LONGTERM
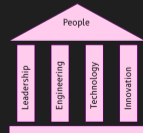
The terminal you have been longing for

Daniel Maslowski

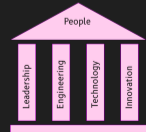IAOTAI

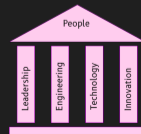# Agenda

- Terminals and Consoles
- Protocols and Platforms
- LONGTERM

People

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Terminals and Consoles

Computers

… started with research.

focus on bureaucracy
- forms, files, folders
- business processes
- administration

WE BARELY USE COMPUTERS. RED TAPE, PAPERWORK, AND BUREAUCRACY SHOULD BE VANISHING, WITH INFORMATION APPEARING WHERE WE NEED IT, FAST AND SECURE.

INSTEAD, WE'RE EMAILING SCANS OF FORMS.

IT'S LIKE HIRING PETER JACKSON TO ANSWER PHONES AT YOUR STUDIO.

OR PUTTING TIGER WOODS ON YOUR OLYMPIC SWIM TEAM.

OR HIRING A GERMAN PORN STAR TO DO HUNGARIAN BALLET.

… IS IT REALLY LIKE THAT?

YEAH, I DON'T THINK ANYTHING'S LIKE THAT.

https://imgs.xkcd.com/ibm/ibm_hc_3.png

Applications

- military
- communication
- entertainment
- gadgets
- ecommerce

- data processing
- …SaaSaaS
- citizen services
- medicine
- surveillance

People

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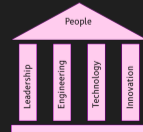
On Interfaces

Simple? Easy to create != easy to consume!

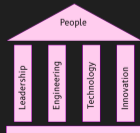"API" - often not application, not even programming

```
echo 1 > foo
```

(nothing exciting)

```
echo 1 > /dev/led
```

Huh? Do I write a "1" on a physical file to turn on light?

```
vim /dev/null
```

CLI / POSIX

`wget` vs `curl`
- 🐝 "do one thing and do it well"?
- 🐝 write to stdout vs current dir
- 🐝 `-o` vs `-O` to specify output file

What is the meaning of a single $-$[1]?

> *Guideline 13: For utilities that use operands to represent files to be opened for either reading or writing, the '-' operand should be used only to mean standard input (or standard output when it is clear from context that an output file is being specified).*

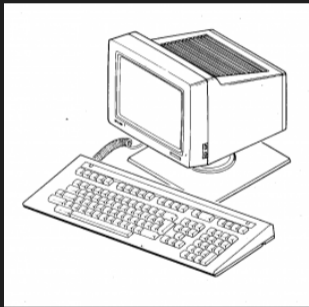Does `wget` take a URL from stdin or write data to stdout?

People

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[1]https: //pubs.opengroup.org/onlinepubs/009695399/basedefs/xbd_chap12.html#tag_12_02
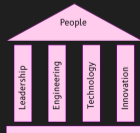
Getting Physical

Oldschool

a

Terminal

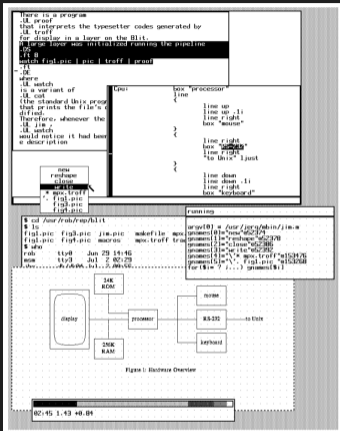- the machine terminating the connection to a "computer" :-)
- may connect to multiple computers
- back in the days: serial
  today: gigabit ethernet
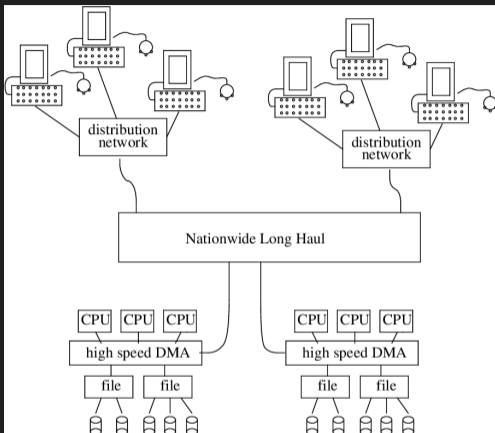- we SSH to multiple machines nowadays in a *terminal emulator*

Console

- the physical interface, aka HMI (Human Machine Interface)
- a physical terminal
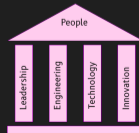
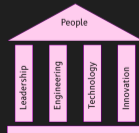# Unix and Plan 9[4] From Bell Labs

Unix and Blit

Plan 9 and Gnot

---

[2]https://doc.cat-v.org/bell_labs/blit/

[3]https://web.archive.org/web/20151022021014/http://homeostasis.scs.carleton.ca/~soma/distos/2014w/presotto-plan9.pdf

[4]https://doc.cat-v.org/plan_9/1st_edition/designing_plan_9

Plan 9 from Bell Labs[7]?

The early catch phrase was to build a UNIX out of a lot of little systems, not a system out of a lot of little UNIXes. The problems with UNIX were too deep to fix, but some of its ideas could be brought along.[5]

Legacy

Early papers can be found in archives[6].
Sources have been released and relicensed: https://9p.io/plan9/

Today

Plan 9 Foundation now owns the rights: https://p9f.org/
The *International Workshop on Plan 9* continues: https://iwp9.org
IWP9 2025 will be held in Paris.

---

[5]https://css.csail.mit.edu/6.824/2014/papers/plan9.pdf
[6]https://www.tuhs.org/Archive/Documentation/AUUGN/AUUGN-V12.1.pdf
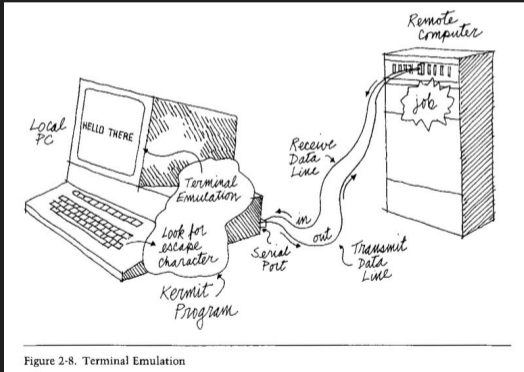[7]https://en.wikipedia.org/wiki/Plan_9_from_Bell_Labs
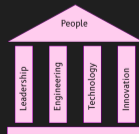
Physical Today
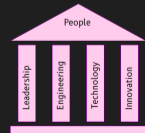
Are you debugging SBCs with extra screens because … HDMI … ?

Do you still see TTYs… *virtual* TTYs, and if so, why in 2024?

Have you heard of Kermit? It is still being developed…

Figure 2-8. Terminal Emulation

https://www.kermitproject.org/diagram.html

Nice Hardware

Niklaus 'vimja' Hofer
@vimja@tooting.ch

Once again I have one of my @mntmn reforms hooked up via serial.

This time I'm trying to get Gentoo running on the i.mx8mplus.

After an initial failed attempt, I can now boot reliably. Unfortunayely though, the keyboard is not accepting any input. Probably an initrd issue? Will have to do some more tinkering some time...

[a]

---
[a] https://tooting.ch/@vimja/112668406067498207
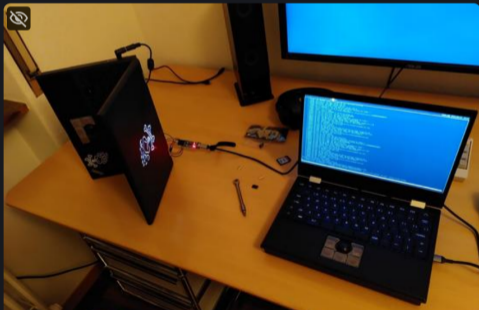
How many computers can you still connect via serial these days?

Observation
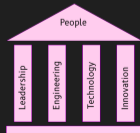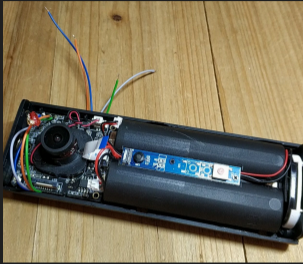We have fancy TUI app frameworks nowadays
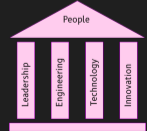- ratatui (Rust)
- Bubble Tea (Go)

Question
Can we serve rich apps via serial and keep SBCs headless?

Internet^WNetwork of Things

Protocols and Platforms
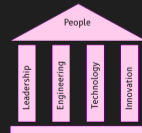
centre and cpu

centre
from Harvey OS
serves DHCP+TFTP+HTTP
https://github.com/harvey-os/go
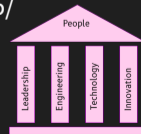`cmd/centre`

cpu
the other one
works on Linux
https://github.com/u-root/cpu

has run `cpu` over Wi-Fi

https://chemnitzer.linux-tage.de/2022/en/programm/beitrag/226/
Drivers From Outer Space - Fast, Simple Driver Development

People
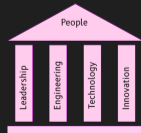
Leadership Engineering Technology Innovation

DEMO
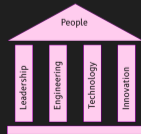
The Web

The thing that started as a platform for documents…

… has turned into a platform for applications.

Let's embrace it and push it further down!

WebGAP (Web General Application Protocol)

NOTE: There is no implementation yet. This is a concept.

Idea

Deploy Wasm code as apps to any gadget, such as a wristband, a camera, a doorbell, a fridge…
Let that serve back apps to consume the gadget again.
Make use of existing runtime environments, such as a web browser or desktop, draw simple graphics, similar to DEC ReGIS, take it further.

- WebAssembly is widely available and used in all sorts of scenarios
- WebSerial lets you use a serial port from the web browser
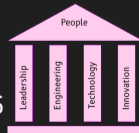- define (app specific) protocols
- can also be used in a simpler environment

Have you heard of "Wasmlet"s?
https://twitter.com/wasm3_engine/status/1465294919422119936

People

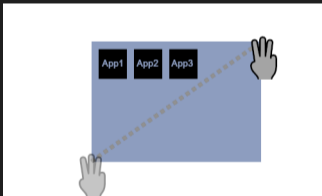Leadership | Engineering | Technology | Innovation

WebALE (Web Application Launch Environment)

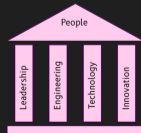You know the app launcher from your phone.

Desktop icons have always been similar.

How about drawing the launcher, just like `drawterm`?

Touch friendly variant: draw a diagonal with 3 fingers.

Add an intermediate step for establishing a connection to and dropping your initial app onto a remote gadget.

Platform System Interface

The *Platform System Interface* project (PSI) is a collection of design ideas, specifications, tools and other resources all around hardware platforms, firmware, bootloaders, OS interfacing and user experience.
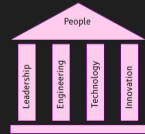
https://github.com/platform-system-interface

Talk: Platform System Interface - Design and Evaluation of Computing as a Whole

in-depth discussion of design paradigms and complexity in computing
https://metaspora.org/platform-system-interface-computing-as-whole.pdf
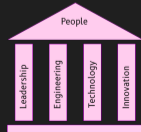
LONGTERM

The terminal you have been longing for

What would a terminal in 2024 look like? What features would it have?

Hardware / IO

- touch screen, keyboard, touchpad
- GPIO ports
- audio ports/switch
- ethernet (switch)
- multiple serial ports
- HDMI (switch) + input/capture
- USB hub
- switch buttons
- glorified KVM switch?
- with a serial switch!

Platform / Design

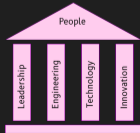- graphical desktop + web browser
- web native desktop?
- built-in tools
  - ▶ `centre`
  - ▶ `cpu`
  - ▶ `drawterm`
- show serial console of attached device by default?
- protocols
  - ▶ XMODEM
  - ▶ Kermit
  - ▶ ReGIS
  - ▶ WebGAP
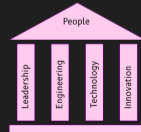
Sketch and Logo
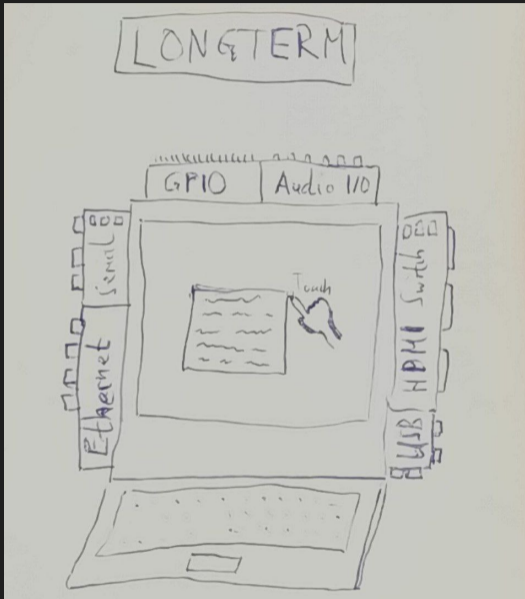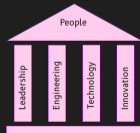

accent color: #E68E41

What if…

… we compile Rust…   … to Wasm…   … and use it in an app?

Magic happens - we can use native code on web platforms!

Howto

Getting started

https://lannonbr.com/blog/2020-01-07-rust-wasmpack/
https://rustwasm.github.io/docs/wasm-pack/

TL;DR

```
cargo install wasm-pack
wasm-pack new my-rust-wasm-foo
```

The glue

https://github.com/wasm-tool/wasm-pack-plugin
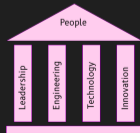https://rustwasm.github.io/docs/wasm-pack/tutorials/hybrid-applications-with-webpack/using-your-library.html

More glue

```
cargo add gloo-utils
```

People

Leadership
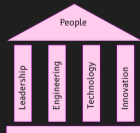Engineering
Technology
Innovation

The Rust side

```rust
extern crate wasm_bindgen;
use gloo_utils::format::JsValueSerdeExt;
use serde::{Deserialize, Serialize};
use wasm_bindgen::prelude::*;

/// ...

#[derive(Serialize, Deserialize)]
struct Foo {
    bar: u32,
    baz: String,
}

#[wasm_bindgen]
pub fn some_fun(data: JsValue) -> JsValue {
    /// ...
    let foo = Foo::new { bar: 42, baz: "Rust Wasm" };
    JsValue::from_serde(&foo).unwrap()
}
```
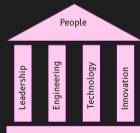
The JavaScript side

```javascript
import { some_fun } from "./rs/pkg";

/* ... */
    const res = some_fun({ woopWoop: 1337 });
    console.info(res);
/* ... */
```
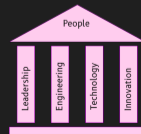
But that is synchronous and blocking!

https://rustwasm.github.io/wasm-bindgen/reference/js-promises-and-rust-futures.html

https://rustwasm.github.io/wasm-bindgen/api/wasm_bindgen_futures/

Thanks! :)

Follow Me

Daniel
Maslowski

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https://twitch.tv/cyrevolt
https://youtube.com/@cyrevolt

https://github.com/platform-system-interface

https://metaspora.org/longterm.pdf

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