



Om LAVA prosjektet UNINETT96

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LAVA

- Delivery of video over ATM
- Financed by Norwegian Research Council
- Part of HUGIN - NFRs broadband initiative
- Develop system for video-on-demand
- Pilot applications
 - services taking advantage of technology in real environments
 - increased knowledge of digital video applications
 - feedback to developers
- Industrial exploitation





User organizations



NRK



Norsk Folkemuseum



Nasjonalbiblioteket i Mo i Rana



Opplysningsfilm



Det Norske Veritas



Oslo Politi



R&D partners



Norsk Regnesentral



NORUT



IDT - NTNU

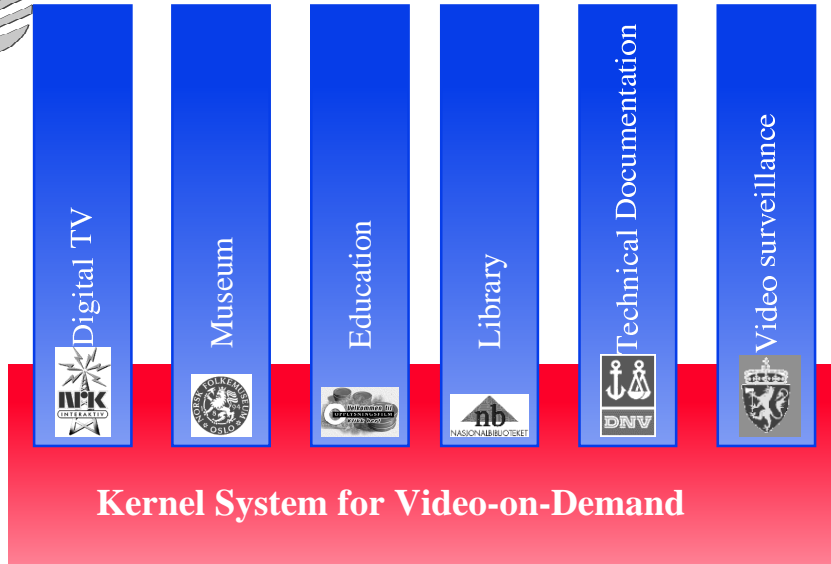


USIT

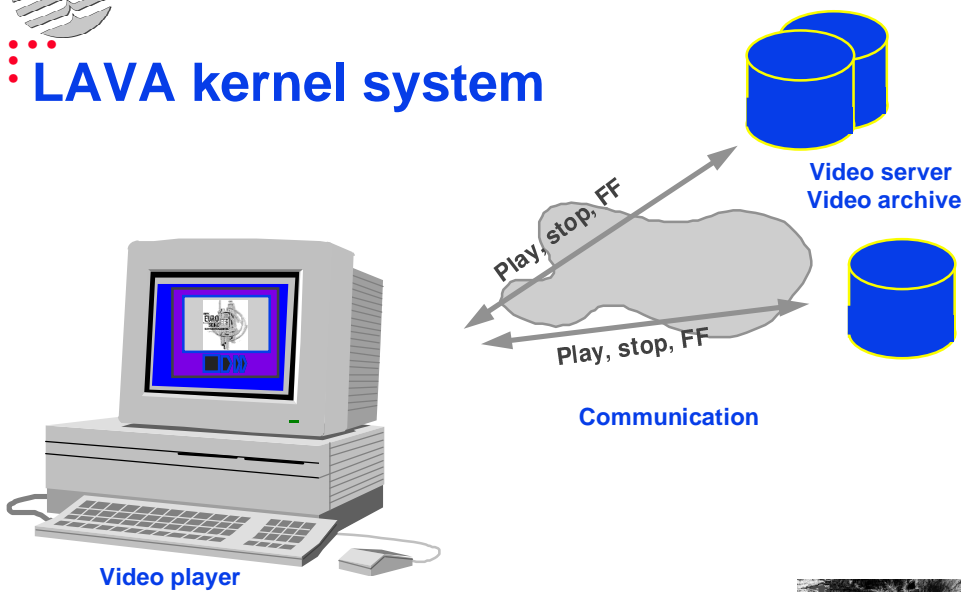


Sintef Tele & Data



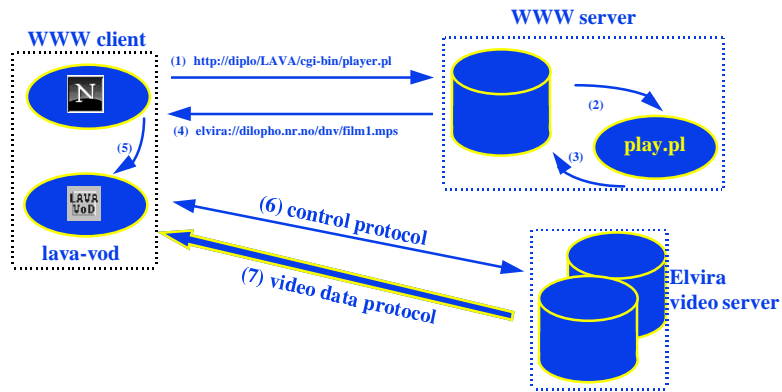


LAVA kernel system



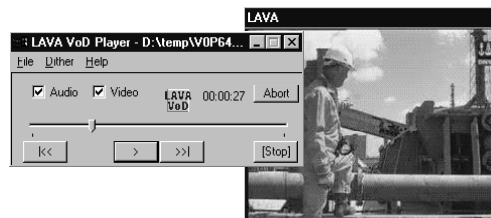


LAVA/W³ Integration



Lava player

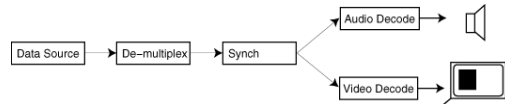
- **Functionality**
 - VCR (play, stop, wind)
 - on demand
 - standard formats (M-JPEG, MPEG)
- **Current version**
 - Sun & SGI
 - PC player beta version
 - M-JPEG: hardware decoding
 - MPEG-I: software decoding
- **Future version**
 - MPEG-I/II hardware decoding
 - Hypermedia integration
 - Web browser plug-in





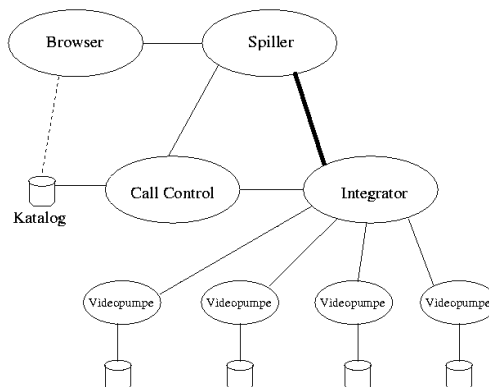
• Player implementation

- **Unix version**
 - C++ decoders and network
 - Tcl/Tk user interface
 - Single threaded (real-time player multi-threaded)
 - Handles MPEG-1 streams up to 300kbps
- **PC version**
 - Win32 (Win95, WinNT 3.51, WinNT4.0) user interface
 - C++ decoders and network
 - Multi-threaded
 - We are working on integration with ActiveMovie



• Lava server

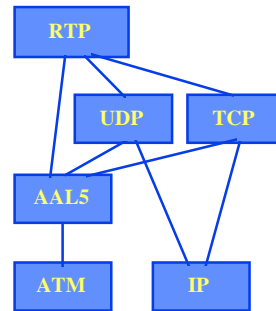
- **Current version**
 - Concurrent delivery of multiple video streams
 - Load sharing on a cluster of servers
 - Client player driven delivery of data
 - Special version of server for real-time video capture on SGI
- **Future version**
 - Adapted to PC player and new communication system
 - Continuous delivery of data
 - Better handling of VCR
 - WinNT version





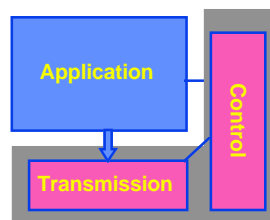
Communication protocol

- **Functionality**
 - Support real-time generated and stored video
 - Use RTP/RTCP
 - Support quality of service
 - Adaptation to actual band-width
- **Current version**
 - TCP based
- **Future version**
 - UDP
 - ATM/AAL5



Protocol implementation

- **Modules**
 - Control protocol objects
 - Data protocol objects
- **Efficient data passing**
 - shared data buffer between compression and transmission layer
 - multiple threads of execution
- **Platform independent**
 - Both UNIX and Win32 supported
 - Adaptive Communication Environment (Washington Univ. St. Louis)





Experiences

- **MPEG decoding in software**
 - the machine becomes the bottle-neck
 - maximum 300kbps on SGI INDY (R4600/200MHz)
 - video/audio synchronization is hard in single threaded clients
 - keep sound quality good, video quality is less critical
- **M-JPEG**
 - real-time encoded M-JPEG generates approx. 15Mbps
 - threads must run with high priority
- **Communication**
 - Supernet gives 155Mbps; works fine between Trondheim and Oslo
 - LAN 10Mbps works fine
 - ISDN doesn't work



Future directions

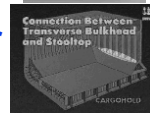
- **New network providers**
 - Alternative infrastructures to Supernet
 - Oslo Energi Tele, Asker og Bærum Energi, EITele
 - CableTV networks, ADSL
- **Deploy into user environments**
 - Give schools access to video services for educational video
 - DNV intranet
 - Cinema advertisements
 - surveillance centrals
 - medical services
- **More integration with other data types**
 - hypermedia integration





Demonstrasjoner

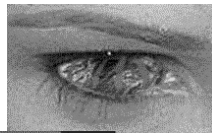
- Nordnytt
- PUCK
- Reklamefilm fra 50 årene
- Gamle håndverksteknikker - web basert
- Gamle håndverksteknikker - arkiv
- Video i teknisk dokumentasjon
- Overføring av levende bilder fra ransutsatte steder



Digital TV



- NRK
- Nordnytt
- PUCK
- MPEG2





Museum



Norsk Folkemuseum

- Tilgjengeliggjøre filmopptak av gamle håndverks-teknikker



Bibliotek



Nasjonalbiblioteket i Mo i Rana

- Bilde, lyd og video
- Komplette samlinger av reklamefilm fra 50-årene





Teknisk dokumentasjon



Det Norske Veritas



- Kombinasjon av opplæring og teknisk dokumentasjon



Alarmstyrt videooverføring



- Oslo Politi
- Overføring av levende bilder fra
 - ransutsatte steder
 - overvåkede steder



