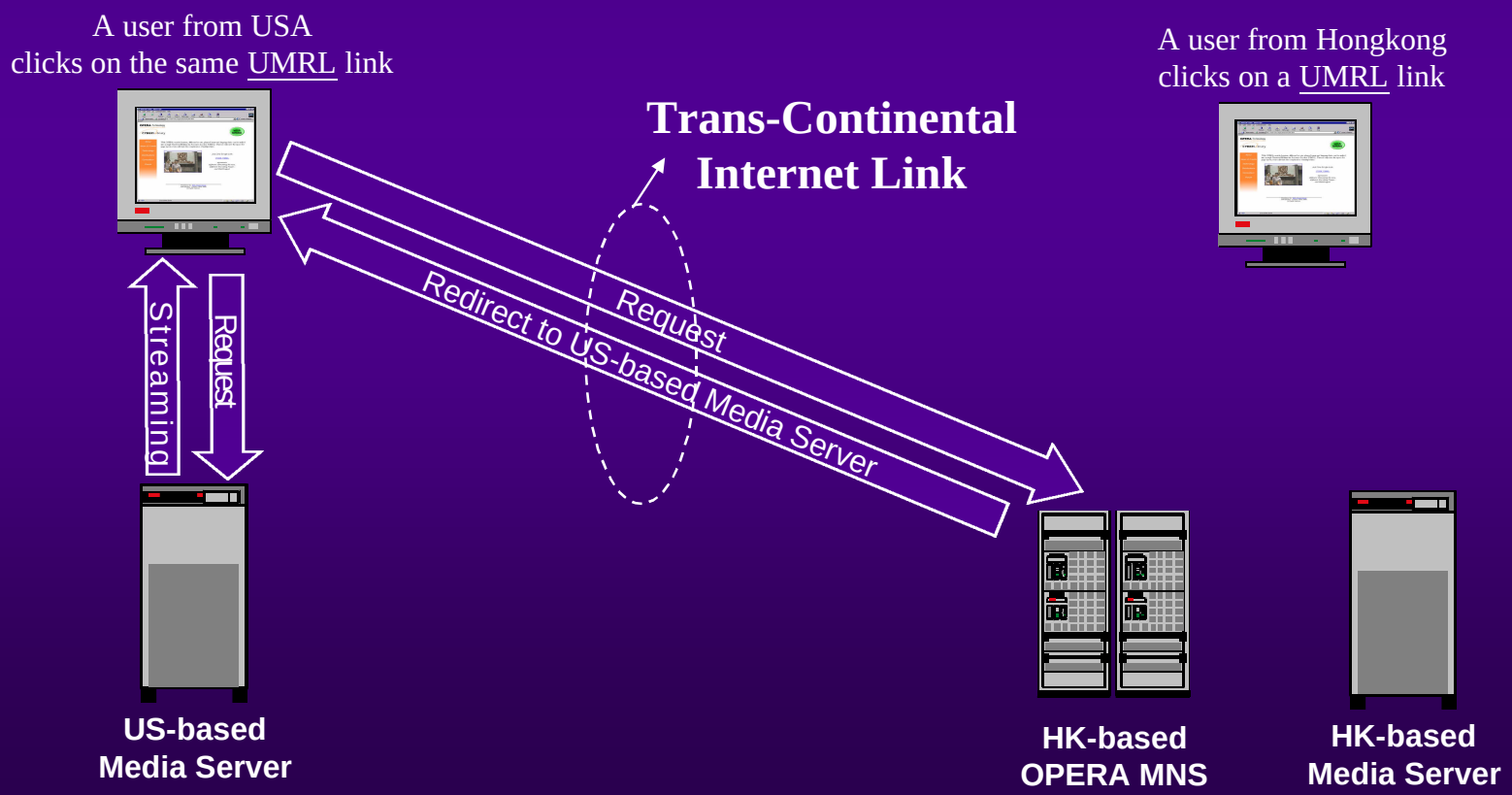

4. OPERA Availability

- Multimedia Name Server
  - Beta2 now available for Solaris platforms
  - Linux and Windows NT versions coming
- Content Management System
  - Java-based
  - Beta now available for Java-ready platforms
- Content Management Agent
  - Beta now available now for Windows
  - MacOS version coming

4. OPERA Availability

- Industrial Consortium
  - Access to Content Management Agent
  - Access to Multimedia Name Server
  - Access to Content Management System
  - Technical support and training

5. New Opportunities

- For Content Providers
  - Improves web interface
  - Contents appeal to broader audience
  - Increases market penetration
  - Reduces production cost
  - Simplifies web site maintenance
  - Personalized / customized contents

5. New Opportunities

- For Service Providers
  - Increase service values
  - Reduces operating costs
  - Reduces resource requirements
  - Improves equipment utilization
  - Improves service reliability
  - Simplifies system administration and maintenance

6. The Future

- Real-time Media Transcoding
- Automatic Server Failover
- Intelligent Media Replication
- Intelligent Server Bandwidth Management
- Intelligent Requests Routing