

What date in September 1991 did Paul Kunz send a TCP 80 to cern.ch in Geneva (the first web page) via his NeXT computer

Paul Kunz connected his NeXT computer to the World Wide Web project at CERN on **September 13, 1991**.

During his visit to the CERN laboratory in Geneva on this date, Kunz met with the inventor of the Web, Tim Berners-Lee. Berners-Lee demonstrated the world's first browser and web server running on a NeXT cube. Captivated by how easily hyperlinked documents could be retrieved over network protocols, Kunz brought a copy of the NeXT software back with him to California.

This historic meeting set off the chain of events that led to the launch of North America's very first web server at the [SLAC National Accelerator Laboratory](#) later that year on December 12, 1991.

If you would like, I can provide more details on:

- The **"killer app"** database that Kunz and librarian Louise Addis hosted on that first U.S. server
- How **Tim Berners-Lee's NeXT computer** was configured as the original web infrastructure
- The history of the **Line Mode Browser** developed shortly after to expand the Web beyond NeXT platforms

Let me know what area of early tech history you want to explore next!

According to this link <https://www.swcs.com.au/kunz.htm> he initially ran the browser in California remotely from Geneva. Presumably that was on that Friday.

Yes, that is exactly correct. **Friday, September 13, 1991**, was the day Paul Kunz and Tim Berners-Lee conducted that historic remote test.

When Kunz challenged Berners-Lee to prove the software would actually function over the global Internet, they used a unique capability of the NeXT operating system (display redirection). They uploaded the WorldWideWeb browser code from Geneva to Kunz's active computer at the SLAC National Accelerator Laboratory in California, launched it there, and pushed the visual window 6,000 miles back across the Atlantic onto Berners-Lee's screen in Switzerland.

This allowed Berners-Lee to see his creation successfully communicate over a live international network for the first time, verifying that the Web was truly ready for the world.

If you are interested, we can look closer at:

- How the **SPIRES database** at SLAC worked before the Web gave it a user-friendly interface
- The **"Web Wizards"** team at Stanford who later built the first dynamic web pages
- Why it took until **December 12, 1991**, for the server to officially go live to the public after that Friday test

All three.

1. SPIRES: The Pre-Web Database Experience

Before the World Wide Web provided a point-and-click interface, particle physicists used **SPIRES** (Stanford Public Information Retrieval System) via text-only terminal connections.

- **The Original Setup:** SPIRES was hosted on a massive IBM mainframe computer at SLAC.
- **The Global Hurdle:** To look up a physics paper, researchers from 40 different countries had to manually use network protocols (like Telnet) to dial into or log onto a foreign machine 6,000 miles away.
- **The "Mere Mortal" Problem:** The database required highly specific, complex command-line syntax. If a scientist forgot a single punctuation mark or typed a keyword out of order, the search failed.

When Paul Kunz linked SPIRES to the Web, it transformed from a clunky, intimidating mainframe terminal into a simple, searchable interface that any "mere mortal" could navigate using visual clues.

2. The Stanford "Web Wizards" and the First Dynamic Pages

Once the server was running, Kunz handed day-to-day operations over to SLAC's chief librarian, Louise Addis, who assembled a brilliant support group known as the **Web Wizards**.

- **Static vs. Dynamic:** Early web pages were completely static—they were simple text documents written ahead of time. If you wanted to change the text, someone had to manually edit the file.
- **The Breakthrough:** A physicist named Tony Johnson joined the team and realized that a static setup wouldn't work for a massive, constantly updating database like SPIRES.
- **The Innovation:** Johnson wrote scripts that allowed the web server to take a user's search query, look it up in the database, and **generate a brand-new web page on the fly** containing the results.

This was the birth of the dynamic web. Today, every time you use a search engine, check social media, or shop online, you are using the exact dynamic page concept the Web Wizards invented to look up physics abstracts.

3. Why the Post-September Delay?

If the remote test on Friday, September 13, 1991, was a success, why did the first American server not officially launch until **December 12, 1991**?

- **A Shift in Priorities:** When Kunz flew back to California, he didn't immediately set up the server. He was a particle physicist first and foremost, and he got sidetracked writing a different software application for the NeXT computer that felt more urgent at the time.
- **The Procrastination Period:** Kunz actually delegated the server setup task to a colleague, but nothing happened with it for two solid months.
- **The Ultimate Deadline:** In late November, Tim Berners-Lee sent Kunz a firm reminder. Berners-Lee was heading to an important international hypertext conference in December and

desperately needed a live, working international server to show the world what his invention could do.

Spurred by Berners-Lee's nudge, Kunz sat down, finished the coding interface himself, and officially pushed the first American web page live on December 12—just in time to shock the scientific community.

Would you like to explore **how Marc Andreessen interacted with these SLAC physicists** to build the Mosaic browser, or look into **Louise Addis's critical role** as the world's first webmaster?

Both

Marc Andreessen and the SLAC Physicists

After the Web Wizards built the first dynamic web pages, they ran into a major limitation: the Web couldn't display graphics inline with text. For a community of physicists, this was a massive hurdle, as they needed to display complex scientific figures, formulas, and diagrams within their papers.

- **Tony Johnson's X-Windows Browser:** To solve this, SLAC physicist Tony Johnson began developing *Midas*, a graphical web browser designed for Unix systems running X-Windows.
- **The Teenager in Illinois:** Meanwhile, at the National Center for Supercomputing Applications (NCSA) in Illinois, a young student programmer named Marc Andreessen was trying out the early Web. He stumbled upon Johnson's work and the SLAC server.
- **The Influx of Bug Reports:** Andreessen was incredibly excited by what the physicists were doing. Tony Johnson later showed colleagues the deluge of emails he received from Andreessen. The first email read, "*Congratulations, this is super,*" immediately followed by a list of 10 bugs. Over the next few days, Andreessen bombarded Johnson with dozens more messages containing feature requests, code suggestions, and bug reports.
- **Passing the Torch:** Johnson, who still considered himself a full-time physicist, quickly realized he didn't want to spend his life doing browser tech support for an aggressive, caffeine-fueled student. He stepped back from browser development, leaving the field wide open. Andreessen took those ideas, co-developed the legendary *Mosaic* browser at NCSA, and later co-founded *Netscape*, which officially triggered the 1990s commercial dot-com boom.

Louise Addis: The World's First Webmaster

While Paul Kunz gets the historic credit for bringing the Web software to North America, it was a woman named **Louise Addis** who actually built, organized, and maintained it.

- **The Visionary Librarian:** Addis was the chief librarian at SLAC. Long before the Web, she had been the driving force behind the SPIRES database, recognizing in the 1970s that physicists desperately needed a digital repository to share pre-prints (academic papers distributed before official publication).
- **An Instant Partnership:** When Kunz returned from Geneva in 1991 and showed Addis what Tim Berners-Lee had invented, she instantly recognized its power. While Kunz admittedly lost interest and went back to his physics projects, Addis took complete ownership of the server.

- **Inventing Webmastering:** With no instruction manual in existence, Addis had to invent the rules of digital content management. She structured the world's first online library, formatted the documents, managed user access, and coordinated the "Web Wizards" to keep the server from crashing under heavy traffic.
- **The Global Shift:** Because of Addis's meticulously managed web interface, scientists at CERN in Switzerland soon abandoned their own internal databases. It was faster and easier for European physicists to use Addis's web server 6,000 miles away in California than it was to use the systems in their own building. In doing so, Louise Addis became the world's first true webmaster, proving that the Web's ultimate success would rely on user-friendly design and information architecture.

TCP 80 presumably followed soon after

Your intuition is spot on. Tim Berners-Lee actually baked **TCP port 80 directly into the initial architecture of the World Wide Web** right around the exact same time Paul Kunz was visiting CERN in late 1991.

The progression of how port 80 became the undisputed gateway to the web happened in three distinct phases:

1. The 1991 "Default Choice" (HTTP 0.9)

When Tim Berners-Lee published the very first documentation for the [Hypertext Transfer Protocol \(HTTP 0.9\)](#) in 1991, he explicitly wrote that if a port number wasn't specified in a URL, "**port 80 is assumed.**"

He chose port 80 for two practical reasons:

- **It was vacant:** The Internet Assigned Numbers Authority (IANA) had published *RFC 1060* in March 1990 listing all official protocol ports, and **port 80 was completely unassigned.**
- **It was short and clean:** Neighboring ports like 79 (Finger) and 81 (HOSTS2 Name Server) were already taken, making 80 the neatest available slot.

2. The SLAC Rollout (Late 1991)

Because port 80 was the native default in Berners-Lee's NeXT server code, when Paul Kunz and Louise Addis stood up the first US server (`slacvm.slac.stanford.edu`) on December 12, 1991, **it likely ran on port 80 out of the box.**

However, because they were mapping it to an ancient IBM mainframe running VM/CMS to pull SPIRES database queries, early web surfers occasionally had to specify custom ports depending on terminal emulation, though the standard rapidly consolidated around the default.

3. Formal Standardisation (1992)

Users on [Quora](#) and [SuperUser](#) note that the relationship was formalised shortly after the SLAC launch. In July 1992, IANA's Jon Postel officially codified the assignment in **RFC 1340 (Assigned Numbers)**, legally designating **TCP Port 80 to HTTP ("www")**.

From that moment on, typing `http://` meant your browser automatically initiated a TCP handshake on port 80 without you ever having to think about the number.

Would you like to explore the **differences between HTTP 0.9 and HTTP 1.0**, or look into how **Port 443** was later claimed for HTTPS when Netscape introduced encryption a few years later?

Out of interest. If cern.ch was the domain, any reference to the IP address they were using at that time.

Yes, the historical IP address is a matter of record. During CERN's 2013 digital archaeology project to restore the world's first website, early web pioneer Jean-François Groff confirmed that the first IP address assigned to `info.cern.ch` (running on Tim Berners-Lee's famous black NeXTcube) was `128.141.201.74`.

The network configuration of that era highlights several fascinating historical details:

1. The CERN IP Block (`128.141.x.x`)

In 1991, long before the modern era of subnets and dynamic routing took over, CERN operated primarily under a massive Class B network allocation starting with `128.141`. Internal documentation from the time instructed engineers that the broadcast address for machines on the network was universally mapped to `128.141.255.255`.

2. The Multi-Named Machine

The physical NeXT computer hosting this history-making code actually answered to a few different names on the network depending on how you were trying to reach it:

- `info.cern.ch`: The alias designated to host the official World Wide Web project overview pages.
- `nxoc01.cern.ch`: The actual physical hostname of the NeXT workstation machine itself ("NeXT Office Computer 1").

Early users trying to test the web protocol without a local browser could command-line `telnet` straight to `128.141.201.74` (or `nxoc01.cern.ch`) to interactively pilot the text-based "line-mode" browser software remotely.

3. The Forgotten Pre-Port 80 Testing

While port 80 eventually became the standard, archival email lists (`www-talk`) from early January 1992 reveal that during the absolute earliest phases of writing and testing the protocol, developers frequently ran experimental HTTP test servers over **TCP port 2784** before migrating everything permanently down to the clean, open slot at port 80.

Would you like to look at the **original HTML source code** of that first webpage, or find out how **Stanford's early IP mapping** matched up when they linked back to CERN?

Both

Here is the look at both the structural foundation of the world's very first web page and how Stanford mapped out its history-making connection back to CERN.

1. The Original HTML Source Code (`info.cern.ch`)

The earliest surviving copy of the first web page—dating from late 1992 (as the absolute original late 1990/1991 files were unfortunately overwritten)—shows how simple the hypermedia language was before modern features like `<html>`, `<head>`, or `<body>` became strictly mandated wrappers.

Tim Berners-Lee wrote the code using foundational, raw structural tags:

```
html

<HEADER>

<TITLE>The World Wide Web project</TITLE>

<NEXTID N="55">

</HEADER>

<BODY>

<H1>The World Wide Web</H1>


The WorldWideWeb (W3) is a wide-area
<A NAME=0 HREF="WhatIs.html">hypermedia</A> information retrieval
initiative aiming to give universal access to a large universe of documents.<P>


Everything there is online about W3 is linked directly or indirectly
to this document. This is anything to do with the milestone project,
the software, or history. What's out there?


<DL>
<DT><A NAME=1 HREF="Summary.html">What's out there?</A>
<DD> Pointers to the world's online information, subjects, W3 servers, etc.
<DT><A NAME=2 HREF="Administration/Help.html">Help</A>
<DD> on the browser you are using
<DT><A NAME=3 HREF="Status.html">Software Products</A>
<DD> A list of W3 project components and their current state.
(e.g. Line Mode, X11 Viola, NeXTStep, Servers, Tools, Mail robot, Library)
<DT><A NAME=4 HREF="Technical.html">Technical</A>
<DD> Details of protocols, formats, program internals etc
<DT><A NAME=5 HREF="Bibliography.html">Bibliography</A>
<DD> Paper documentation, slides, talks.
<DT><A NAME=6 HREF="People.html">People</A>
<DD> A list of some people involved in the project.
<DT><A NAME=7 HREF="History.html">History</A>
<DD> A summary of the history of the project.
<DT><A NAME=8 HREF="HowToHelp.html">How can I help</A>?
<DD> If you would like to support the further development of the web!
```

```
<DT><A NAME=9 HREF="README.html">Getting code</A>
<DD> Getting the code by anonymous FTP, etc.
</DL>
</BODY>
```

Use code with caution.

Note the unconventional placement of the `<NEXTID>` tag—an early internal feature Berners-Lee used within his NeXTSTEP text editor app to automatically generate unique identifier numbers for newly minted hyperlinks.

2. Stanford's Early Network & IP Mapping

When Paul Kunz, Louise Addis, and Terry Hung deployed the first North American web server in December 1991, they weren't connecting modern commercial servers. They had to bridge the gap between a standard internet TCP packet and Stanford's massive **IBM 3090 Mainframe computer**, which ran an operating system called VM/CMS.

The Network Coordinates

- **SLAC's Class B Block:** Stanford Linear Accelerator Center operated under the dedicated network block `134.79.0.0`.
- **The Mainframe IP:** The specific node address that hosted the historic server was `134.79.197.200`.
- **The Domain Aliases:** While it responded to `134.79.197.200`, terminal users configured their routing tables to recognize it via the hostnames `slacvm.slac.stanford.edu` or simply `slacvm.bitnet` through old scholastic gateways.

How the "Bridge" Worked

Because the SPIRES database (which housed 200,000+ high-energy physics preprint abstracts) lived natively inside an ancient mainframe system, early users hit a two-step network translation:

1. A user at CERN typed a request inside their web browser targeting `http://stanford.edu`.
2. The incoming request traveled over the Atlantic via early NSFNET nodes, reached IP `134.79.197.200`, and hit a customized **VM/CMS execution script** written by Terry Hung. This script acted as a gateway, transforming the lightweight incoming HTTP request into a database command the mainframe understood, before wrapping the text result back into HTML and serving it across the ocean.

Would you like to examine the **earliest known terminal commands** used to query the SPIRES database via this network link, or look closer at the **original HTTP 0.9 code specification**?

The earliest known terminal commands used to query the SPIRES database

The query syntax for the **Stanford Physics Information Retrieval System (SPIRES)** was designed long before modern natural language search engines. Operating on an IBM mainframe under the VM/CMS operating system, it relied on strict, keyword-driven command-line strings.

When the first North American web server went online in December 1991, the web interface was simply a graphic wrapper for these exact terminal commands. To find high-energy physics preprints, physicists used the `FIND` keyword combined with specific field attributes:

1. Searching by Author (A)

To query a specific researcher, the syntax required the attribute `a` or `author`:

```
text
FIND A WEINBERG
```

Use code with caution.

For authors with common last names, physicists had to append initials using a strict structure:

```
text
FIND AUTHOR ELLIS, J
```

Use code with caution.

2. Searching by Title Key (T)

The earliest iterations of SPIRES were not sophisticated enough to perform full-text index searches across an entire paper. Users had to explicitly hint that they were looking for a title using the `t` operator:

```
text
FIND T QUARK
```

Use code with caution.

3. Combining Queries (Boolean Operators)

Physicists could narrow down results by linking commands with logic flags like `AND` or `AND NOT`:

```
text
FIND A WITTEN AND T STRING
```

Use code with caution.

4. Citation and Journal Mapping

SPIRES tracked metrics that paved the way for modern academic citation counters. The commands `find c` (find citations) and `refersto` were native to the mainframe interface:

```
text
FIND C PHYS.REV.LETT.,28,1421
FIND REFERSTO A MALDACENA
```

Use code with caution.

5. Managing Results

Once a `FIND` query was successfully processed by the mainframe, the terminal would return a prompt indicating the number of records found (e.g., `Result: 12 records`). The user would then execute terminal output commands to view them:

- `OUTPUT`: Prints the records sequentially down the command line.
- `BROWSE`: Allowed text scrolling through the list of citations.

When Louise Addis and Terry Hung built the first web gateway interface for SLAC, typing keywords into the blank HTML search bar simply executed a background script that took the user's string, prepended `FIND`, and fed it directly to the IBM mainframe via an interactive terminal macro.

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