State of the Web
000

Gemini
0000000000000

Gemini Software
00000

"Built on Gemini"
0000000

Gemini - a quieter web experience
niceness through simplicity

Giovanni Moretti - giovanni@reflections.co.nz

May 17, 2021

State of the Web
●○○

Gemini
○○○○○○○○○○○○○○

Gemini Software
○○○○○

"Built on Gemini"
○○○○○○○

Section 1

State of the Web

The world-wide-web

Modern web browsers support dozens (hundreds) of standards

- CSS
- HTML 4, 5
- Javascript
- audio: .mp3 .ogg . . .
- graphics: .jpg .gif .png .svg . . .
- video display: .mp4 .webm . . .
- cookies
- SSL encryption

Resultant complexity is problematic

- implausible to start from scratch
- security and validation is difficult/impossible

State of the Web
○○●

Gemini
○○○○○○○○○○○○○○

Gemini Software
○○○○○

"Built on Gemini"
○○○○○○○

Problems with WWW

User tracking

- cookies, tracking pixels, browser fingerprinting

Security is broken

- too many (unknown) CAs trusted by default

Pages heavy & hard to know what's downloaded

- DuckDuckGo: 26 requests - 1.3MB of content - 7 scripts
- Google.com: 35 requests - 2.2MB of content - 11 scripts

Layout & formatting defined by the creator

- lots on the screen at once – distracting
- page complexity and weight – accessibility?

State of the Web
○○○

Gemini
●○○○○○○○○○○○○○

Gemini Software
○○○○○

"Built on Gemini"
○○○○○○○

Section 2

Gemini

Gemini Overview

Started June 2019: Gemini is a new internet protocol that:

- is heavier than gopher
- is lighter than the web
- will not replace either
- strives for maximum power to weight ratio
- takes user privacy very seriously

Gemini Specifications

`https://gemini.circumlunar.space/docs/specification.html`

Gemini Goals

FAQ: gemini://gemini.circumlunar.space/docs/faq.gmi

Gemini - a new application-level Internet protocol

- for distributing of arbitrary files
- a lightweight hypertext format

Gemini is for people who are:

- opposed to the web's ubiquitous tracking of users
- tired of nagging pop-ups, obnoxious adverts, autoplaying videos
- interested in low-power computing and/or low-speed networks

You may think of Gemini as

- "the web, stripped right back to its essence", OR
- "Gopher, souped up and modernised just a little"

State of the Web
ooo

Gemini
oooo●oooooooooo

Gemini Software
ooooo

"Built on Gemini"
ooooooo

Gopher - before the WWW

Gopher predates the web

- created at Uni Wisconsin, Madison
- intended to facilitate text search
- links documents
- used by libraries

```
Floodgap Systems Gopher Server
        Welcome to Floodgap Systems' official gopher server.
        Floodgap has served the gopher community since 1999
        (formerly gopher.ptloma.edu).

        We run Bucktooth 0.2.9 on xinetd as our server system.
        gopher.floodgap.com is an IBM Power 520 Express with a 2-way
        4.2GHz POWER6 CPU and 8GB of RAM, running AIX 6.1 +patches.
        Send gopher@floodgap.com your questions and suggestions.


        ***********************************************************
        **              OVER 20 YEARS SERVING YOU!             **
        **                Plain text is beautiful!             **
        ***********************************************************

[txt]   Does this gopher menu look correct?
        (plus using the Floodgap Public Gopher Proxy)
  [/]   Super-Dimensional Fortress: SDF Gopherspace
        Get your own Gopherspace and shell account!

        --- Getting started with Gopher ------------------------
  [/]   Getting started with gopher, software, more
        (what is Gopherspace? We tell you! And find out how
        to create your own Gopher world!)

[txt]   Using your web browser to explore Gopherspace
        (READ IT! LEARN IT! LOVE IT!)
        (useful tips for gopher newbies, updated 17 November 2018)
```

Problems with Gopher

- intended just for text
- no support for other file types (images, video . . .)
- no security (plain text transfer)

Gemini has:

- arbitrary non-ASCII character sets
- linking to content in other protocols via simple URLs
- identifies binary content using MIME types
- redirects to prevent broken links
- domain-based virtual hosting

State of the Web · · · · · · · · · · Gemini · · · · · · · · · · · · Gemini Software · · · · · · · · · · "Built on Gemini"

○○○   ○○○○○●○○○○○○○○○   ○○○○○   ○○○○○○○

Gemini goals

Early Gemini discussion included three clear goals:

1. it should be possible to remember the entire protocol spec after reading it once or twice.
2. a basic but usable (not ultra-spartan) client should fit in ≈50 lines of code in a modern language.
3. a client comfortable for daily use which implements every single protocol feature should be a feasible weekend project for a single developer.
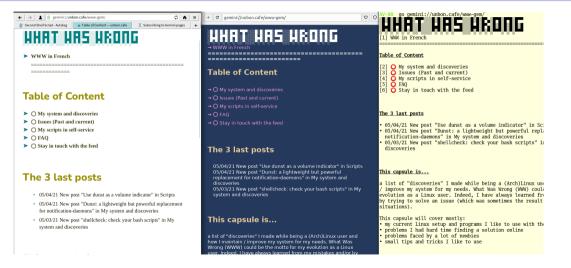
It will be difficult to extend in the future

so it stays simple and privacy conscious

State of the Web
○○○

Gemini
○○○○○○●○○○○○○

Gemini Software
○○○○○

"Built on Gemini"
○○○○○○○

Gemini - Text formatting

- ALL styling is done by the client
- text lines will be wrapped
- preformatted text is not altered or wrapped
- UTF-8 is the default character set
- there's no inline formatting: i.e. no bold/italics

State of the Web
ooo

Gemini
oooooooo●ooooooo

Gemini Software
ooooo

"Built on Gemini"
ooooooo

Gemini clients control the page style

Same page in Lagrange, Kristall and AV98 (terminal) browsers

State of the Web
○○○

Gemini
○○○○○○○○○●○○○○○

Gemini Software
○○○○○

"Built on Gemini"
○○○○○○○

Gemini Markup

There are five core elements:

- **Headings:** start with '#' '##' or '###'.
  - level 1 header is usually page title.

- **List items:** begin with '*'

- **Quotes:** these lines begin with '>'

- **Preformatted text:** begins/ends with lines of three backticks ("`')

- **Links:** *on a new line*, starting with =>
  => https://www.reddit.com Reddit
  => image-dir/giant-peach.jpg
  => gemini://gemini.circumlunar.space/docs/specification.gmi
  => mailto:fred@example.com
  => gemini://podcast.com/episode-1.mp3

State of the Web
000

Gemini
0000000000●0000

Gemini Software
00000

"Built on Gemini"
0000000

Why not use a subset of HTML?

If the complexity of HTML is the problem, why not use a HTML subset:

- just headers, links and blockquote?

Answered in FAQ (but briefly), using an HTML subset:

1. you could never be sure what a server was sending
   - you ask for one page: browser loads 30MB of images and 15 scripts . . .
2. there's no clear delineation between Gemini and HTML sites
3. tracking/user profiling would still work
4. security of the (huge) browser still a problem

Let's see what Gemini users have created

Demo: let's explore Gemini Space

State of the Web
ooo

Gemini
ooooooooooooo●oo

Gemini Software
ooooo

"Built on Gemini"
ooooooo

What's the protocol: Gemini Request/Response

A Gemini transaction: one request - one response:

1. Client: Opens connection
2. Server: Accepts connection
3. Client/Server: Complete TLS handshake
4. Client: Validates server certificate
5. Client: Sends one line Request-URL or URL+query-string)
6. Server: Sends response header (one line), closes connection
7. Server: Sends response body (text or binary data)
8. Server: Closes connection
9. Client: Handles response

Gemini Uploads are very limited

Requests and response headers are limited to 1024 bytes

After connecting, Return status '10' uploads data from client:

Client sends	gemini://mysite.com/book-request.gmi
Server responds	10 What Title:
User enters	War and Peace
Client resends	gemini://mysite.com/book-request.gmi?War%20and%20Peace
server Responds	20 text/gemini; charset=utf-8
	The contents of War and Peace

TLS Certificate TOFU vs "Known" Validation

Gemini uses TLS v1.3 (ideally) or v1.2

- no certificate authority required
- users are based on "Trust on First Use" (TOFU) - like SSH

Sites can identify returning users by their TLS certificate

- no need for cookies for 'session persistence'
- clients can support multiple certificates - user chooses
- if a certificate is deleted, that identity is *gone*

Section 3

Gemini Software

Gemini Servers

Very little load on server - Raspberry Pi is fine

Jetforce - written in Python 3

- easy to set up
- has CGI interface

Agate - written in Rust

- Installation: gemini://gem.chriswere.uk/gemserver.gmi
- or a video tutorial:

`https://share.tube/videos/watch/4fe4e1f0-7896-4b8c-bfb8-2ff19c78d8e5`

Gemini Browsers

There's *lots* of gemini software: `https://gemini.circumlunar.space/software/`

- Lagrange: `https://github.com/skyjake/lagrange/releases/tag/v1.4.0`
- Kristall: `https://github.com/MasterQ32/kristall`
- Amfora: - terminal based client
  - Playing with Gemini & Amfora:
    `https://www.youtube.com/watch?v=i-iZ3R9U5ug`
- Elpher for Emacs - via Melpa
- Android: Ariane from Play Store
- iPhone/Pad Elaho from App Store and `https://github.com/pitr/gemini-ios`

Quick overview of Lagrange

Lagrange is the most feature-rich Gemini browser:

- it looks really nice!
- multiple tabs
- subscriptions
- inlining of images and audio
  => gemini://fixato.org/2021-03-18-drawing-with-kiddos-crayons.gmi
- clear certificate management
- split-screen view
- available for Linux, Mac and Windows

Gemini's not just text: Images loaded on request

Gemini's designer intended:

- one request, one response: no hidden network activity
- images can be inlined OR loaded in external viewer – client decides

An example of a photo album in Gemini

See

- gemini://fixato.org/2021-03-10-eye-of-fixato-an-example-photo-album-for-gemini.gmi

It has

- one image as an index
- detailed descriptions, which are good for accessibility

Section 4

"Built on Gemini"

Subscribing to Gemini pages

Options: Browser detects change in page headings OR simple day-timestamp scheme:

Welcome to my Gemlog, where you can read every Friday about my adventures in urban gardening and abstract algebra!

My posts
=> bokashi.gmi 2020-11-20 - Early Bokashi composting experiments
=> finite-simple-groups.gmi 2020-11-13 - Trying to get to grips with finite simple groups. . .
=> balcony.gmi 2020-11-06 - I started a balcony garden!

Other gemlogs I enjoy
=> gemini://example.com/foo/ Abelard Lindsay's gemlog
=> gemini://example.net/bar/ Vladimir Harkonnen's gemlog
=> gemini://example.org/baz/ Case Pollard's gemlog

from gemini://gemini.circumlunar.space/docs/companion/subscription.gmi

State of the Web
ooo

Gemini
ooooooooooooooo

Gemini Software
ooooo

"Built on Gemini"
ooo●oooo

What are people doing with it?

Lots

- Gemini-to-Web proxy - `https://portal.mozz.us`
- Gemini Quickstart - `gemini://geminiquickst.art/`
- Gemini Search: `gemini://geminispace.info`
- Geminispace aggregator - `gemini://gemini.circumlunar.space/capcom`
- TrouserMonkey.net – `gemini://trousermonkey.net`
- Blogging Client in 30 lines
    - `gemini://spool-five.com/gemlog/2021-04-01-second`$_s$`cript.gmi`
- Blogging – `gemini://fixato.org/2020-03-25-an-uneventful-day.gmi`
- Podcasts – `gemini://gem.chriswere.uk/trendytalk/`
- Proxying other services:
    - HackerNews - `https://news.ycombinator.com/item?id=25986378`

Mastodon: `https://mastodon.social/tags/gemini`

Small Web (smolweb) related sites

- Tilde sites: e.g.
  - `https://tildeverse.org/`
  - `https://tilde.team/`
  - gemini://tilde.team – Free Gemini Hosting
- Pubnixes: Public Unix servers
  Super Dimensional Fortress:
  - `https://sdf.org`
  - `https://sdfeu.org`

State of the Web
ooo

Gemini
ooooooooooooooo

Gemini Software
ooooo

"Built on Gemini"
oooooo●oo

Interesting Gemini sites

- Konpeito is quarterly Lo-fi hip-hop & chill mixtape - gemini://konpeito.media
- xj9 - tech blog gemini://sunshinegardens.org/ xj9
- Sunshine Gardens: gemini://sunshinegardens.org
- How I use RSS: gemini://gemlog.blue/users/joelchrono12/1612624540.gmi
- Progress to Offline first: - gemini://gemini.circumlunar.space/ solderpunk/gemlog/progress-toward-offline-first.gmi
- News sites proxied to Gemini: gemini://simplynews.metalune.xyz
- One Hundred Rabbits (resilience, offline-first, sailing, cooking, Plan9, design):\ gemini://gemini.circumlunar.space/users/hundredrabbits
- Gembooks & .gpub - an eBook format using Gemini:
  - `https://codeberg.org/oppenlab/gempub`

Conclusion

Gemini

- for users
    - provides very simple and accessible markup for creating pages
    - is suitable for many (but not all) documents
    - provides an ad-free, secure, and distraction-free environment
    - provides a human-scale community of users

- for developers
    - is simple enough to encourage experimentation
    - simple gemtext markup is easily mapped to other formats
    - has low hardware and network traffic requirements

QUESTIONS?

State of the Web
ooo

Gemini
ooooooooooooo

Gemini Software
ooooo

"Built on Gemini"
oooooo●

Links & Reuse/License

Links

- Getting Started with Gemini: gemini://geminiquickst.art ← Really Good
- Gemini Home: `https://gemini.circumlunar.space`
- Gemini Search: gemini://geminispace.info
- Gemini on Mastodon: `https://mastodon.social/web/timelines/tag/gemini`

Reuse this presentation