w3.1- History Through Supercomputing

w3.1- History Through Supercomputing.mp4 — Haruna Media Player

Dial-Up Access

- You were happy to connect to one computer without having to walk across campus
- You could 'call' other computers long distance
- The characters were encoded as sound
- Pretty Common in the 1970's

http://deepblue.lib.umich.edu/handle/2027.42/79576 (1963)

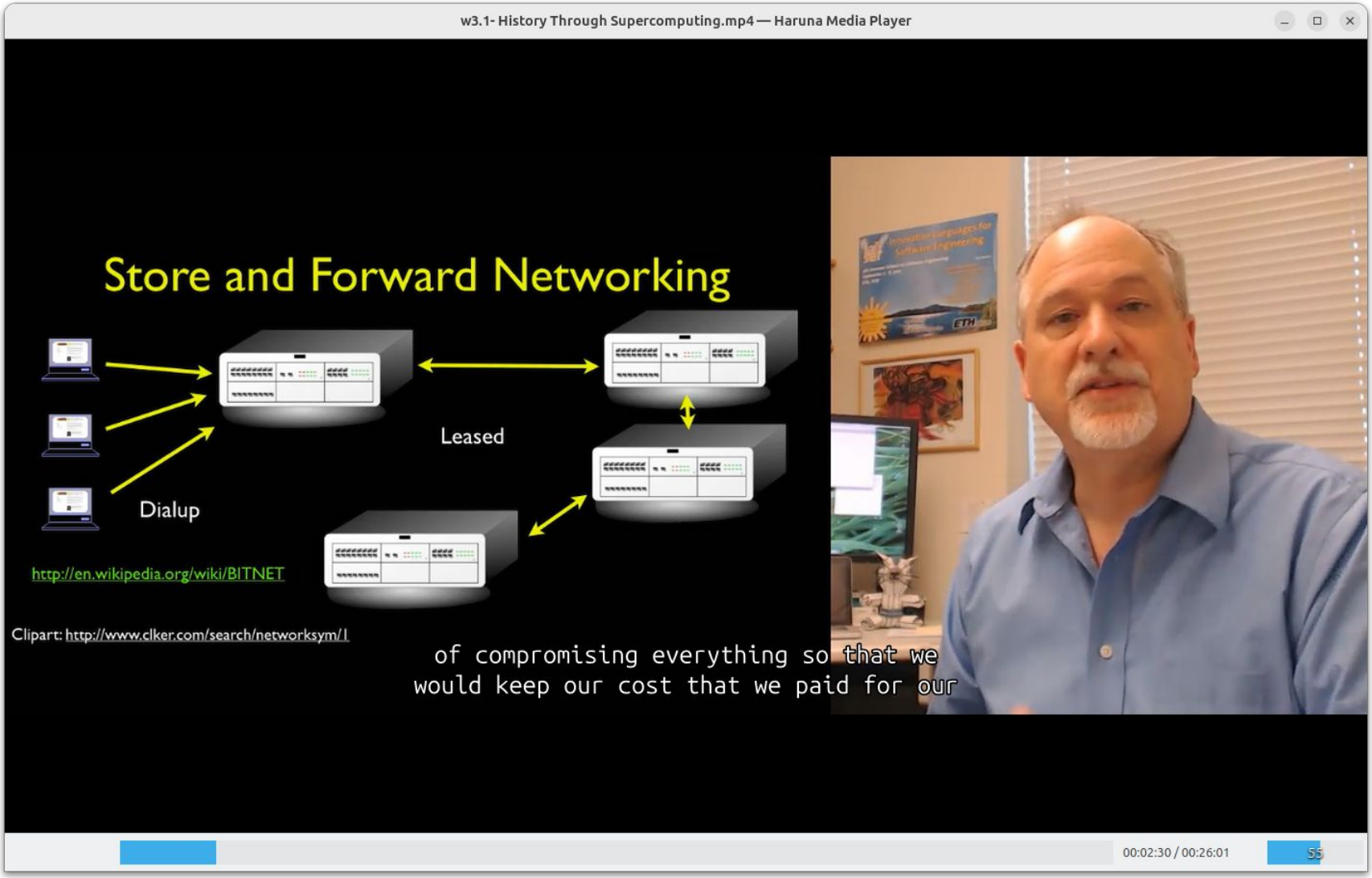
00:00:02 / 00:26:01

Data Transfer with Leased Lines

- You could get a dedicated connection between two points from the phone company
- No dialing was needed leased lines are always connected
- Reserved dedicated phone wires and permanent connections
- Expensive because of limited copper - cost was based on distance
- Think bank branch offices and other places where cost is significant

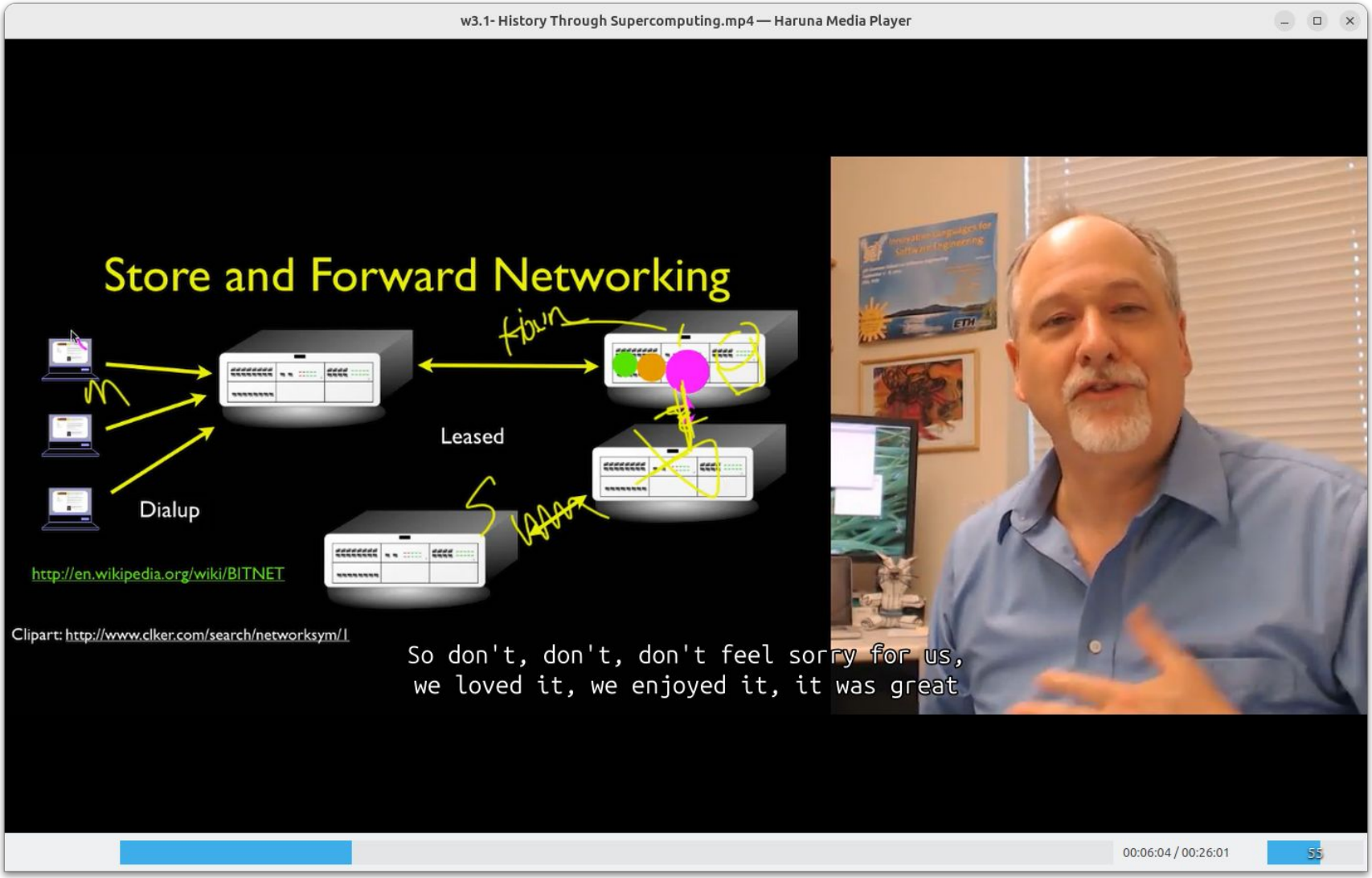
http://en.wikipedia.org/wiki/Leased_line

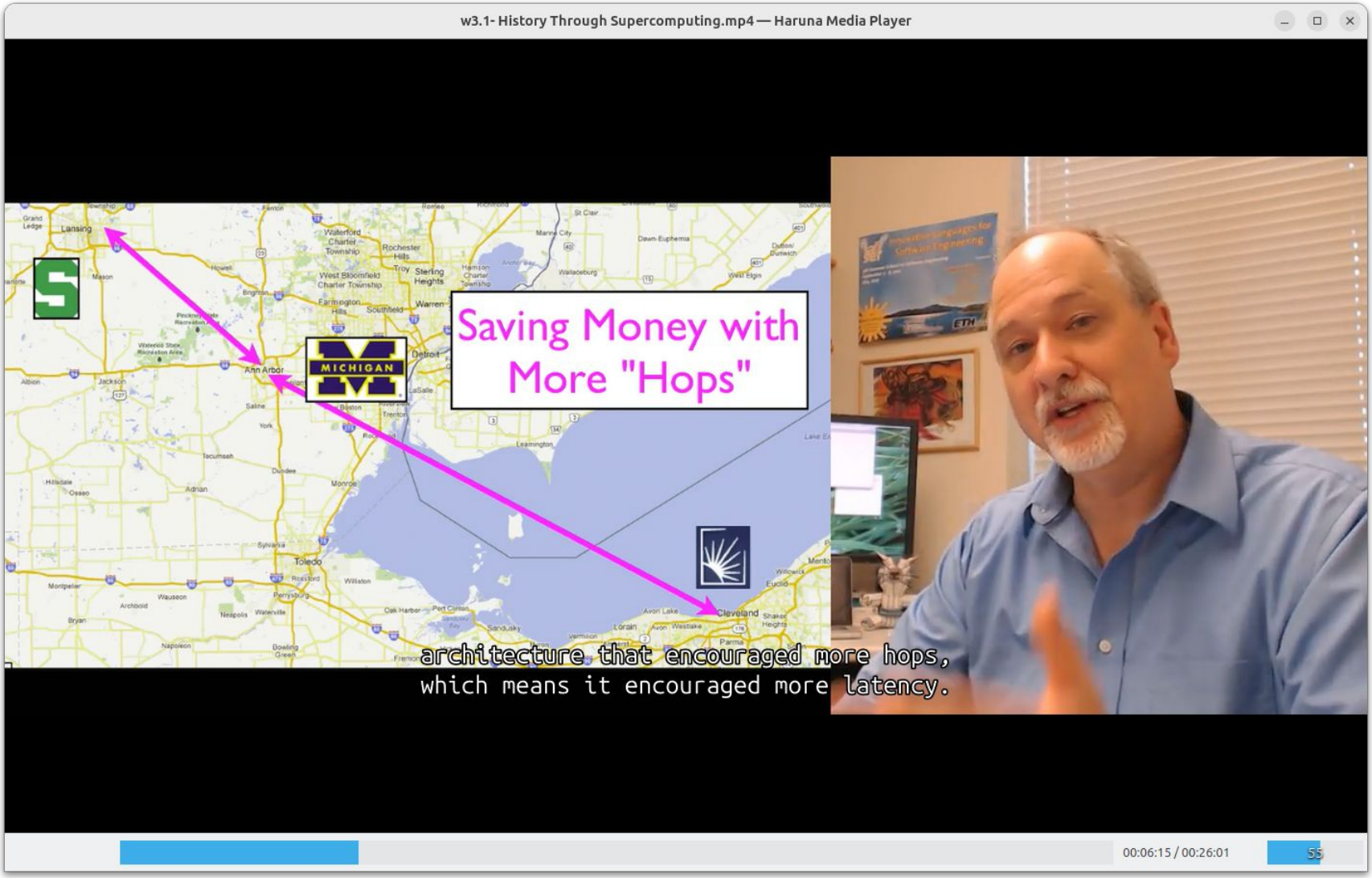
leased lines.
And the typical thing about leased lines is

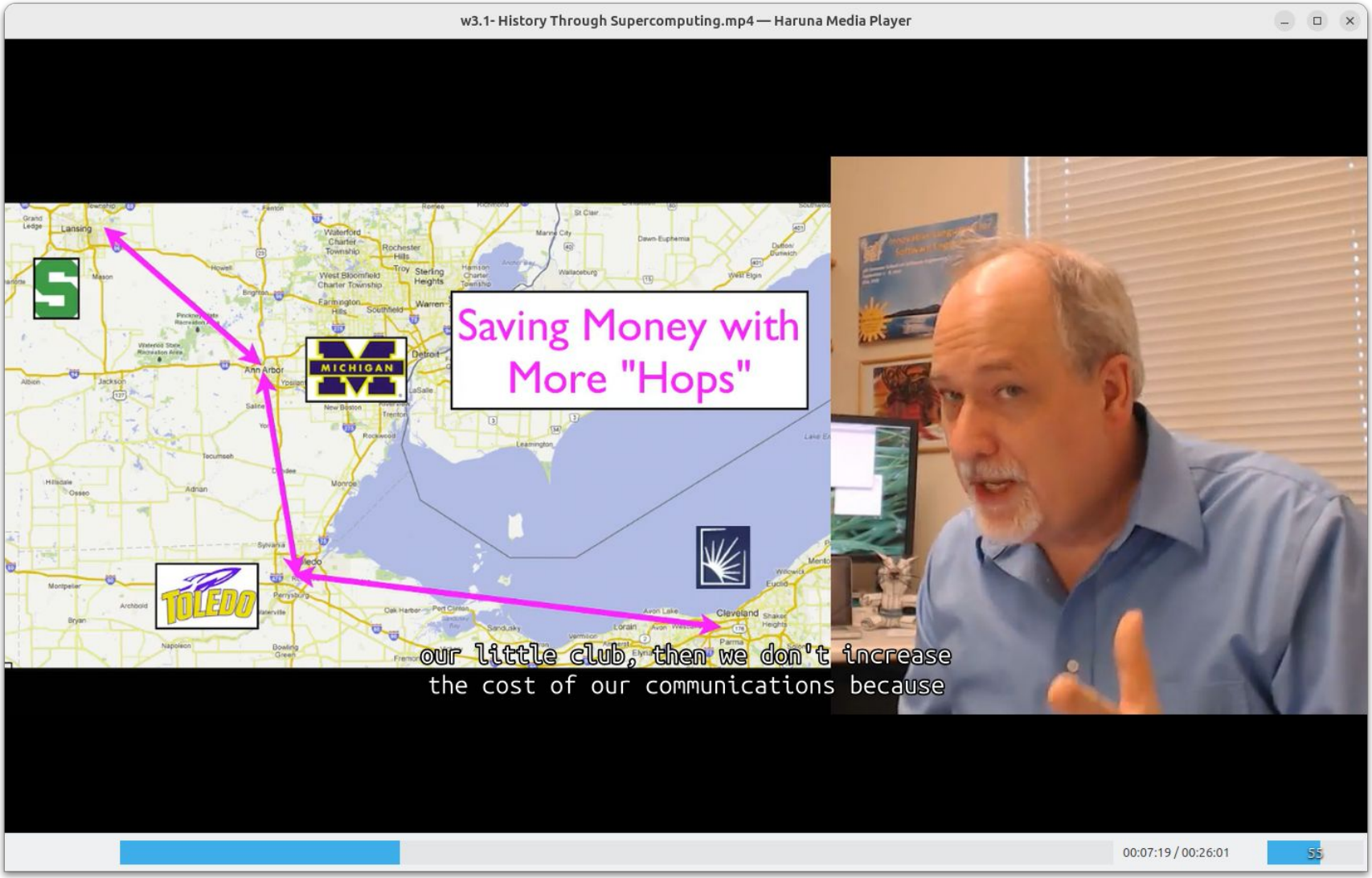


Key Technical Concepts in the Image

- **Store and Forward Networking:** This is a telecommunications technique in which information is sent to an intermediate station where it is kept and inspected before being forwarded to the final destination or another intermediate station.
- **BITNET:** There is a Wikipedia link visible on the slide referring to BITNET (Because It's Time Network), a cooperative USA university network founded in 1981 that relied on these protocols.
- **Network Nodes:** The diagram illustrates different connection types used in early networking:
  - **Dialup:** Connections likely from individual terminals or smaller computers.
  - **Leased Lines:** Dedicated communications channels between major network nodes.







Store and Forward Networking

- Typically specialized in Mail
- E-Mail could make it across the country in six hours to about 2 days
- You generally focused your life on one computer
- Early 1980's

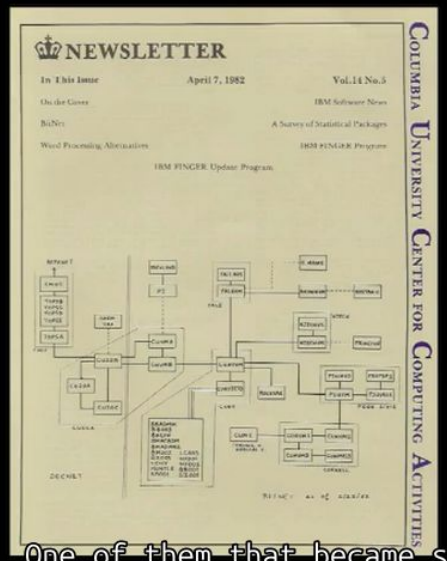
http://en.wikipedia.org/wiki/IBM_3270

just simply adding hops.
So in this environment we had a lot of

BITNET

- Typically specialized in Mail
- E-Mail could make it across the country in 6-hours to about 2 days
- You generally focused your life on one computer
- Academic network in the 1980's

http://www.columbia.edu/acis/history/bitnet.jpg



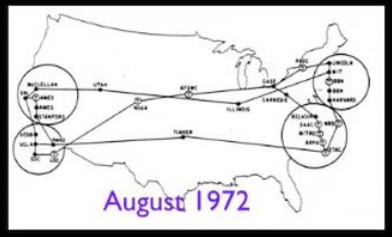
One of them that became sort of
pretty widely used was a thing called

w3.1- History Through Supercomputing.mp4 — Haruna Media Player

Subtitle scale: 0.4

Research Networks 1960-1980's

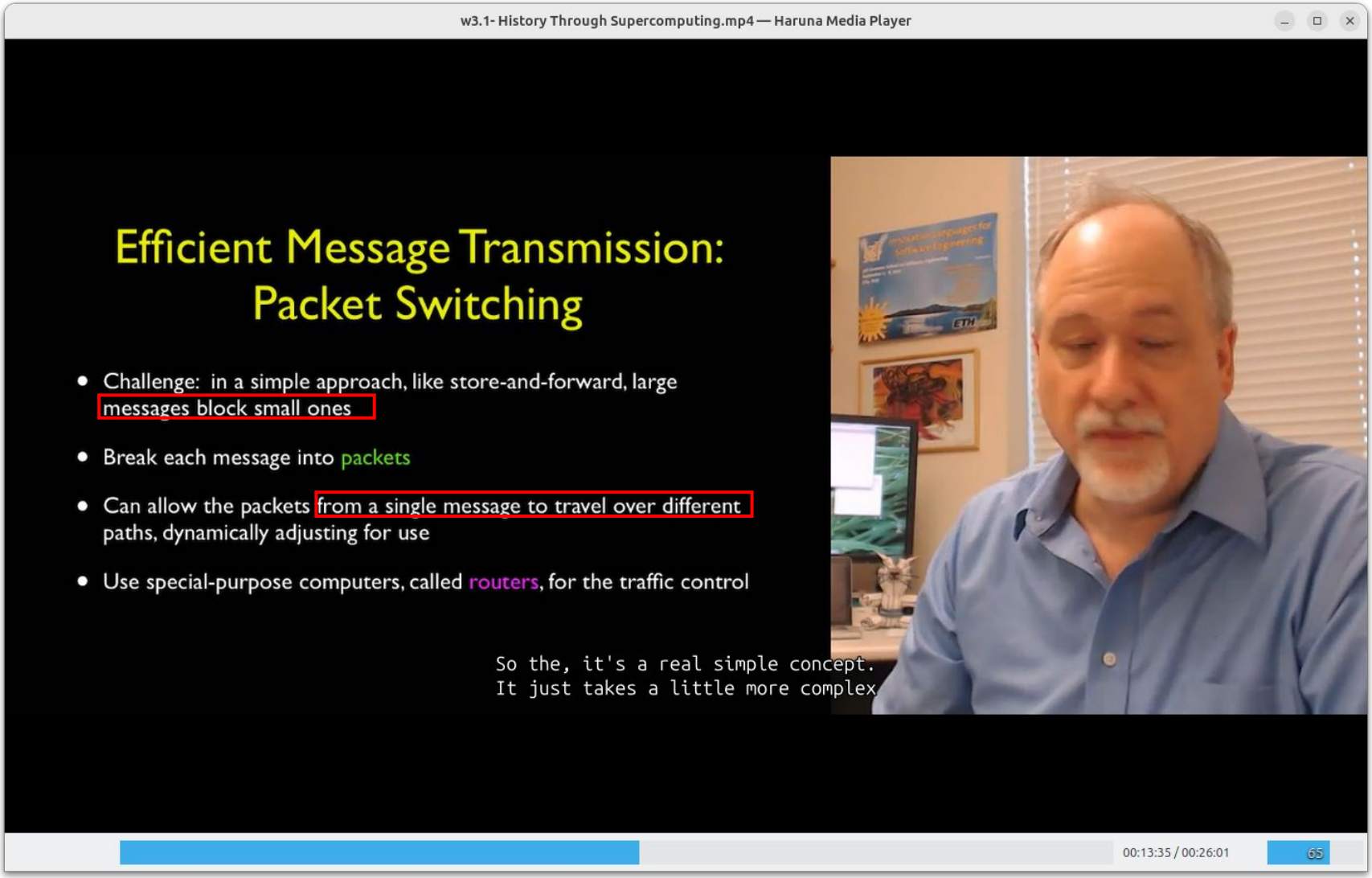
- How can we avoid having a direct connection between all pairs of computers or long snake-like connections?
- How can we dynamically handle outages switching between multiple paths?
- How to transport many messages simultaneously and efficiently?

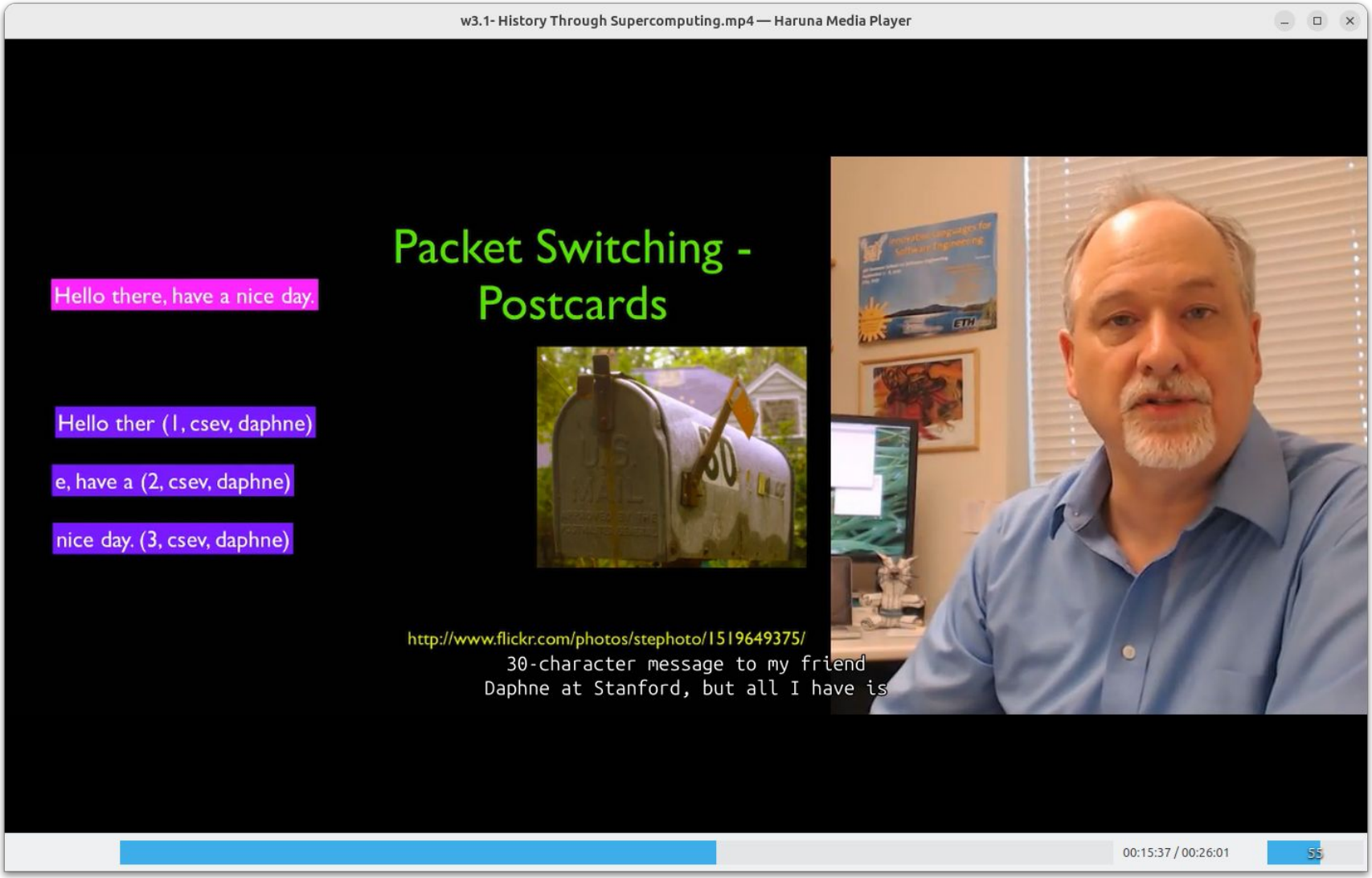


http://som.csudh.edu/fac/lpress/history/arpamaps/

But during that exact same time, from the 1960s to the 1980s, the US Department of

00:09:55 / 00:26:01





w3.1- History Through Supercomputing.mp4 — Haruna Media Player

Packet Switching - Postcards

http://www.flickr.com/photos/stephoto/1519649375/

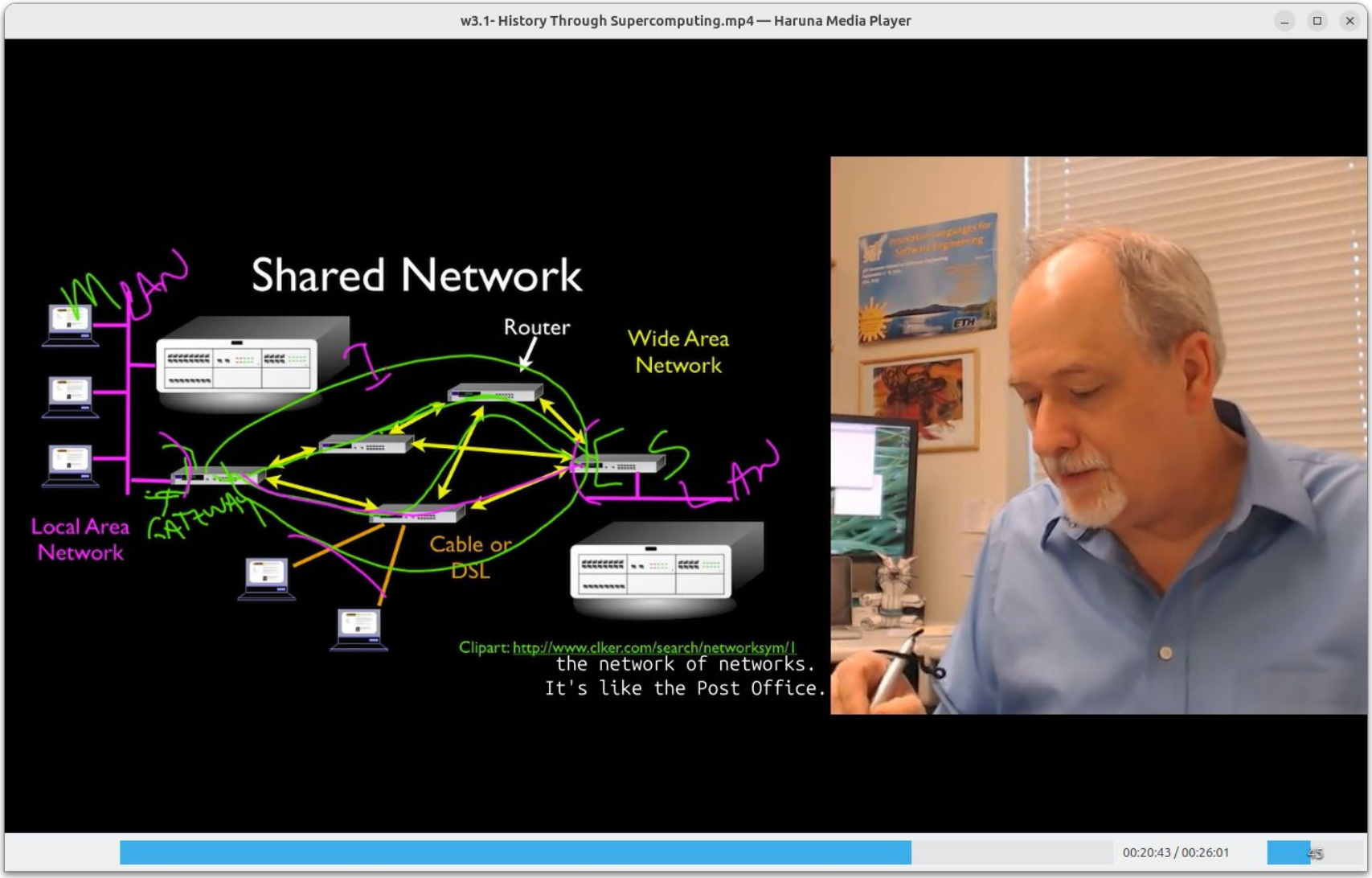
Hello ther (1, csev, daphne)

nice day. (3, csev, daphne)

the more southerly route.
And she goes, well I'm missing something,

00:18:57 / 00:26:01

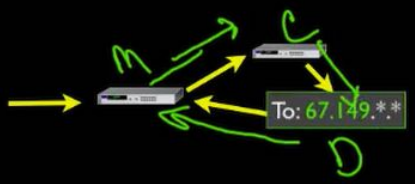
w3.1- History Through Supercomputing.mp4 — Haruna Media Player



w3.1- History Through Supercomputing.mp4 — Haruna Media Player

An Example Problem to Solve

- With each router having only a local / subset knowledge of the shape of the network, how do we avoid confusion if the information is a little "messed up"?

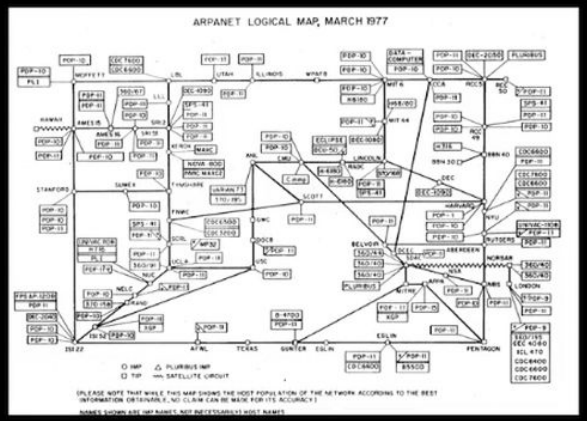


Clipart: http://www.clker.com/search/networksym/1

is in a loop, right?
This wouldn't be good for the Post Office

00:21:49 / 00:26:01

w3.1- History Through Supercomputing.mp4 — Haruna Media Player



Heart, F., McKenzie, A., McQuillian, J., and Walden, D., ARPANET Completion Report, Bolt, Beranek and Newman, Burlington, MA, January 4, 1978.

http://som.csudh.edu/fac/lpress/history/arpamaps/arpanetmar77.jpg

It had gotten to be very sophisticated, it had been a good investment.

00:22:31 / 00:26:01

w3.1- History Through Supercomputing.mp4 — Haruna Media Player

Supercomputers...

- As science needed faster and faster computers, more universities asked for their own Multimillion dollar supercomputer
- The National Science Foundation asked, "Why not buy a few supercomputers, and build up a national shared network?"

And so, at the same time that, this kind of goes back to Bletchley Park, right,

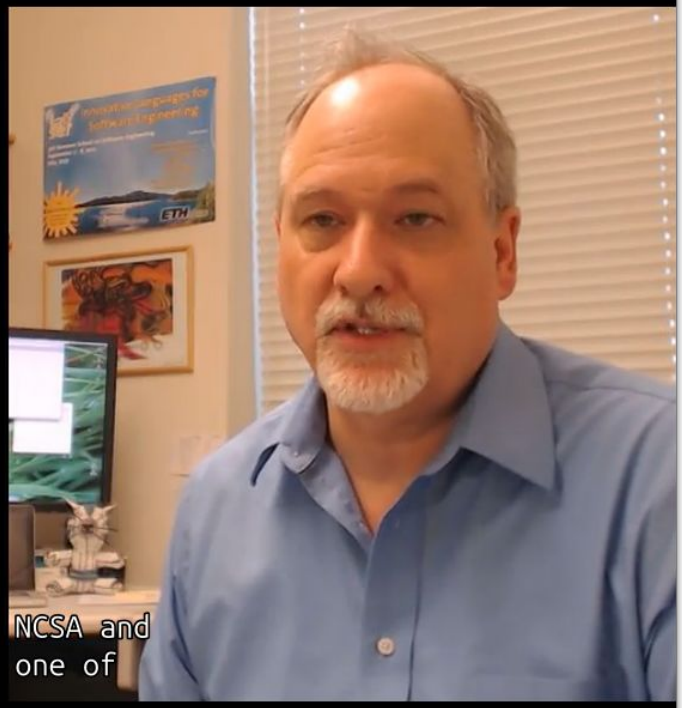
00:23:38 / 00:26:01

w3.1- History Through Supercomputing.mp4 — Haruna Media Player

Subtitle scale: 0.5

NCSA - Innovation

- We now "assume" the Internet and the Web - it was not so easy...
- A number of breakthrough innovations came from the National Center for Supercomputing Applications at Urbana-Champaign, Illinois
- High Performance Computing and the Internet were deeply linked



http://www.vimeo.com/6982439 (11:53)

And Larry was the director of NCSA and
one of the many people, but one of

00:25:37 / 00:26:01

Summary

This transcript features a nostalgic and technical dive into the evolution of networking, transitioning from the "haphazard" but beloved era of **Store-and-Forward** to the revolutionary **Packet Switching** research of the ARPANET.

1. The Era of "Awesome but Slow" (60s–70s)

Before the modern internet, connectivity was physical and proximity-based:

- **Physical Media:** Data lived on punch cards or was transmitted via **Teletypes** that converted data into audible squeals.
- **The 20-Mile Radius:** Most users relied on a single local computer reachable via a local phone call.
- **Leased Lines:** Connecting cities required renting copper wires from phone companies. Costs were high and grew linearly with distance.

2. Store-and-Forward vs. Packet Switching

The lecture highlights the fundamental shift in how data moves across a network:

- **Store-and-Forward (The Academic Compromise):** To save money, universities like Michigan and Stanford used 'hops.' A computer would receive an entire message, store it on a disk, and wait for a free line to forward it to the next computer. If you were stuck behind a large file, your email might take hours to move.
- **Packet Switching (The ARPANET Breakthrough):** This research broke long messages into small "chunks" (packets). This allowed multiple users to share a single line simultaneously—a small email could "sneak past" a massive data transfer by weaving its packets in between.

3. The Postcard Analogy

To explain **Packets**, the speaker uses the analogy of a 30-character message sent via 10-character postcards:

1. **Segmentation:** Break the message into three postcards.
2. **Addressing:** Each card gets a "To," a "From," and a **Sequence Number**.
3. **Routing:** Each postcard might take a completely different path (e.g., one via Chicago, one via Dallas).
4. **Reassembly:** The recipient (Daphne) waits for all cards to arrive and uses the sequence numbers to put the message back together, even if they arrive out of order.

4. ARPANET and the Shift to "Network of Networks"

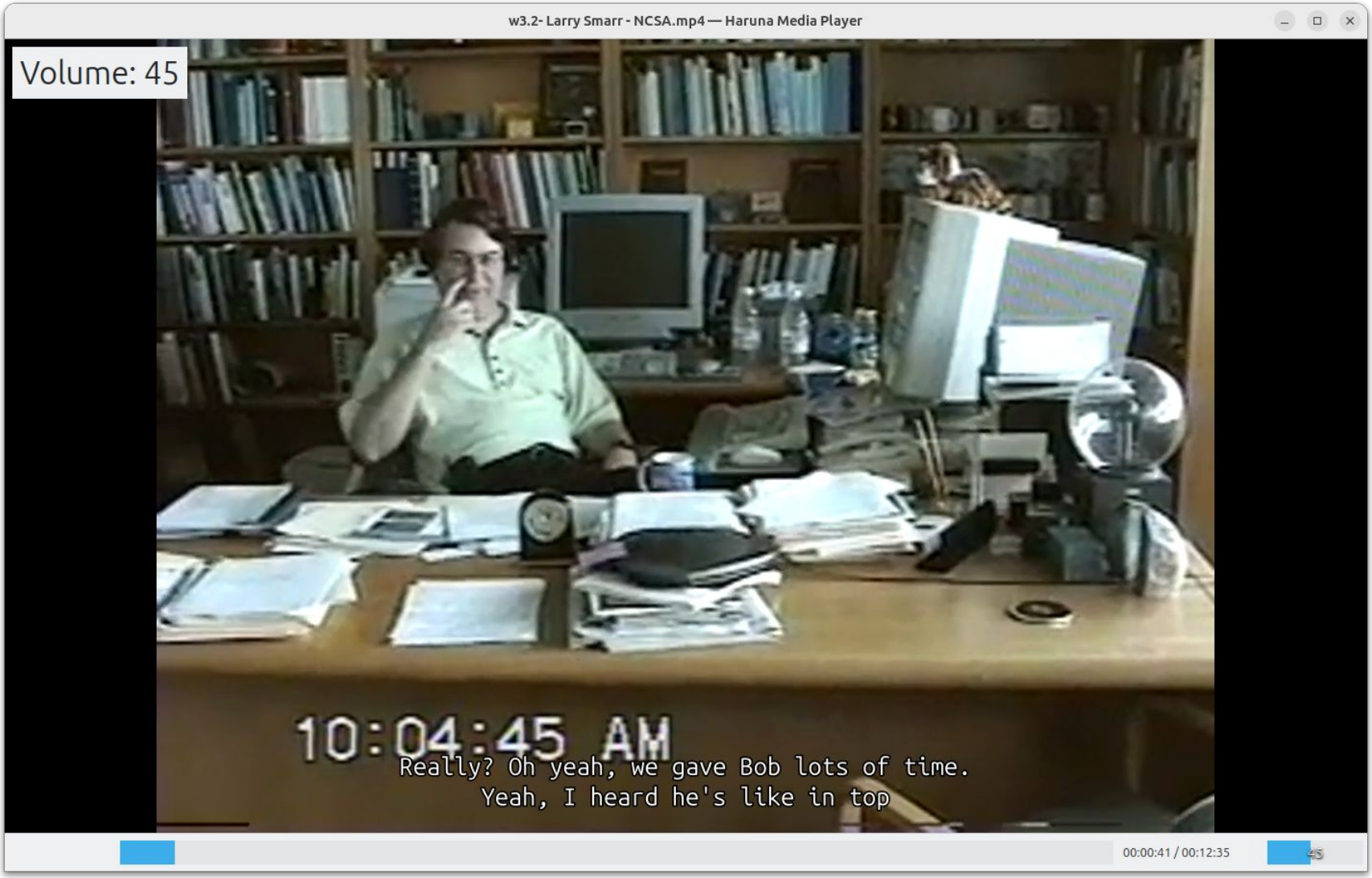
While academics were using slow networks like **Bitnet**, the US Department of Defense was funding **ARPANET**.

- **Motivation:** It wasn't just fear of nuclear war; it was about **people-centered efficiency** (allowing researchers to access distant computers) and **battlefield redundancy** (ensuring the network stays up even if one node/trailer is destroyed).
- **The 60-Host Limit:** By the late 70s, the ARPANET was a sophisticated "futuristic world" for an exclusive group of about 60 research and military computers.

5. Scaling Up: The NSF and Larry Smarr

The National Science Foundation (NSF) eventually grew tired of buying every university its own $10 million supercomputer (like the **Convex C3800** mentioned). Their solution was to create a national network to connect a few shared supercomputing centers. This transition, led by figures like **Larry Smarr** at the NCSA, moved networking from a niche research project to the foundational Internet we use today.

w3.2- Larry Smarr - NCSA



Summary

This transcript features **Larry Smarr**, the founding director of the National Center for Supercomputing Applications (NCSA), explaining the unlikely origins of the NCSA and how the academic internet (NSFNET) was effectively "smuggled" into existence through the world of astrophysics.

1. The "Flying Saucer" Gap (1970s)

Smarr describes a bizarre technological divide during his early career as a relativistic astrophysicist:

- **The Advanced Civilization:** To solve Einstein's equations (black hole collisions), Smarr had to get **top-secret nuclear weapons clearance** just to access supercomputers at Livermore or Los Alamos.
- **The "Stone Age":** He would then return to places like Harvard, which lacked any comparable computing power.
- **The Munich Epiphany:** While working at the Max Planck Institute (which had an American-built Cray supercomputer), a German host asked why Americans had to travel to Europe to use their own technology. This spurred Smarr to challenge the status quo.

2. The Battle for Academic Access

Smarr returned to the University of Illinois and "cold-called" faculty across various departments (biology, agriculture, chemistry). He found that 65 faculty members were research-blocked by a lack of computing power.

- **The Lax Report:** Smarr fought with prominent mathematician Peter Lax to ensure that universities were not excluded from federal supercomputing plans. At the time, the elite consensus was that universities "couldn't play with sharp instruments without hurting themselves."

3. "Smuggling" the Internet through Policy

The transcript reveals a fascinating political strategy used to build the modern internet:

- **Avoiding the Lobbyists:** In the mid-80s, telecom lobbyists blocked federal funding for a "general" national network, claiming it interfered with the private sector.
- **The "Esoteric" Loophole:** Smarr and his colleagues realized that if they asked for a network **only** to connect five "weird" supercomputing centers, the lobbyists would ignore them because there was "no market" for such an esoteric tool.
- **The Trojan Horse:** This "irrelevant" high-speed backbone (NSFNET) forced universities to install fiber-optic cables so their professors could reach the supercomputers. This localized infrastructure eventually grew and merged into the ubiquitous Internet we use today.

4. Cultural Context

- Smarr highlights how completely divorced academia was from the early ARPANET, which was restricted to military and specific computer science departments.
- He notes the irony that **56 kilobits** was considered the "national high-speed backbone" at the time—slower than a basic ISDN line today.

w3.3- History Through NSFNet

w3.3- History Through NSFNet.mp4 — Haruna Media Player

NCSA - Innovation

- We now "assume" the Internet and the Web - it was not so easy...
- A number of breakthrough innovations came from the National Center for Supercomputing Applications at Urbana-Champaign Illinois
- High Performance Computing and the Internet were deeply linked

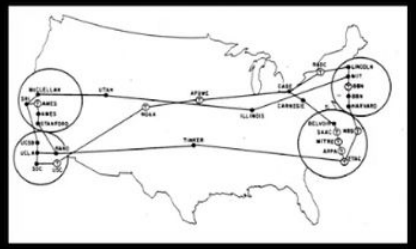
It wasn't like somebody just walked out
and said, hey make a network.

00:00:06 / 00:03:13

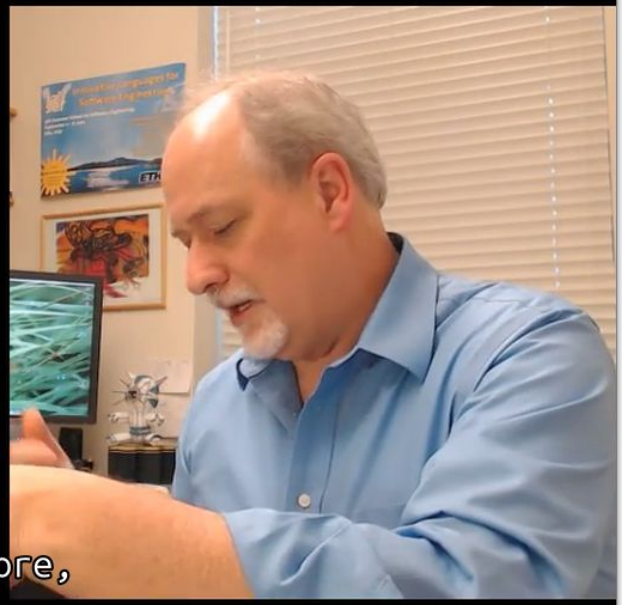
w3.3- History Through NSFNet.mp4 — Haruna Media Player

NSF Net

- NSFNet was funded by the National Science Foundation
- Standardized on TCP/IP
- The first national TCP/IP network that was "inclusive"
- Initially the goal was all research universities



ARPANET August 1972



that was sort of right before,
now it's at 1972.

00:00:59 / 00:03:13

w3.3- History Through NSFNet.mp4 — Haruna Media Player

Michigan's State-Wide Network

In 1969, Merit was one of the earliest network projects that was intended for use by an entire campus population of students, faculty, and alumni. [1]

Merit PDP-11 based Primary Communications Processor (PCP) at the University of Michigan, c. 1975

[1] http://www.zakon.org/robert/internet/timeline/

we built a network using leased lines, a three-node network between Michigan State

00:01:21 / 00:03:13

w3.3- History Through NSFNet.mp4 — Haruna Media Player

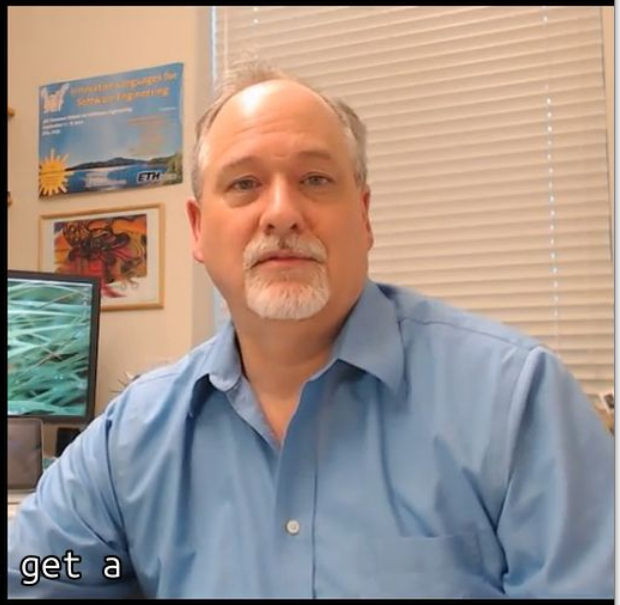
NSFNet @ University of Michigan

- University of Michigan did not get a Supercomputer Center
- Proposed a $55M high-speed network for $15M
- Partners: University of Michigan, Merit Network, IBM Corporation, MCI, and State of Michigan
- Operated from 1988-1995

http://www.vimeo.com/11044819

large university, did want to get a supercomputer center.

13:14



00:02:18 / 00:03:13

Summary

This transcript highlights the political and strategic maneuvering that transitioned networking from a small military experiment into a national academic infrastructure, specifically focusing on the role of the University of Michigan.

1. Overcoming the Lobbyists

The development of a national network was not a guaranteed success. Powerful **telecom lobbyists** actively opposed the government's involvement in networking, viewing it as an intrusion into the private sector. It took the collective influence of **Larry Smarr** and other supercomputing advocates to convince Congress to fund the **National Science Foundation Network (NSFNET)**.

2. The ARPANET Omission

The speaker notes a "glaring omission" in the early maps of the ARPANET: the **University of Michigan**. While other elite schools were joining the military-funded ARPANET, Michigan stayed off the map for a strategic reason—they had already built their own.

3. The Merit Network: Production vs. Research

Michigan, along with Michigan State and Wayne State University, formed the **Merit Network**.

- **Production vs. Research:** While the ARPANET was still considered a "research experiment," Merit was a "production" network. It was already being used for practical, everyday academic life.
- **Early Community:** Long before the modern web, Merit users were sharing compute resources, using chat forums, and playing multi-user text-based "adventures" (early online games).

4. Strategic Pivot: From Supercomputers to the Net

The University of Michigan initially aimed to host one of the national supercomputing centers. When that bid failed due to 'strategic blunders,' the university's leadership, including CIO **Doug Van Houweling**, shifted their focus entirely toward winning the contract to run the network itself.

This pivot was successful: Doug Van Houweling became the principal investigator for the **NSFNET** in 1988, using the **TCP/IP** protocols pioneered by ARPANET to create a more inclusive network for all research academics.

APRANET vs NSFNet

Both ARPANET and NSFNet were government-funded predecessors to the modern internet, each serving as a critical backbone for computer networking during different eras.

ARPANET (Advanced Research Projects Agency Network)

Created by the U.S. Department of Defense in the late 1960s, ARPANET was the pioneering project that proved large-scale networking was possible.

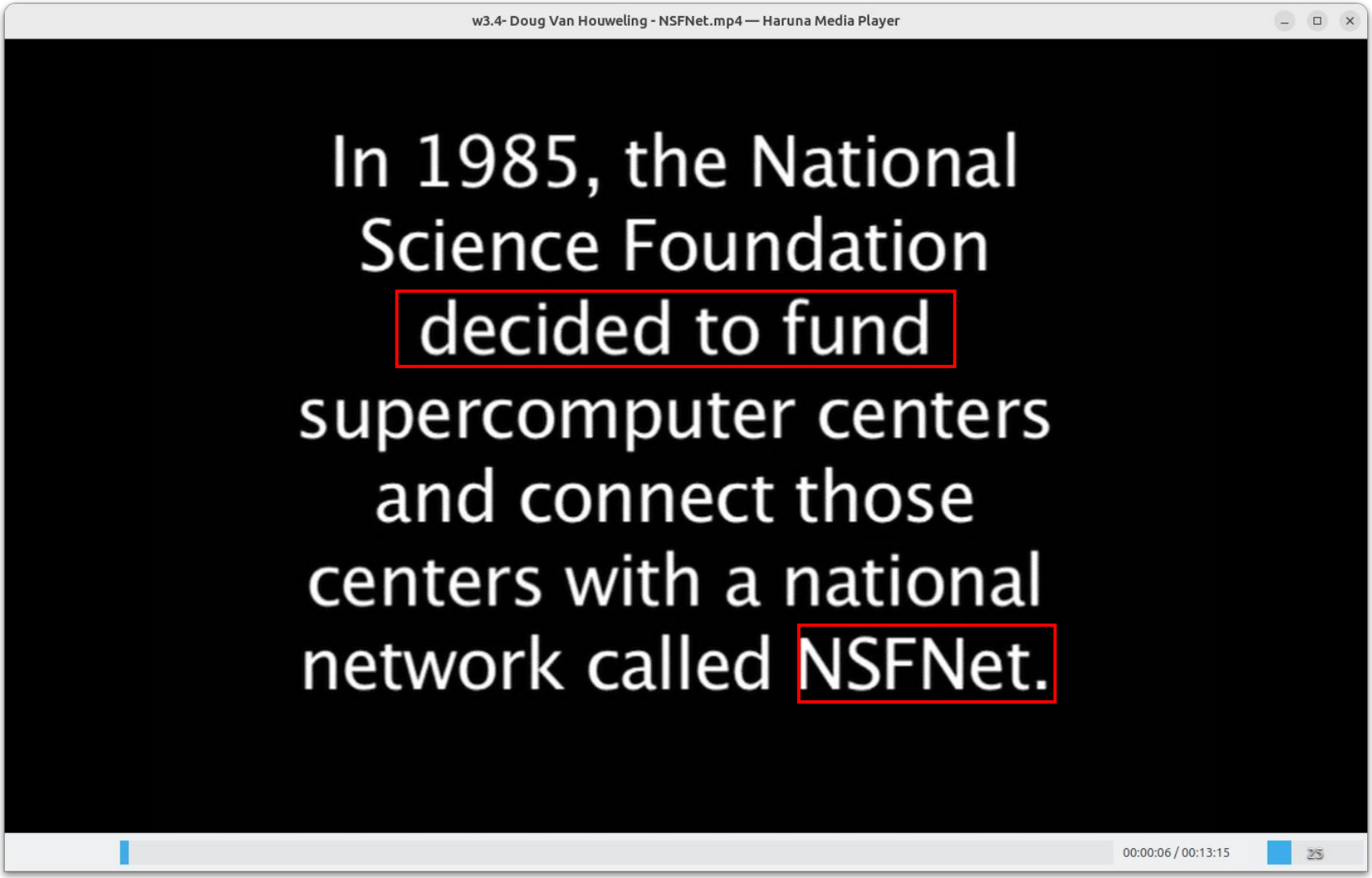
- **Purpose**: Initially designed as a secure and reliable communication means for military and academic institutions during the Cold War.
- **Key Innovations**: It was the first major network to implement **packet switching**, a technology where data is broken into small blocks (packets) that can be sent independently across multiple paths.
- **Nodes and Access**: It began with just four nodes in 1969—connecting UCLA, Stanford Research Institute, UC Santa Barbara, and the University of Utah. Access was tightly restricted to select researchers and military contractors. +1
- **Legacy**: ARPANET adopted the **TCP/IP** protocol in 1983, which became the "universal language" of the internet. It was officially decommissioned in 1990 after its functions were largely absorbed by newer networks. +1

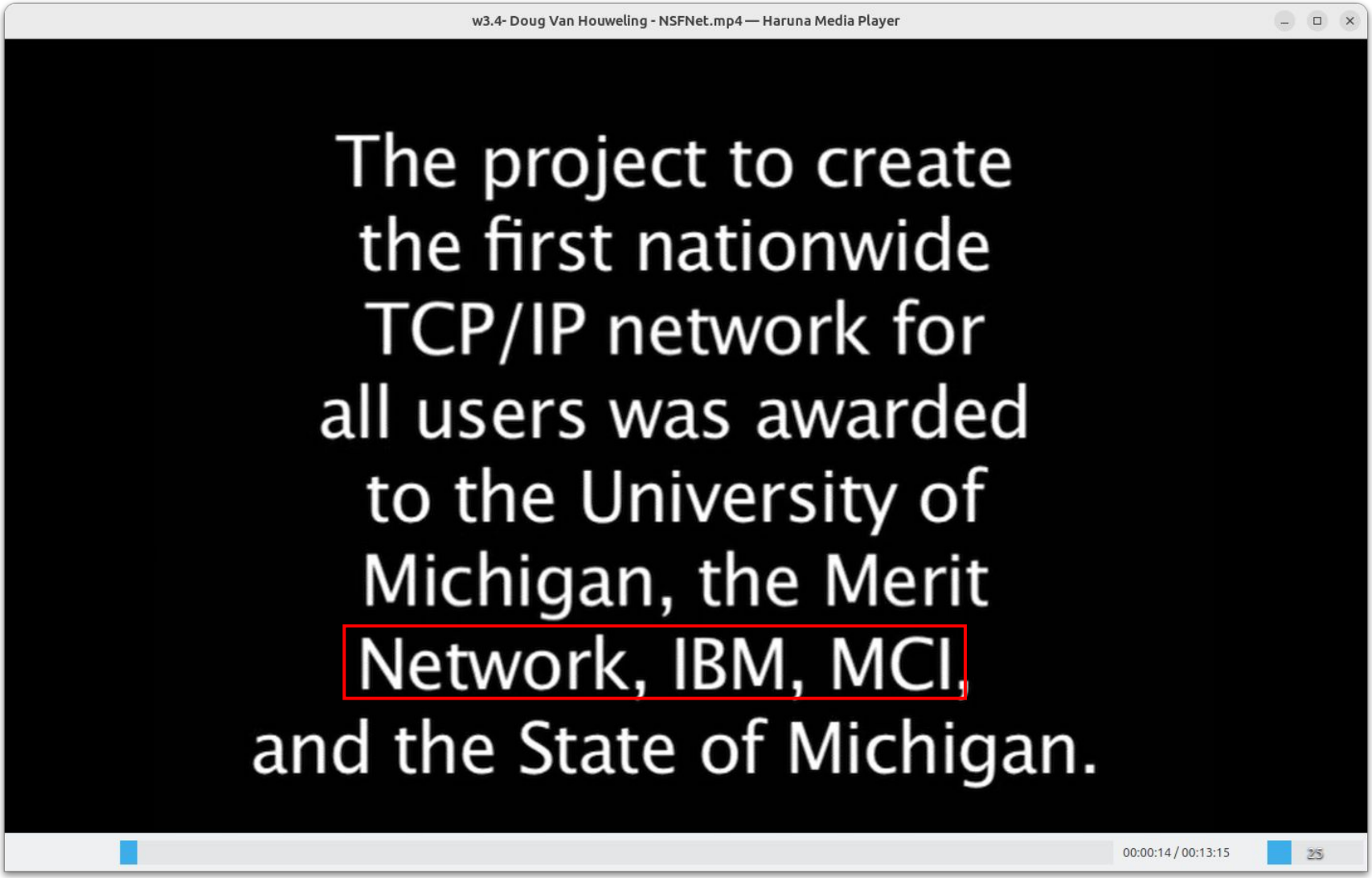
NSFNet (National Science Foundation Network)

Launched in 1986, NSFNet acted as a high-speed "network of networks" that bridged the gap between the experimental ARPANET and the commercial internet we use today.

- **Purpose**: Its primary goal was to connect academic researchers across the U.S. to five newly established supercomputing centers, allowing them to share massive computing resources.
- **Broader Access**: Unlike ARPANET, NSFNet was made available to virtually every researcher and educational institution in the country, which sparked massive growth in network traffic.
- **Performance**: It initially launched with speeds of **56 kilobits per second** (similar to a dial-up modem) but was quickly upgraded to **1.5 megabits per second** (T1) by 1988 and **45 megabits per second** (T3) by 1991 to handle the load.
- **Privatization**: In the early 1990s, the U.S. government began allowing commercial traffic on the network. NSFNet was decommissioned in 1995 as the internet backbone transitioned to private, commercial providers like Sprint and MCI.

w3.4- Doug Van Houweling - NSFNet





Summary

This transcript details the pivotal role the University of Michigan and its partners played in the creation and evolution of **NSFNET** (National Science Foundation Network), the precursor to the modern commercial internet.

Here is a summary of the key events and strategic shifts:

1. The Pivot: From Hardware to Networking (1985)

The University of Michigan initially proposed hosting a national supercomputing center. However, the proposal relied on Japanese hardware, which was politically unlikely to be funded by the NSF at the time. Recognizing this, the team pivoted to a more strategic goal: **running the network that would connect all supercomputing centers.**

2. Building the "Dream Team" Partnership

The NSF had a budget of $15 million, which would only support a slow 56-kilobit network. To "expand the envelope," the team formed a massive public-private partnership:

- **Merit Network:** Michigan's state-wide network served as the principal organization.
- **IBM:** Provided the routing hardware and software (despite internal skepticism about their commitment to open TCP/IP protocols).
- **MCI:** Provided the nationwide communications facilities, seeing it as a way to compete with AT&T.
- **State of Michigan:** Governor Blanchard committed $1 million annually.

This collaboration turned a $15M grant into a **$55M project**, allowing them to start at **T1 speeds (1.5 Mbps)** rather than 56 Kbps.

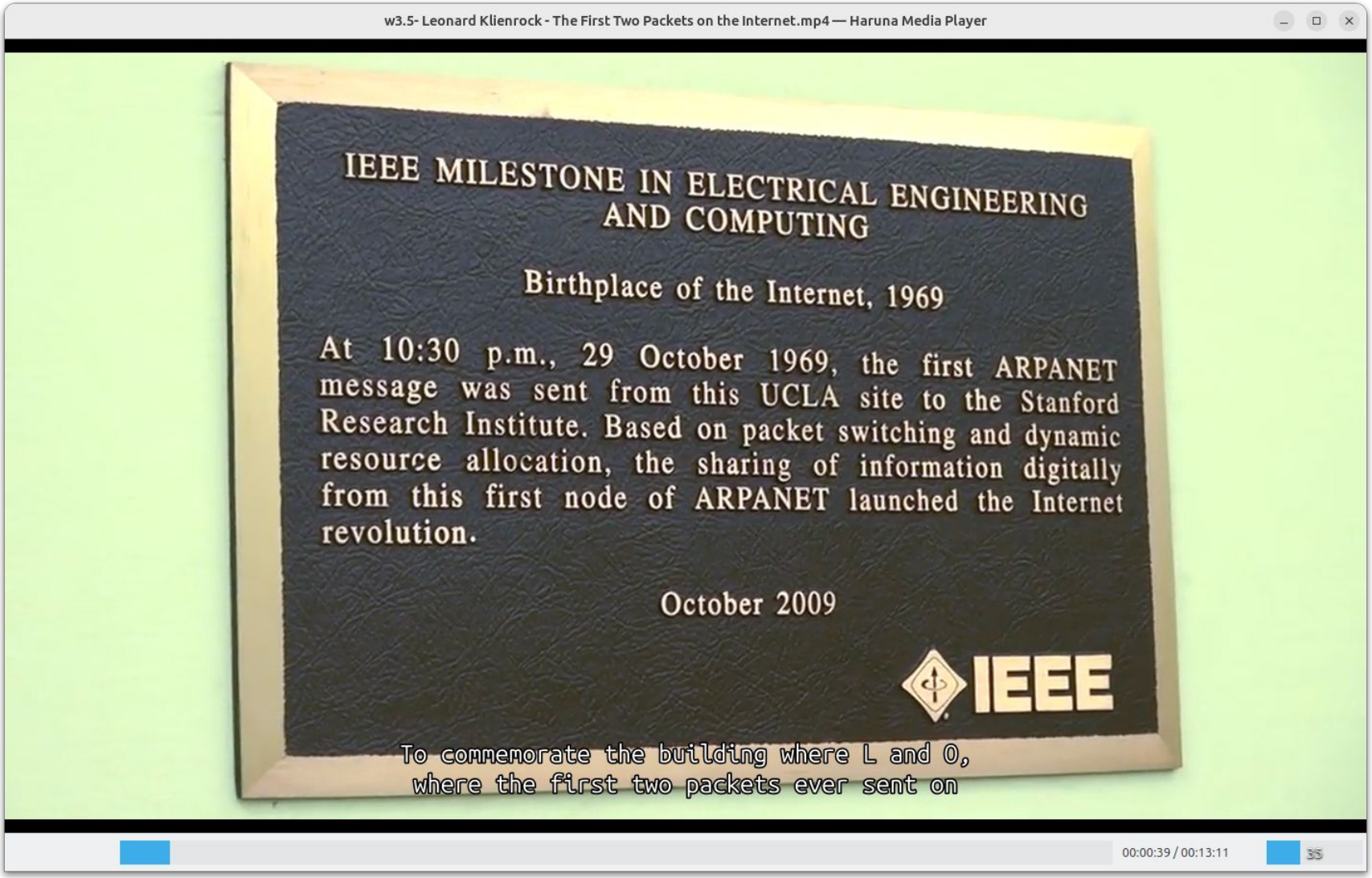
3. Explosive Growth and Innovation

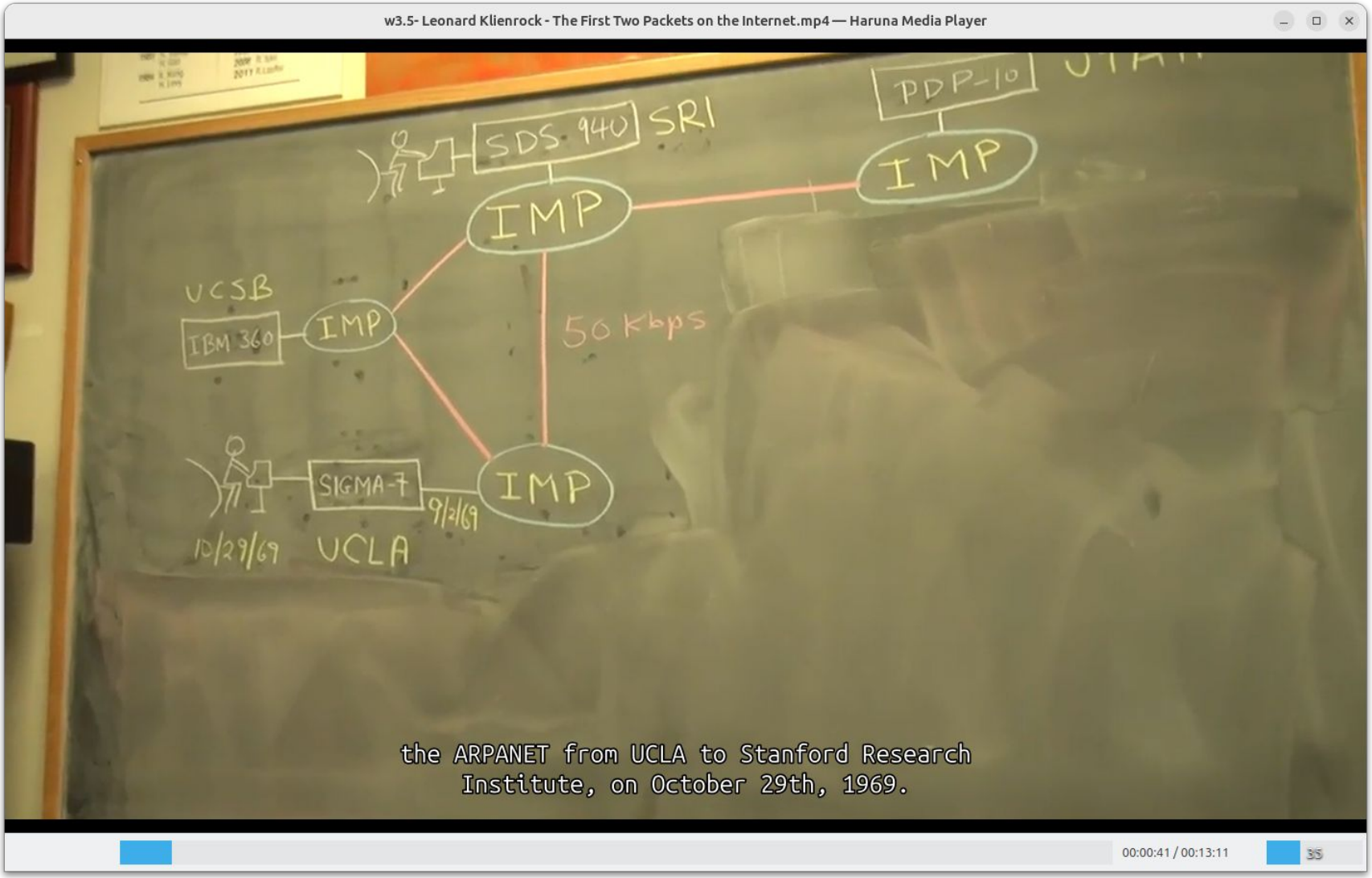
- **Traffic Surge:** From 1988 to 1994, the network grew by **15% every month**.
- **Technical Milestones:** The team had to innovate in real-time, developing **Border Gateway Protocols (BGP)** to manage the interaction of multiple networks.
- **The DS3 Leap:** By 1990, the network upgraded to **DS3 (45 Mbps)**—a 30-fold increase in capacity—managed by a new non-profit called Advanced Network and Services (ANS).

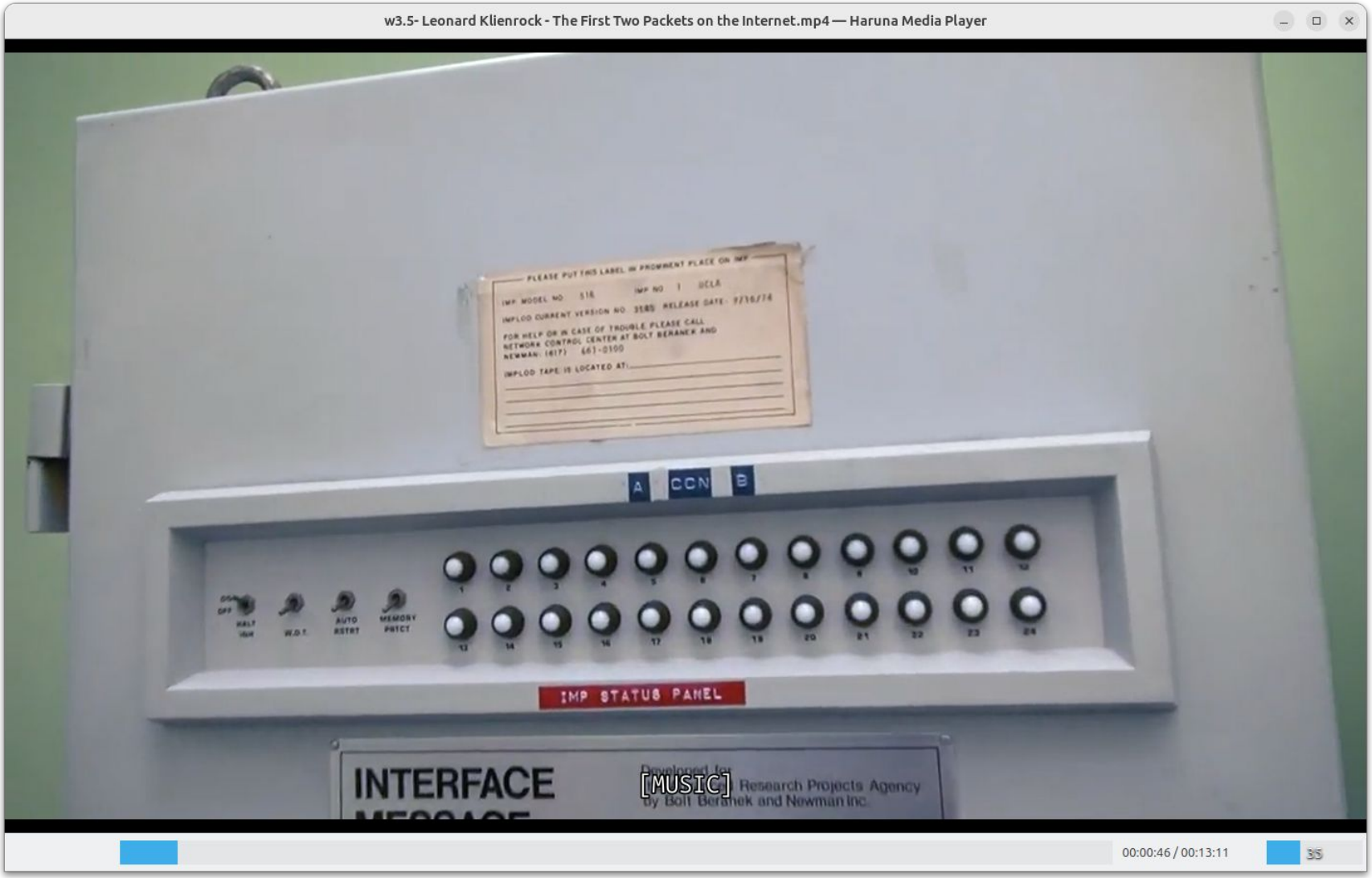
4. Commercialization and "The Innovator's Curse"

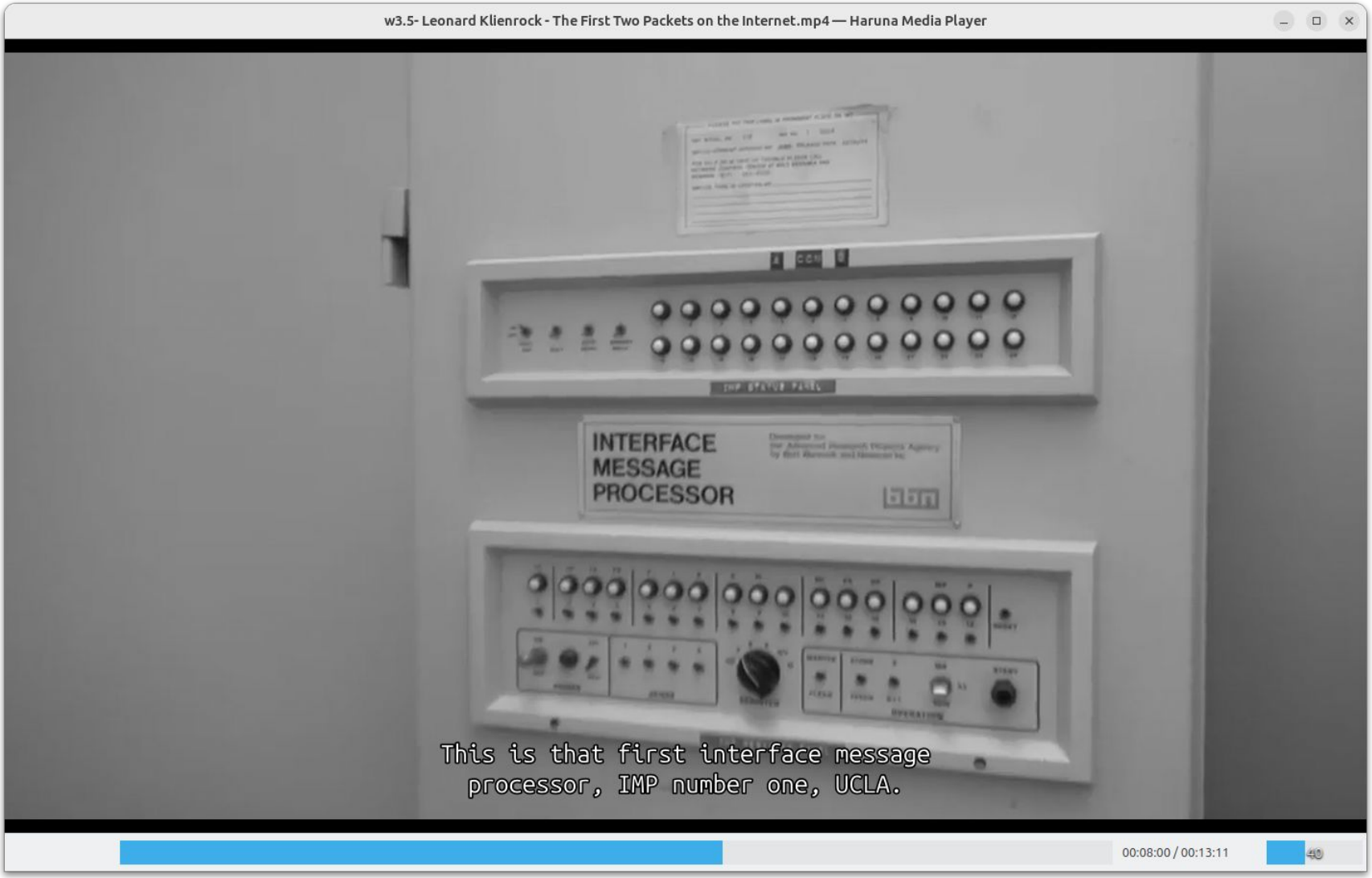
- **Decommissioning (1995):** The NSFNET was retired when Congress decided the internet should be a commercial facility. The speaker notes the irony of startups lobbying against NSF funding while simultaneously using the NSFNET as a reliable backup for their own failing commercial networks.
- **IBM's Strategic Blunder:** Despite being the leader in routing technology during this era, IBM chose to kill its router projects to protect its proprietary systems. This decision effectively cleared the path for **Cisco** to dominate the market.

w3.5- Leonard Klienrock - The First Two Packets on the Internet









Summary

This transcript features **Dr. Leonard Kleinrock**, a key architect of the internet, detailing the birth of the ARPANET at UCLA and the philosophy of distributed control that defines the modern web.

1. "Lo and Behold": The First Message

Dr. Kleinrock explains the historical significance behind the "random" tile patterns at UCLA's Boelter Hall:

- **The Transmission:** On October 29, 1969, the first message was sent from UCLA to the Stanford Research Institute (SRI).
- **The "Crash":** The goal was to type "LOGIN." The UCLA team typed the "L" (received), then the "O" (received). When they typed the "G," the system crashed.
- **The Result:** The first message ever sent on the internet was simply **"LO"**—serendipitously spelling the start of "lo and behold."

2. Resource Sharing Over Nuclear Defense

Kleinrock clarifies a common misconception: the ARPANET was created for **resource sharing**, not specifically to survive a nuclear holocaust.

- **The Economic Problem:** ARPA was funding researchers across the country. Every new researcher wanted the unique capabilities of others (Utah's graphics, Illinois's high-performance computing).
- **The Solution:** Instead of buying everyone a computer, they built a network so researchers could log into specialized machines remotely.

3. Engineering Reliability and Experiments

Kleinrock describes the pragmatic design of the network's infrastructure:

- **The Spec:** Timesharing experts demanded a latency of less than **0.5 seconds**. The team delivered **200 milliseconds**.
- **The Two-Connector Topology:** To ensure reliability, they designed the network so that if any single node failed, everyone else could still communicate.
- **The IMP (Interface Message Processor):** Built by BBN, this was the first "switch" (router). Kleinrock shares a vivid memory of seeing a Honeywell computer (the base for the IMP) hanging from a ceiling while a man hit it with a sledgehammer to prove its military-grade durability.

4. Distributed Control: The Internet's DNA

A critical design choice was to avoid a single point of control.

- **Delegating Authority:** Inspired by the decentralized way ARPA funded its "smart guys," Kleinrock insisted that control be distributed among peers.
- **Peer-to-Peer Philosophy:** This allowed the network to scale without a central bottleneck. It fostered a research and development mentality where brilliant graduate students (like **Jon Postel**) were given the freedom to innovate and keep meticulous records (the **IMP LOG**).

5. Technical Challenges and "Open" Code

The team faced early hurdles with proprietary interests:

- **Throughput:** They ganged multiple **4.8 kbps** lines to create the first **50 kbps** backbone.
- **Proprietary vs. Open:** Initially, BBN kept the IMP code proprietary. Kleinrock and his team fought to have it opened so they could fix faults themselves, leading to the "Open Source" spirit that still governs much of the internet today.

BBN and IMP

In the context of the history of networking you are studying, **BBN** and **IMP** are the architect and the engine of the early internet.

BBN (Bolt, Beranek and Newman)

BBN is a high-tech research and development company based in Cambridge, Massachusetts, that was awarded the contract to build the ARPANET in 1968.

- **The "Architects"**: While many researchers contributed ideas, BBN's team of engineers actually designed and implemented the hardware and software that made the network function.
- **Problem Solvers**: They were tasked with solving the "Magnitude 1,000,000" challenge of how to get different types of computers to talk to each other over a single network.
- **Legacy**: Beyond the ARPANET, BBN is responsible for many foundational digital technologies, including the first network email and the use of the "@" symbol.

IMP (Interface Message Processor)

The **IMP** was the actual hardware device developed by BBN to handle the networking tasks.

- **The First Router**: You can think of the IMP as the "grandfather" of the modern router.
- **The Intermediary**: Instead of connecting the main computers (hosts) directly to each other, each host was connected to an IMP. The IMPs then talked to each other to move data packets. +1
- **Packet Switching Hardware**: The IMPs performed the actual **packet switching**, taking data from a host, breaking it into packets, and routing them to the destination IMP.
- **Physical Form**: The first IMPs were built using modified Honeywell DDP-516 minicomputers, which were about the size of a large refrigerator and extremely rugged.

w3.6- Katie Hafner - Where Wizards Stay Up Late

Summary

This transcript features **Katie Hafner**, author of *Where Wizards Stay Up Late: The Origins of the Internet*, discussing her years of primary research into the human stories behind the ARPANET.

1. Uncovering the "Untold Story"

Hafner describes her research as a journey into the "unpretentious" and "uncharted" history of the late 60s and early 70s.

- **The "Garage" Archive:** While visiting **Larry Roberts** (who ran the IPTO), she found foundational ARPANET documents and sketches in mildewy boxes in his garage—primary source materia that had never been professionally archived.
- **BBN and the "Interfaith" Processor:** She details her time with **BBN (Bolt, Beranek and Newman)**, the firm that built the first **IMP (Interface Message Processor)**. She shares a humorous anecdote about Senator Ted Kennedy mistakenly congratulating them on building an "interfaith" message processor.

2. Key Figures: Ray Tomlinson and Jon Postel

The summary highlights the humble personalities of the internet's creators:

- **Ray Tomlinson:** The man who chose the **@ sign** for email. Hafner describes him as a "wonderful, really quiet guy" who was largely unschooled in dealing with the media.
- **Jon Postel:** The architect of the **Domain Name System (DNS)**. Hafner paints a portrait of a man who lived unpretentiously (long white beard, beat-up Volvo) and was more concerned with solving a small country's domain problems than "cementing his place in history." When asked why he never tried to get rich, he simply replied: *"It's just not what this is about."*

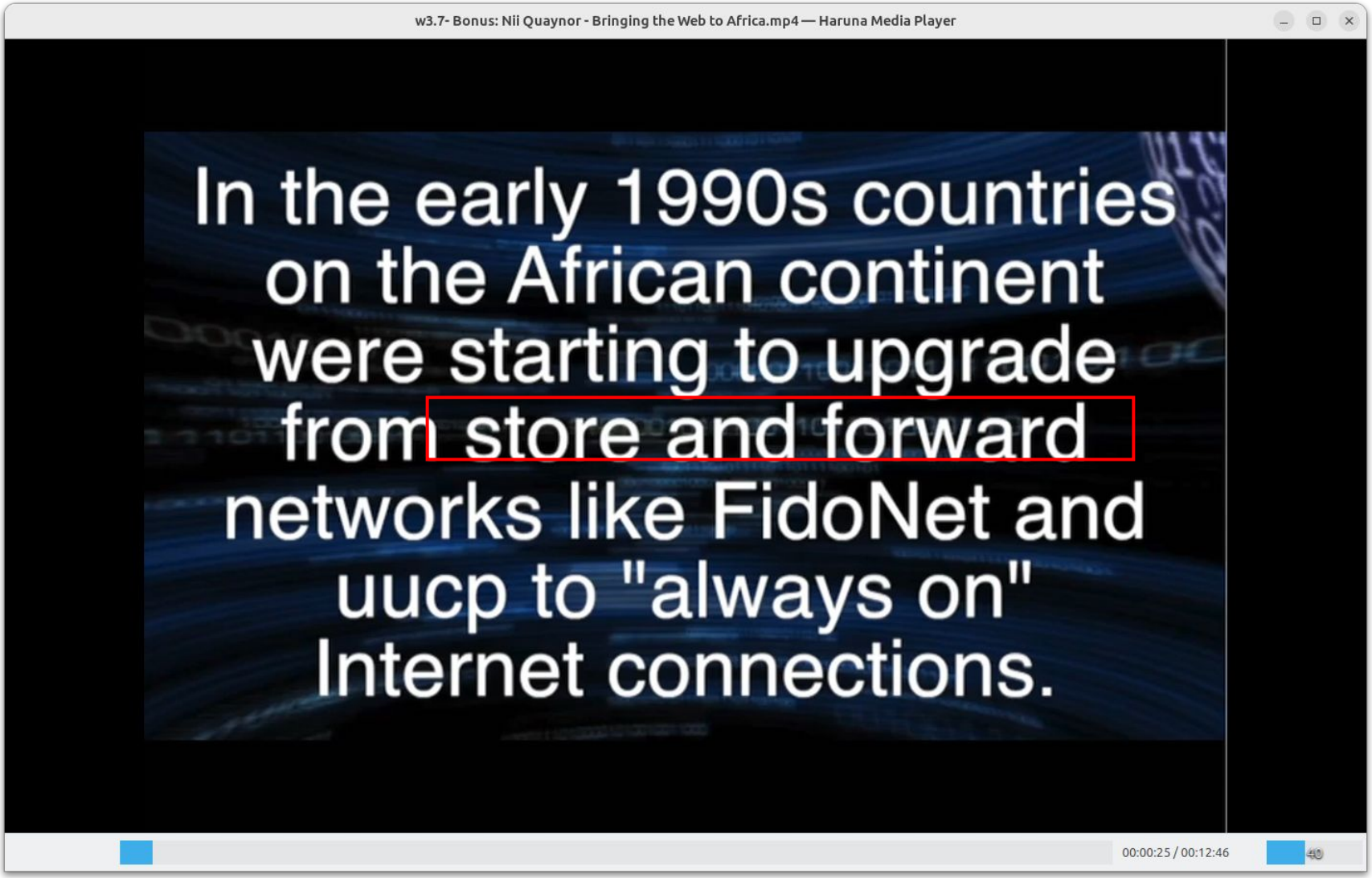
3. Corporate "No Vision" and Policy

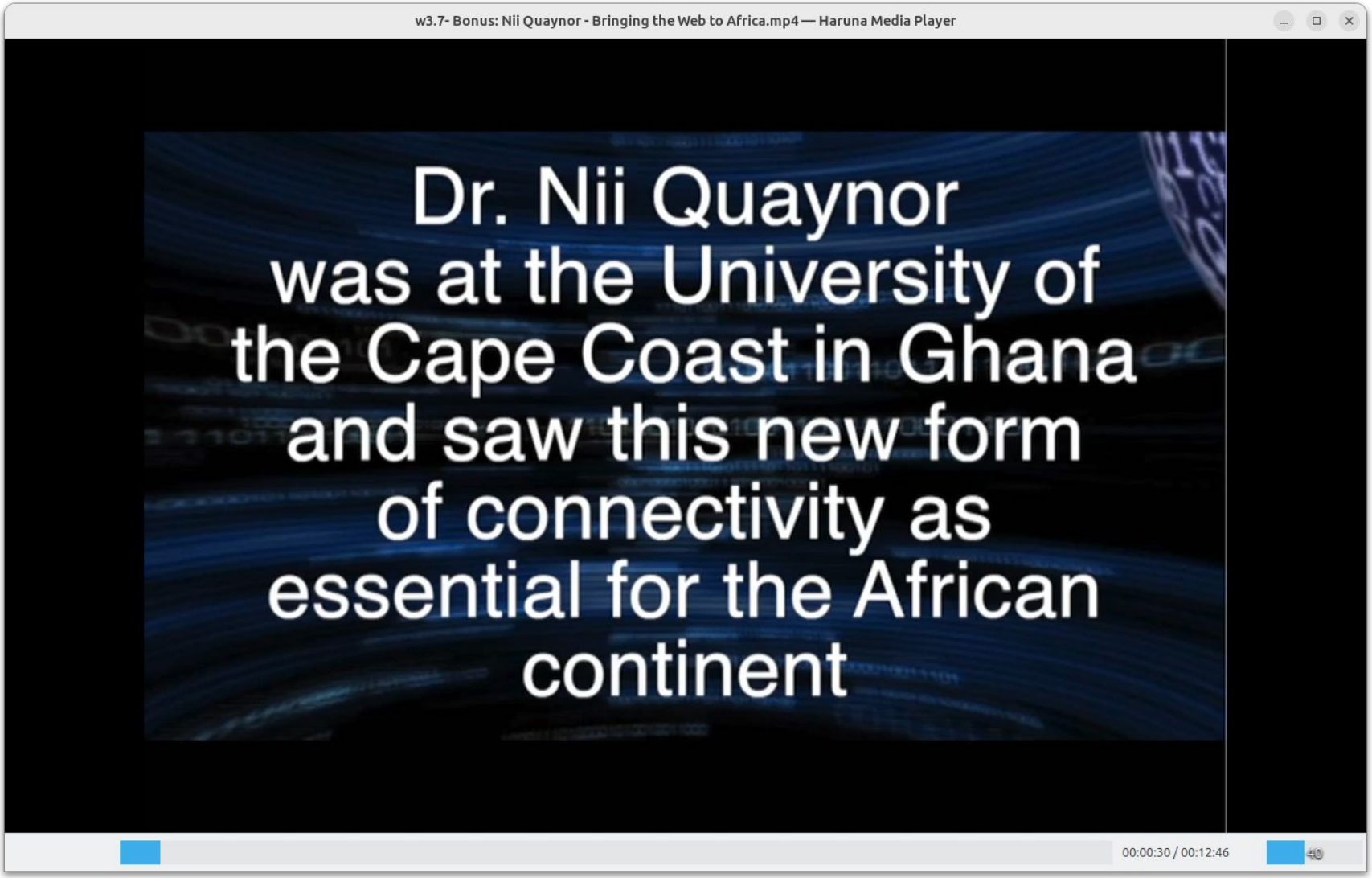
- **AT&T and IBM:** Hafner notes the irony that corporate giants like AT&T and IBM completely lacked the vision to build the network. AT&T, comfortable in its monopoly, suffered from "not invented here" syndrome and couldn't see a use for the packet-switched technology developed by Paul Baran.
- **Al Gore:** Hafner defends Al Gore's legacy, stating he is "underappreciated" for his role. She emphasizes that while he didn't "invent" the technology, his policy work and white papers provided the essential political support required to move the internet into the mainstream.

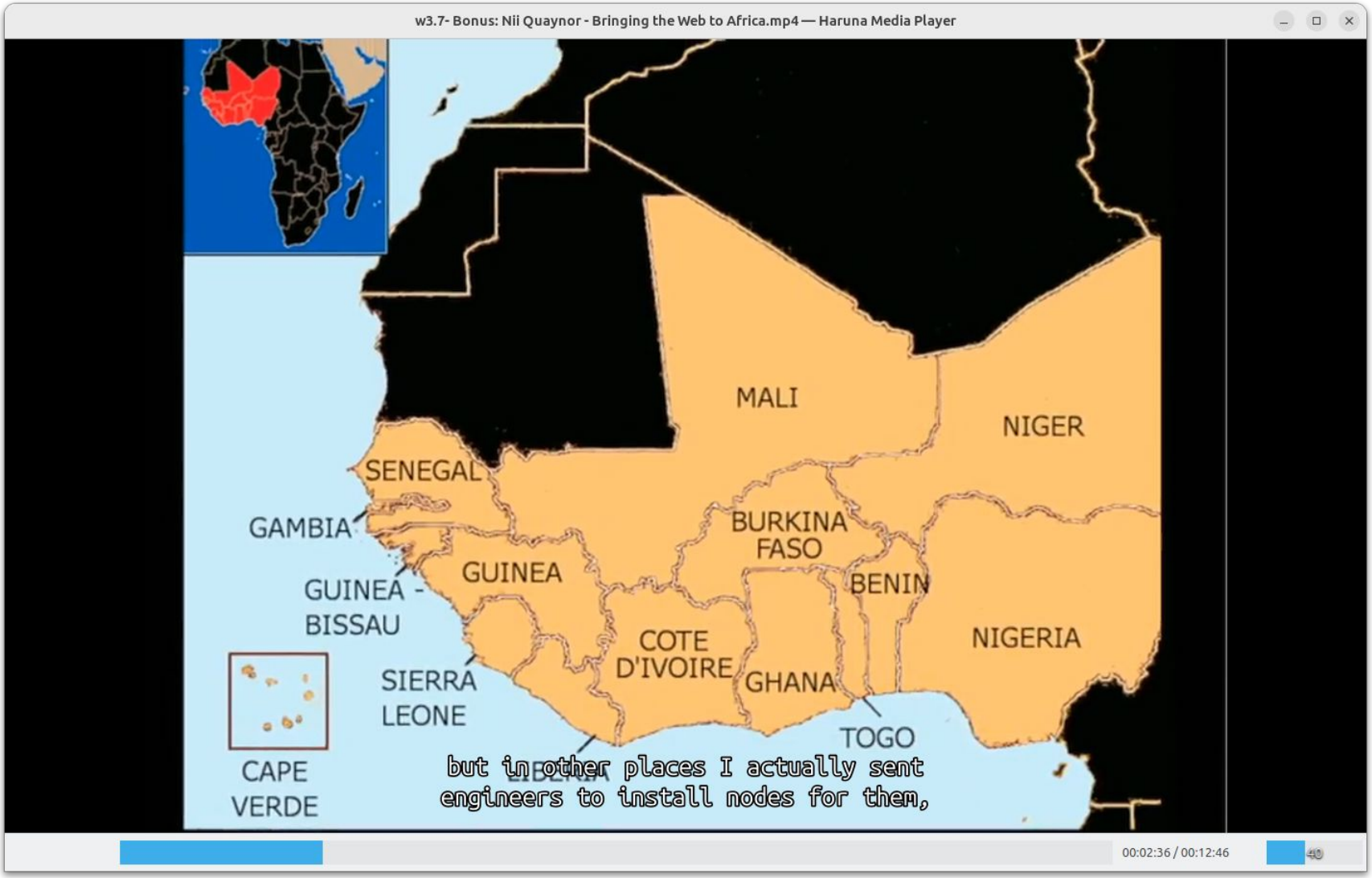
4. Technical and Research Context

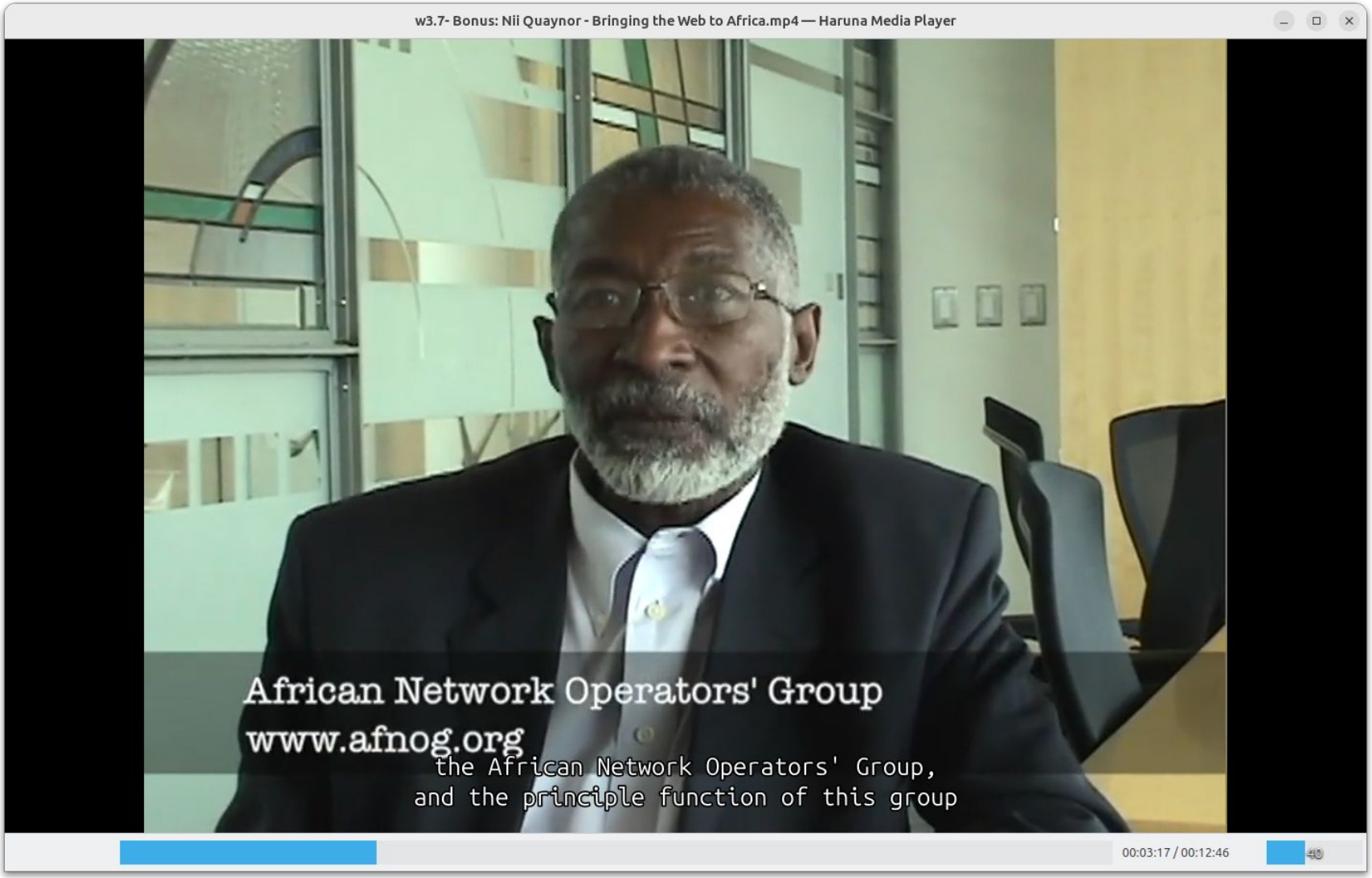
- Hafner's research took several years, transitioning from physical travel to heavy use of **email** as a research tool by 1993.
- She emphasizes the distinction between the **ARPANET** (the research precursor) and the **Internet** as it later evolved.

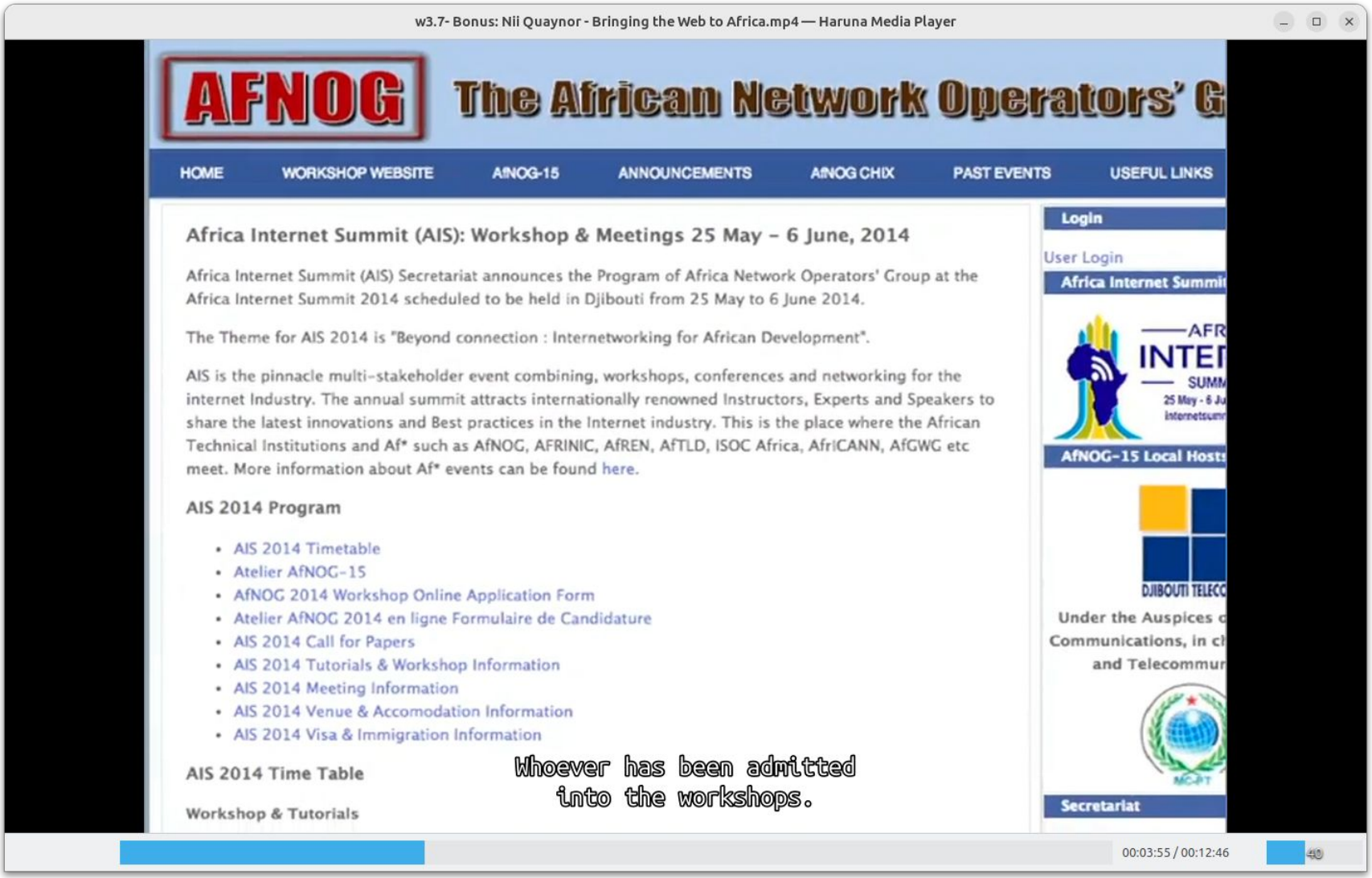
w3.7- Bonus: Nii Quaynor - Bringing the Web to Africa

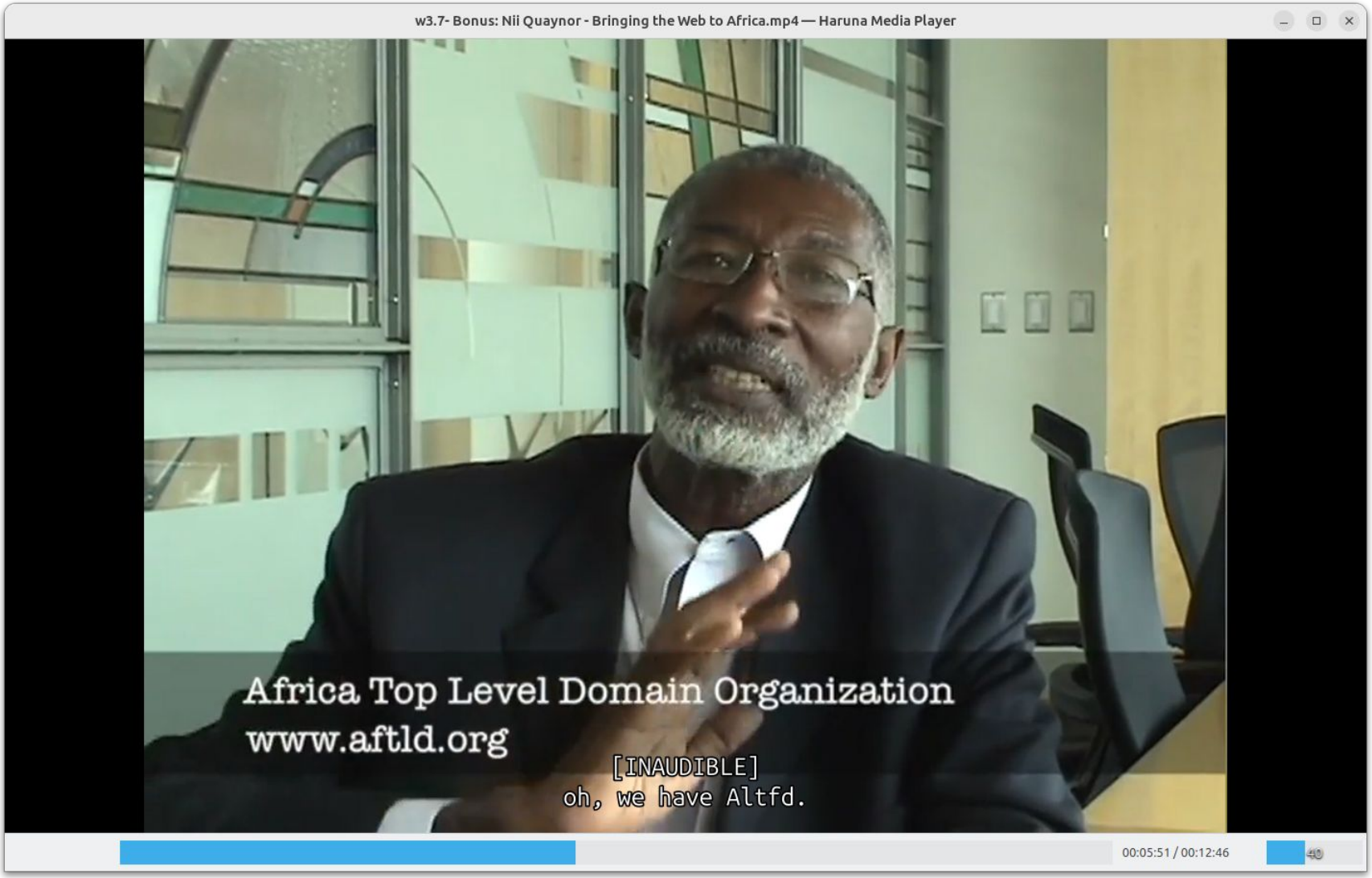


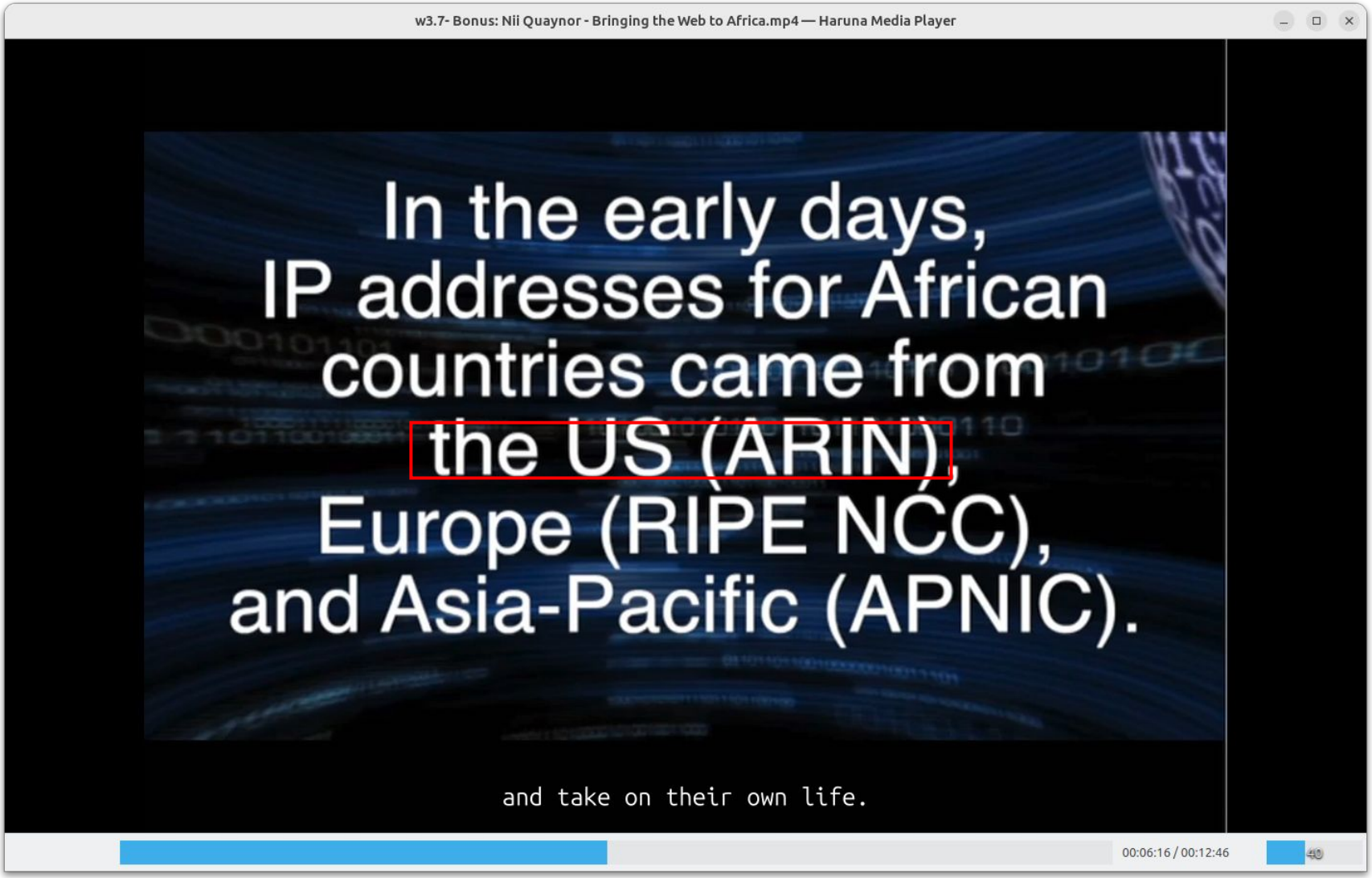


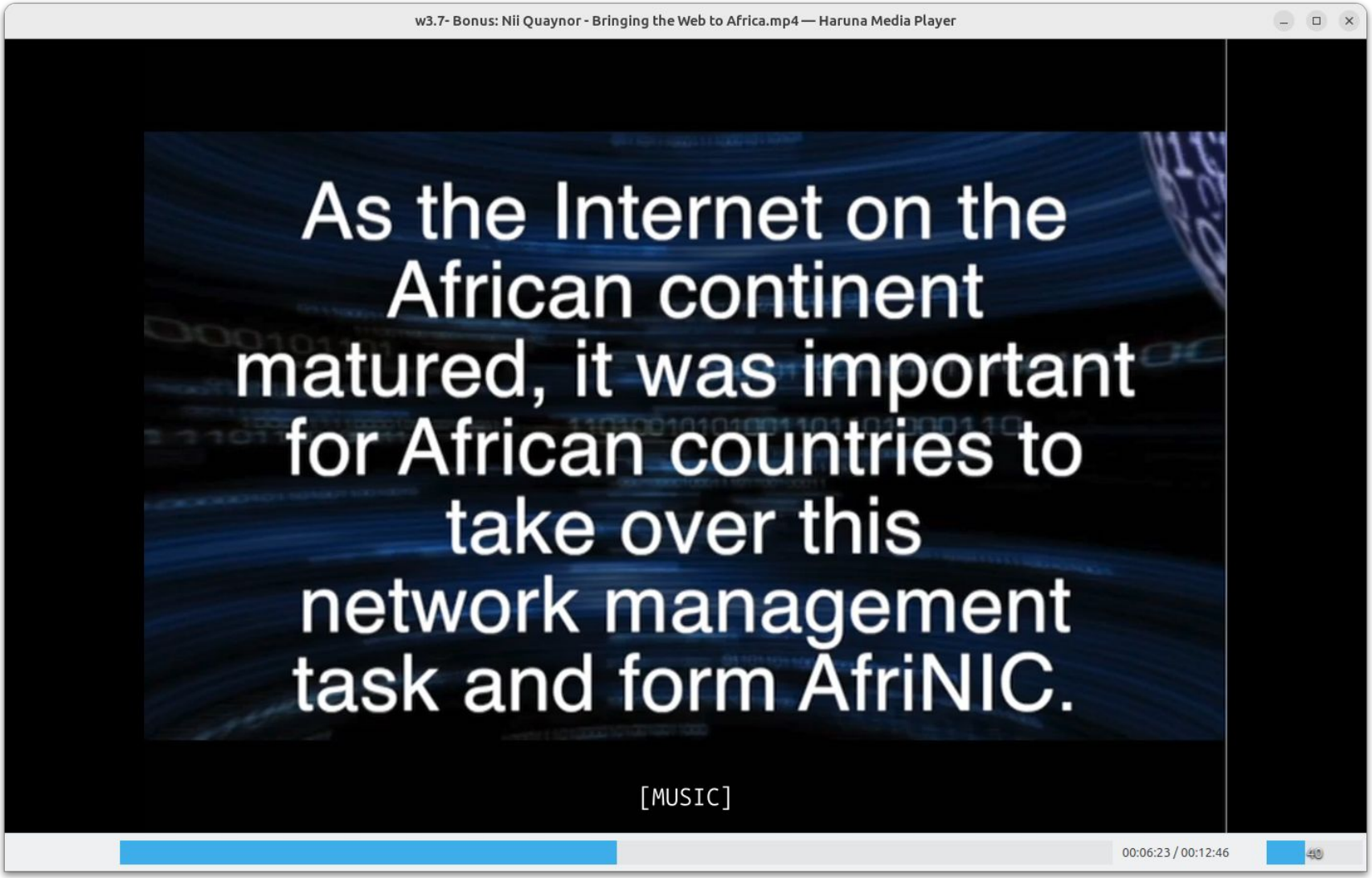


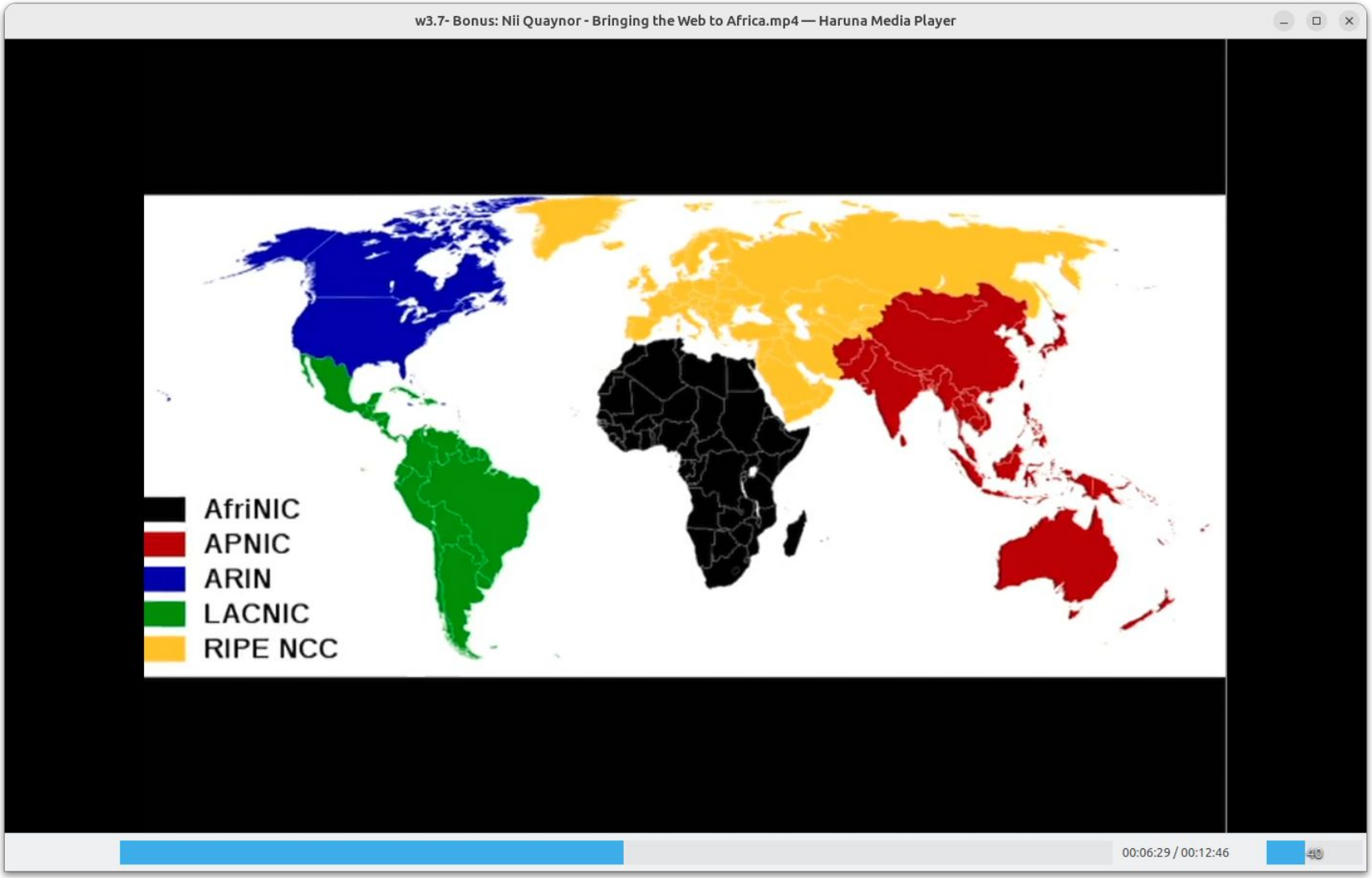


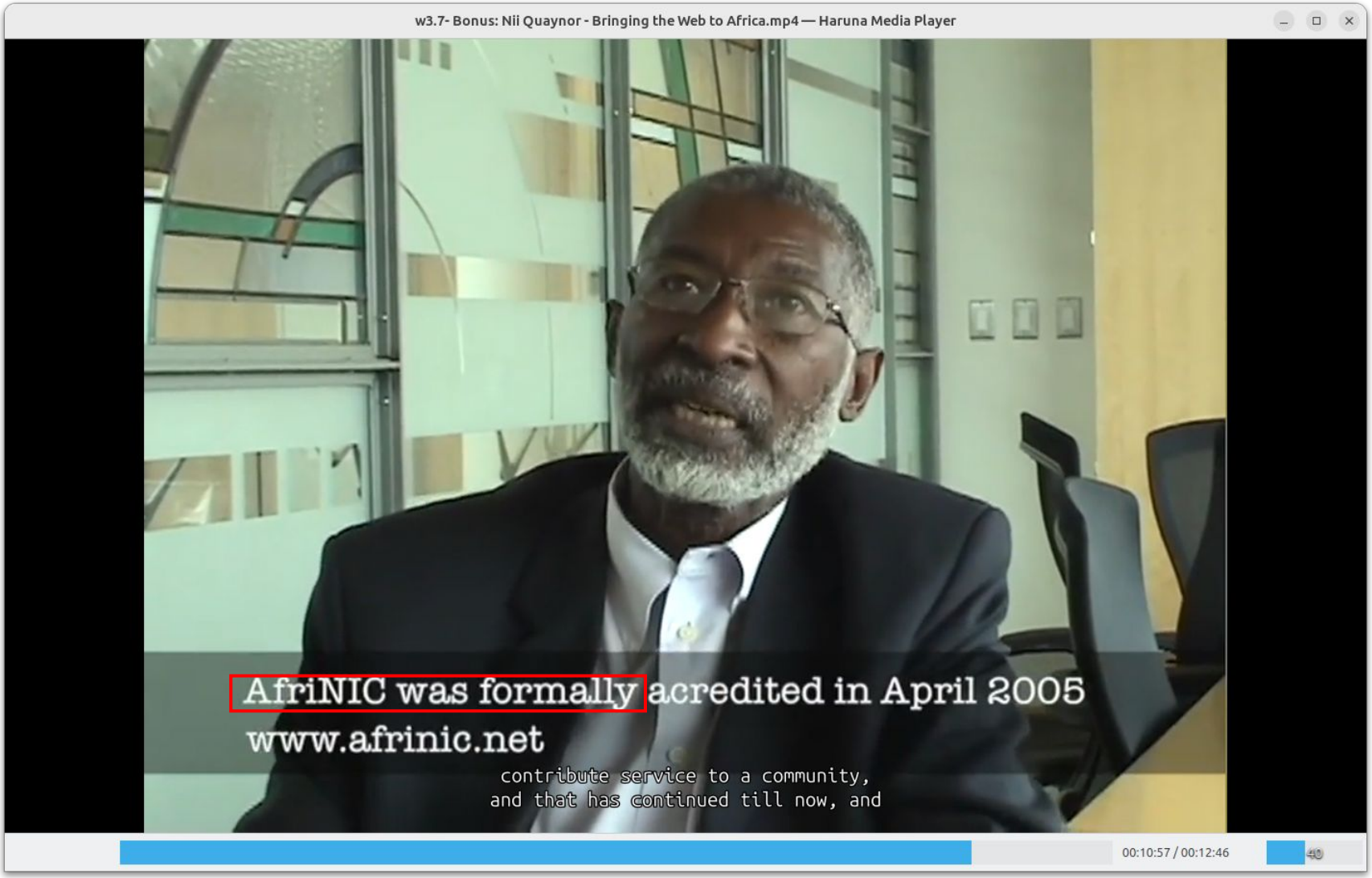












Summary

This transcript features **Dr. Nii Quaynor**, often referred to as the "Father of the Internet in Africa," detailing the grassroots, private-sector-led efforts to bring connectivity to the continent and the strategic establishment of **AFRINIC** (African Network Information Centre).

1. The Private Sector Avalanche

In countries like Ghana, the government was initially unaware or uninterested in the internet. Dr. Quaynor describes himself as a "critic" who utilized the private sector to bypass government inertia.

- **Strategic Motivation:** He realized that waiting for government-led investment would take forever. By starting small and proving it was possible, he aimed to create an **"avalanche"** of momentum.
- **Regional Variation:** While Ghana and West Africa were private-sector-led, other nations had different paths, such as **Egypt** (government-led success) and **South Africa** (driven by academia).

2. Community Building: AfNOG and Capacity

Dr. Quaynor highlights the importance of shared community over individual profit:

- **AfNOG (African Network Operators' Group)**: Founded as a meeting place for the technical community. It features annual two-week workshops (including a French track) to train engineers in routing and infrastructure.
- **Cross-Border Support**: He actively supported neighbors by allowing data transit through Ghana (for Togo), sending engineers to install nodes (Gambia), and training telecom staff (Swaziland).
- **Funding Model:** The group relies on funding from organizations like Cisco, ISOC, and IDRC, but it is moving toward a self-sustaining model where commercial operators pay more to subsidize academic and research participants.

3. The 10-Year Battle for AFRINIC

The establishment of **AFRINIC** (the Regional Internet Registry for Africa) was a decade-long process of building consensus.

- **The "Cotonou" Agreement:** To ensure fairness, they decided on a geographic board structure, where each subregion elects its own representative to avoid Northern or Southern dominance.
- **The Jon Postel Connection:** Dr. Quaynor served as an interface between the African and global technical communities. He recounts a moment of shame when his own people were divided, and the late **Jon Postel** gave him the simple mandate: *"Get your people ready.'*
- **The 2005 Accreditation:** After ten years, they finally achieved accreditation.

4. Strategic Exit and Local Policy

Dr. Quaynor shares a masterclass in **Logic-Sync leadership** regarding his departure from the AFRINIC board:

- **The Exit Strategy:** He realized that staying too long would discourage new participation and upset those in other registries who had given up power for AFRINIC to exist. He dissolved the board and chose not to run again to allow fresh energy into the community.
- **Localized Policy:** AFRINIC succeeded by tailoring policies to the African market—specifically by recognizing **smaller operators** and allowing for smaller IPv4 allocation sizes than the global norm.