

CS Summer Challenge

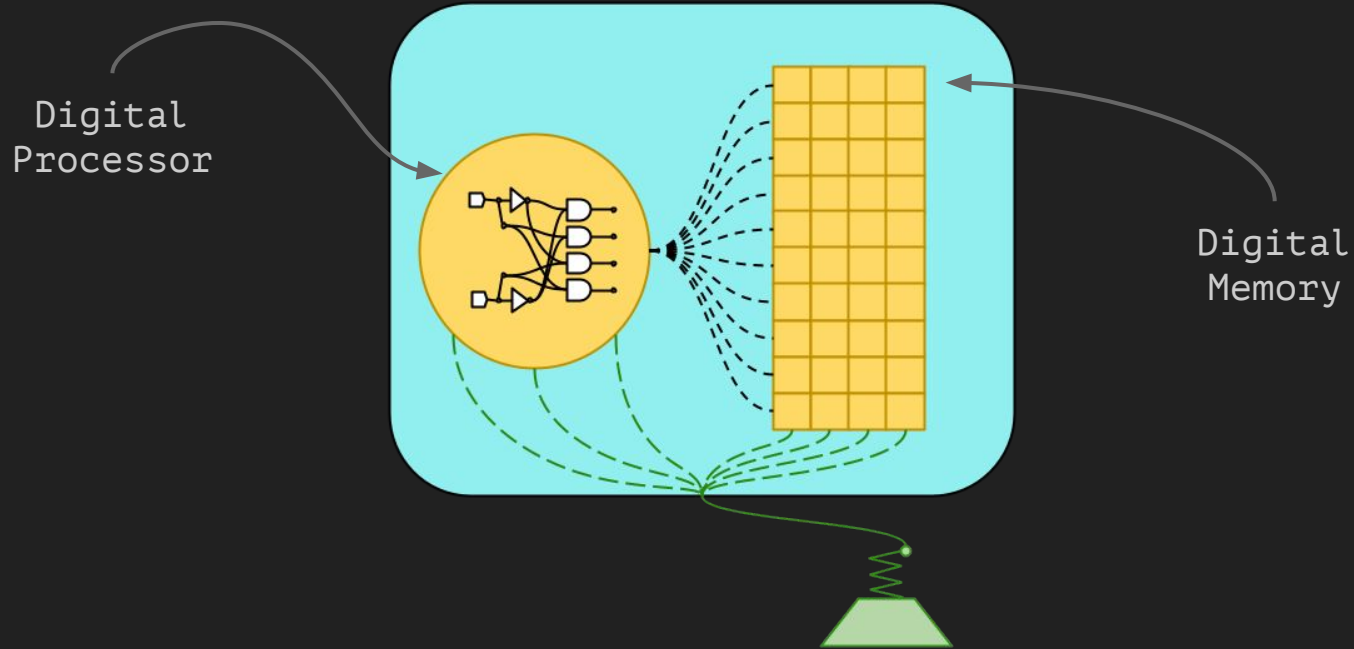
Day 0x1

How does a computer work?

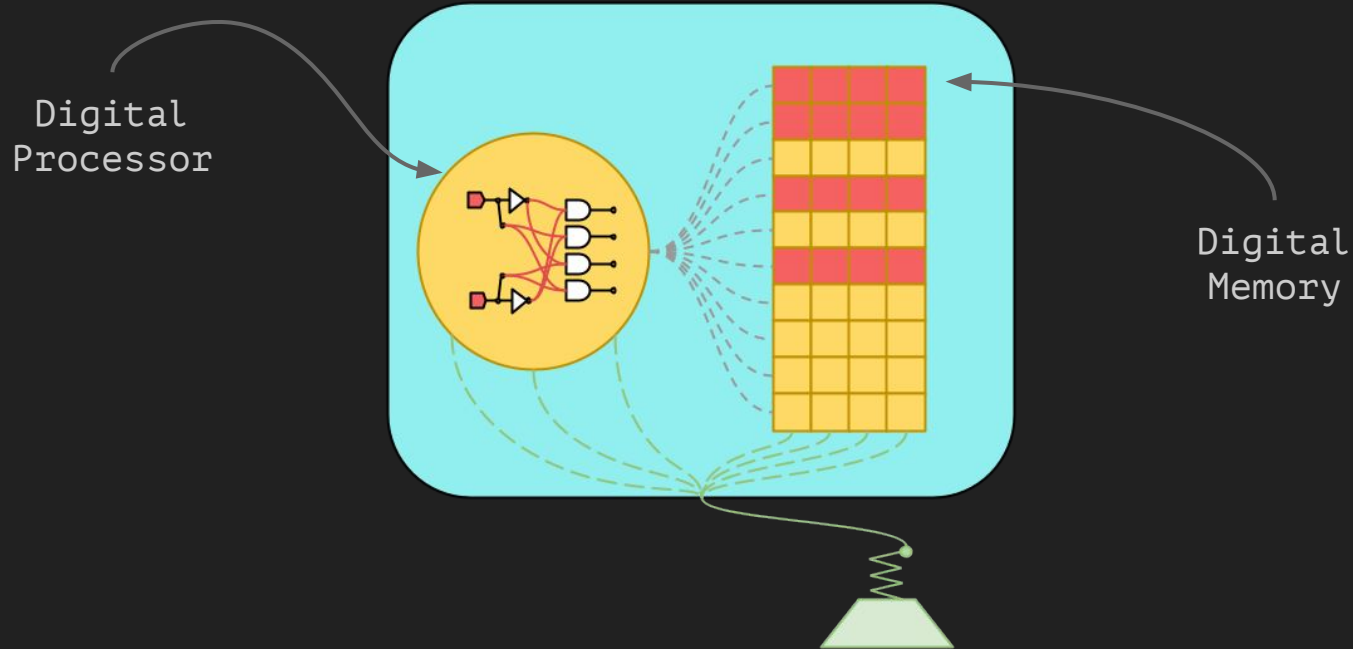
How does a computer work?

The Physical Device

What is a Computer: *Electronic Digital Hardware Device*

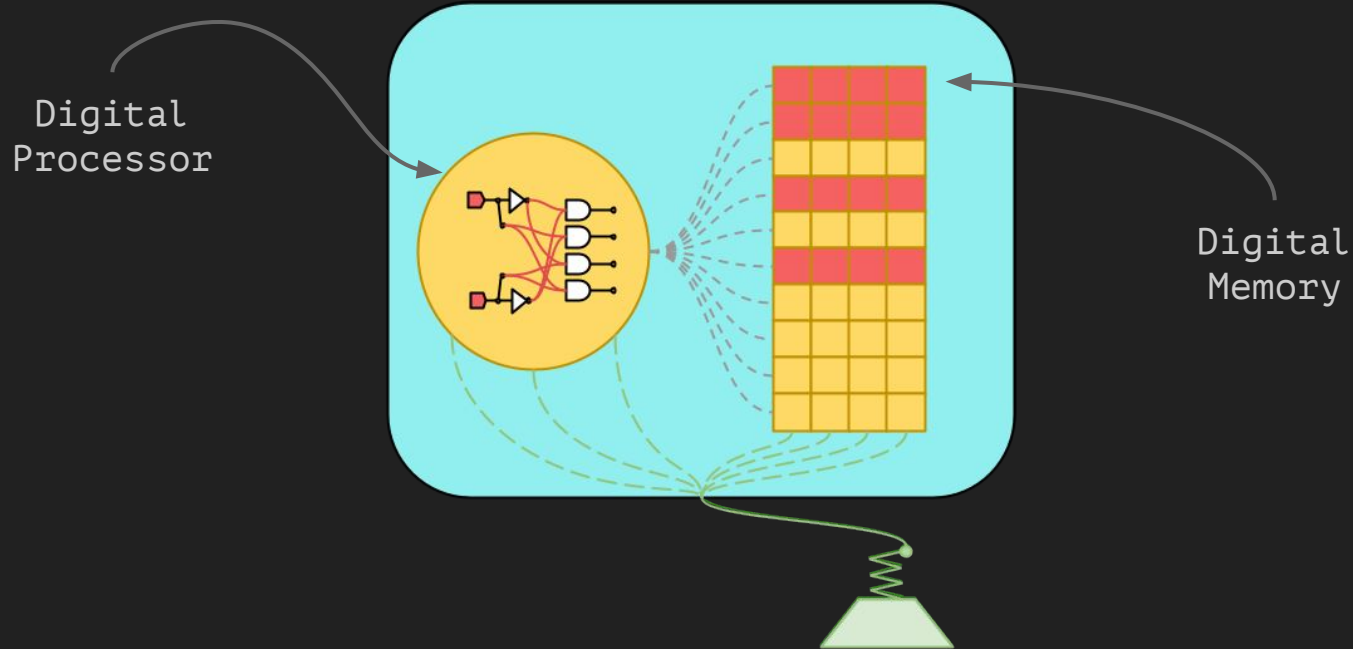


What is a Computer: *Electronic Digital Hardware Device*
to *Store and Execute Software*



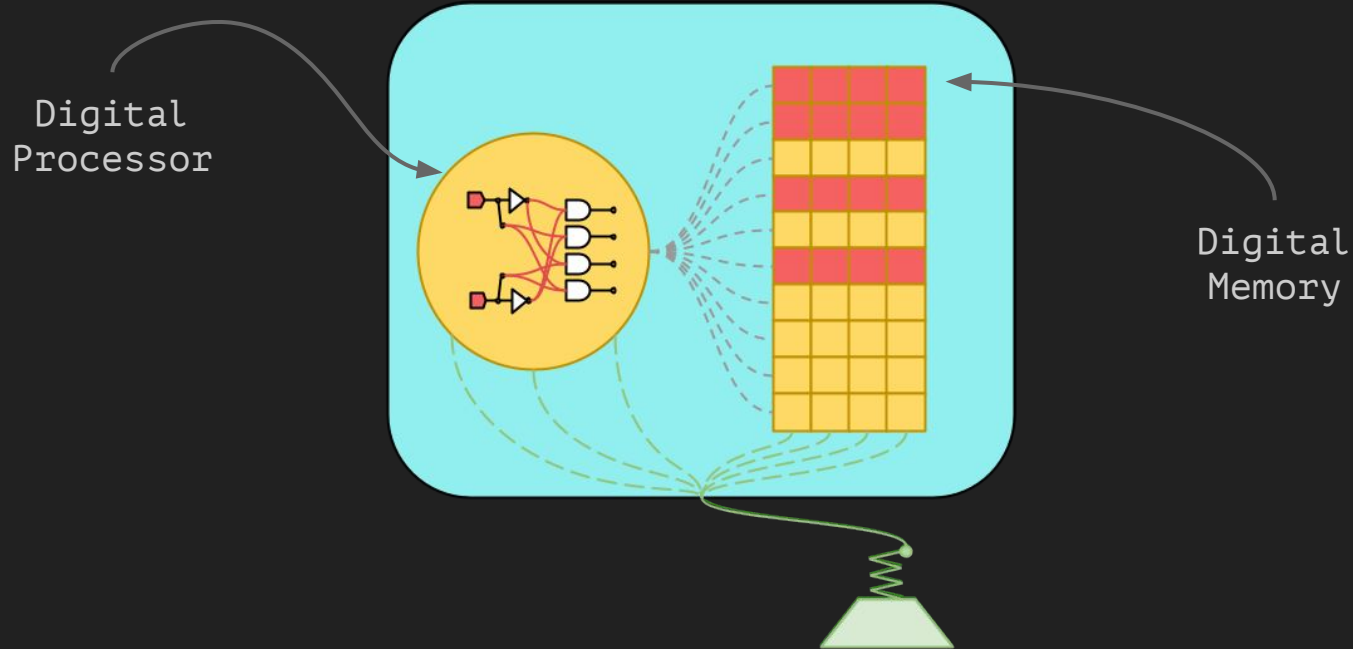
What is a Computer: *Electronic Digital Hardware Device*

00110000101011001010111010100100001010100 ...

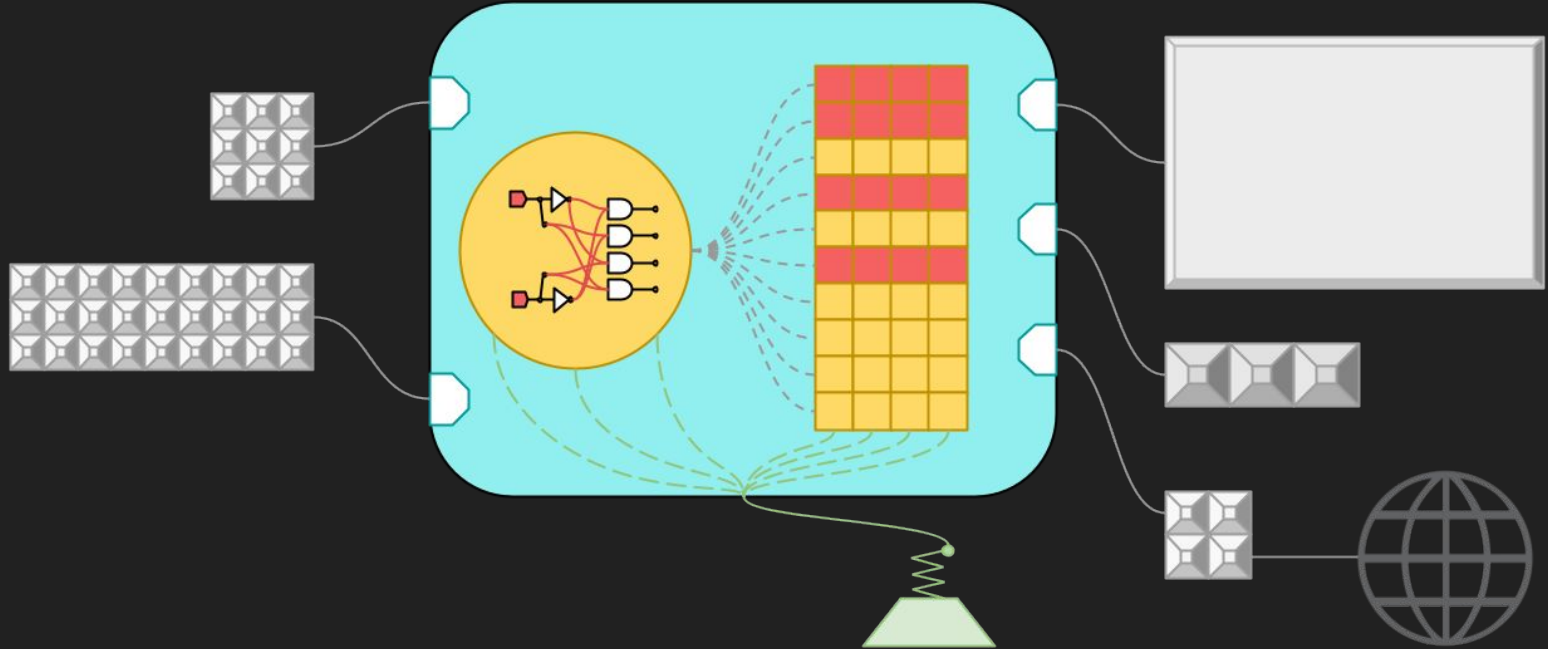


What is a Computer: *Electronic Digital Hardware Device*

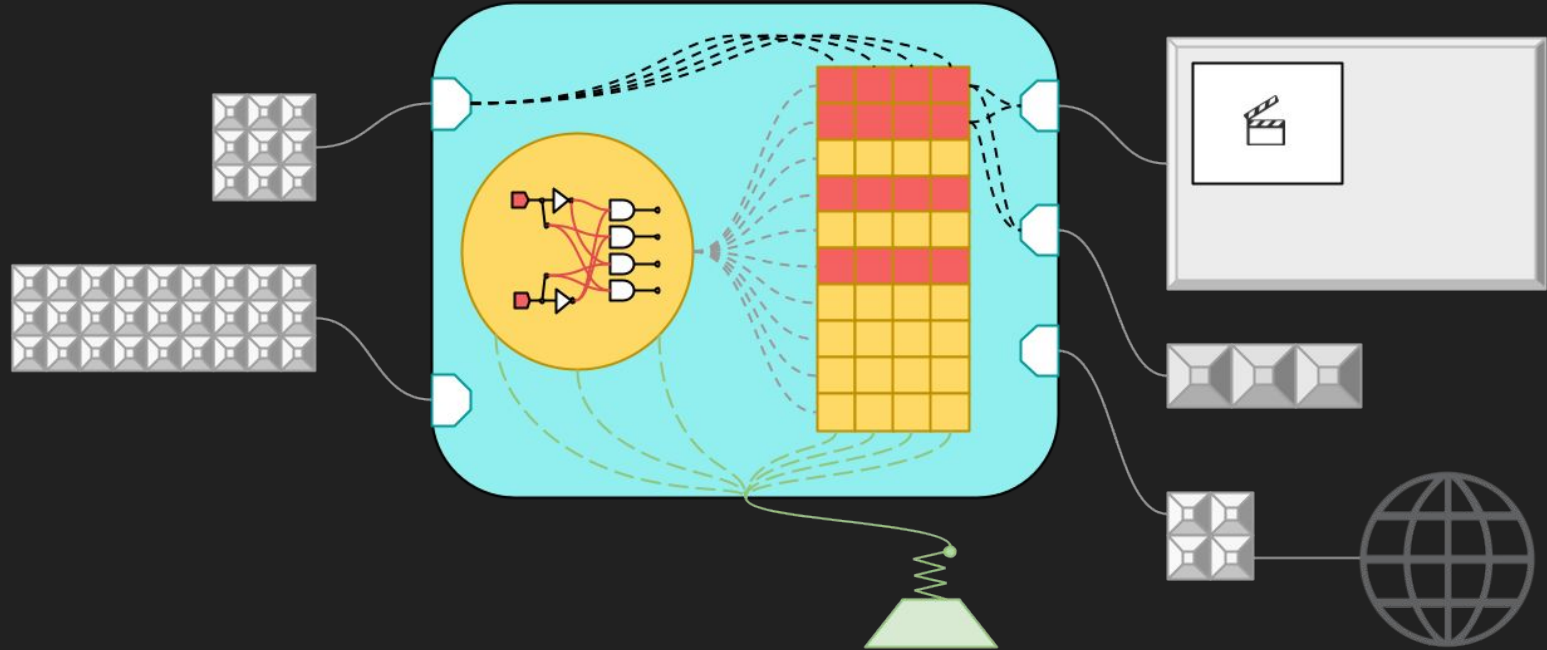
--V-----V-V-W--V-V-VW-V-V--V-----V-V-V-- ...
00110000101011001010111010100100001010100 ...



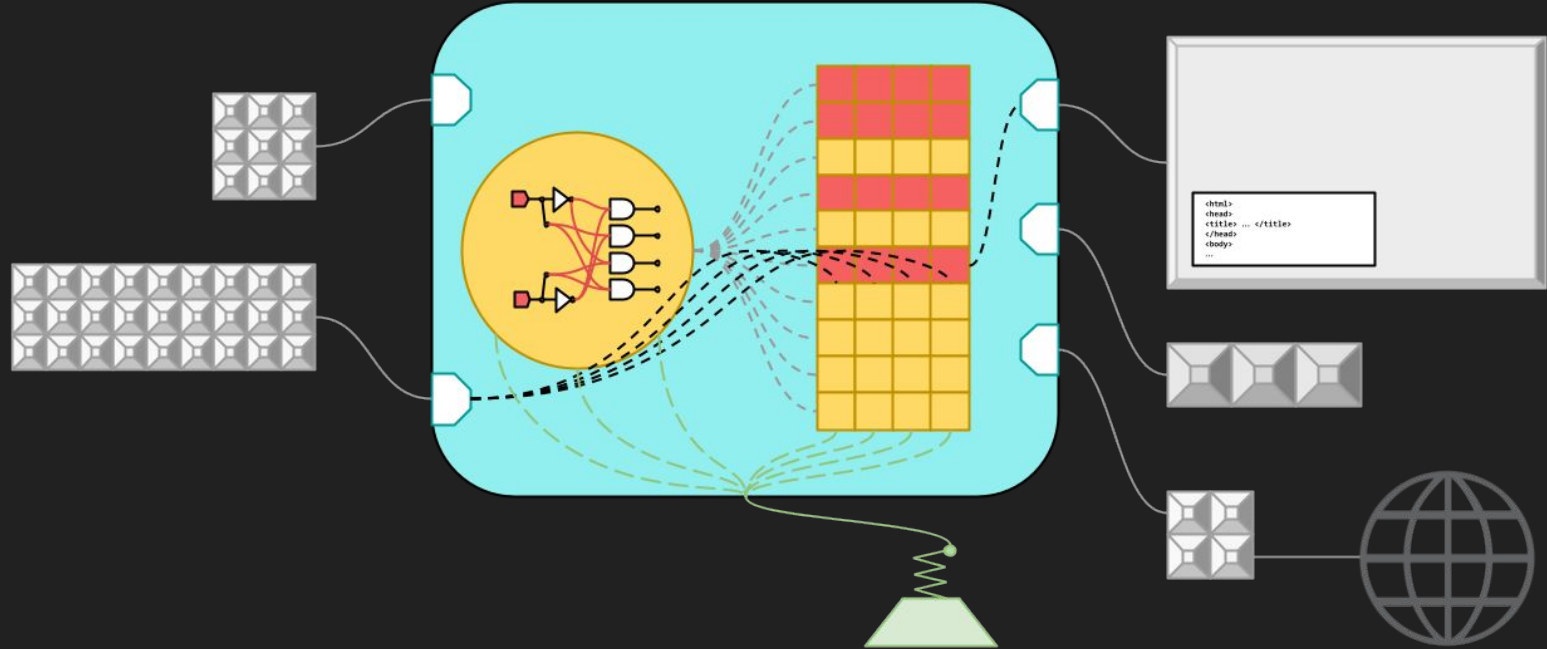
What is a Computer: *Electronic Digital Hardware Device*
to *Store and Execute Software*
in Response to User Interaction



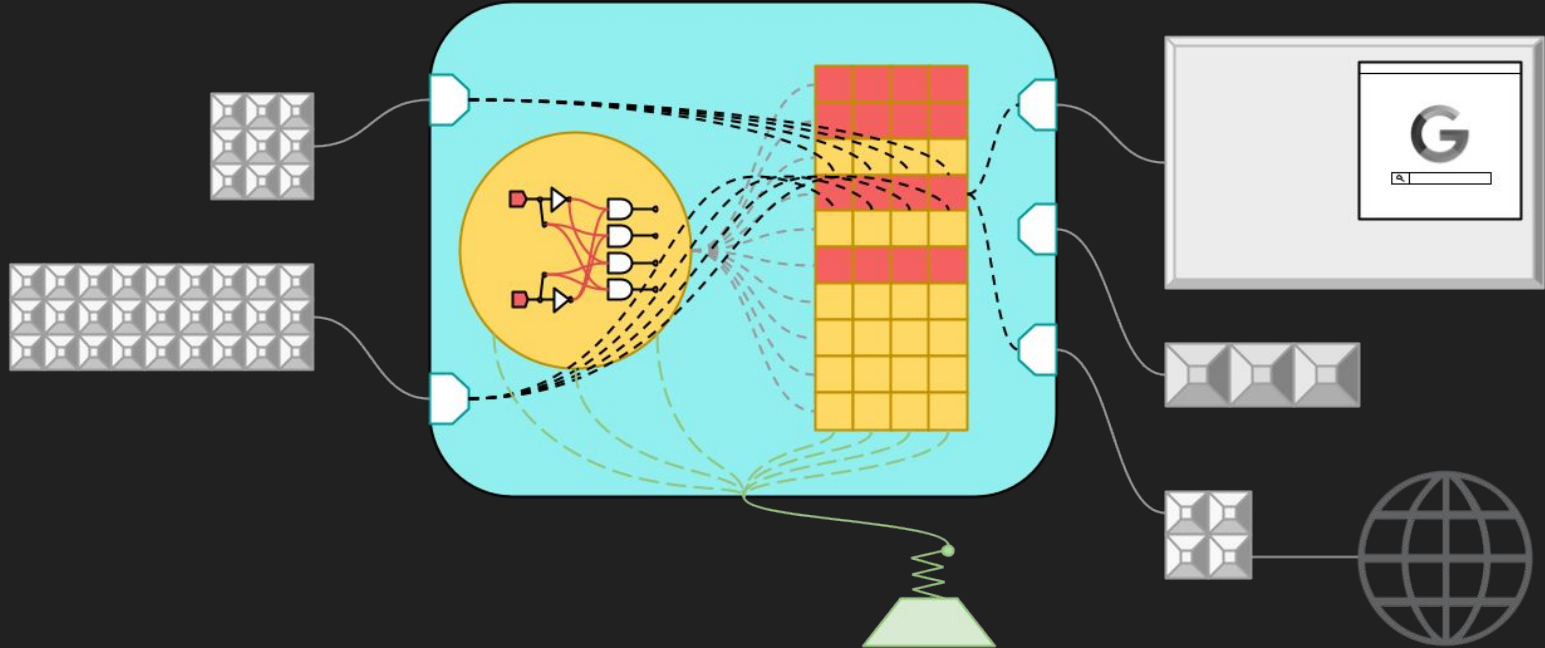
What is a Computer: *Electronic Digital Hardware Device*
to *Store and Execute Software*
in Response to User Interaction



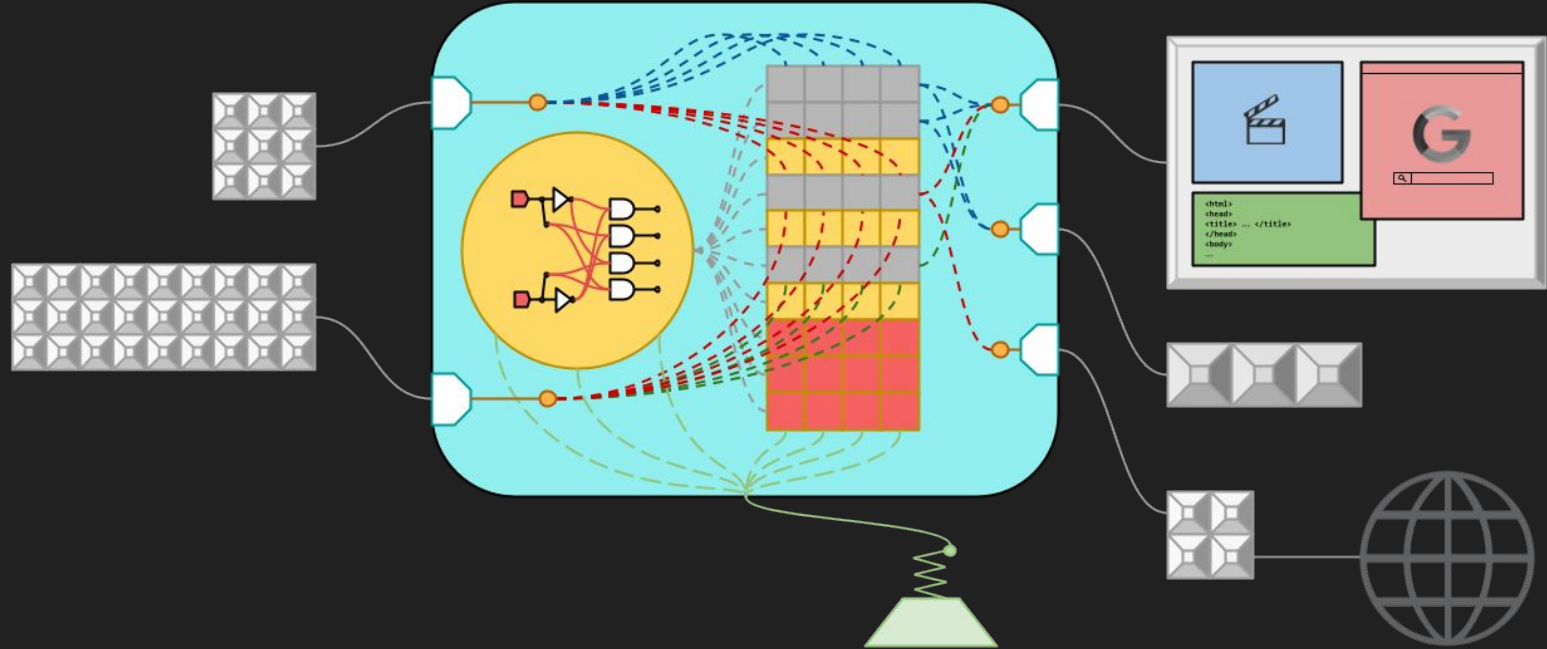
What is a Computer: *Electronic Digital Hardware Device*
to *Store and Execute Software*
in Response to User Interaction



What is a Computer: *Electronic Digital Hardware Device*
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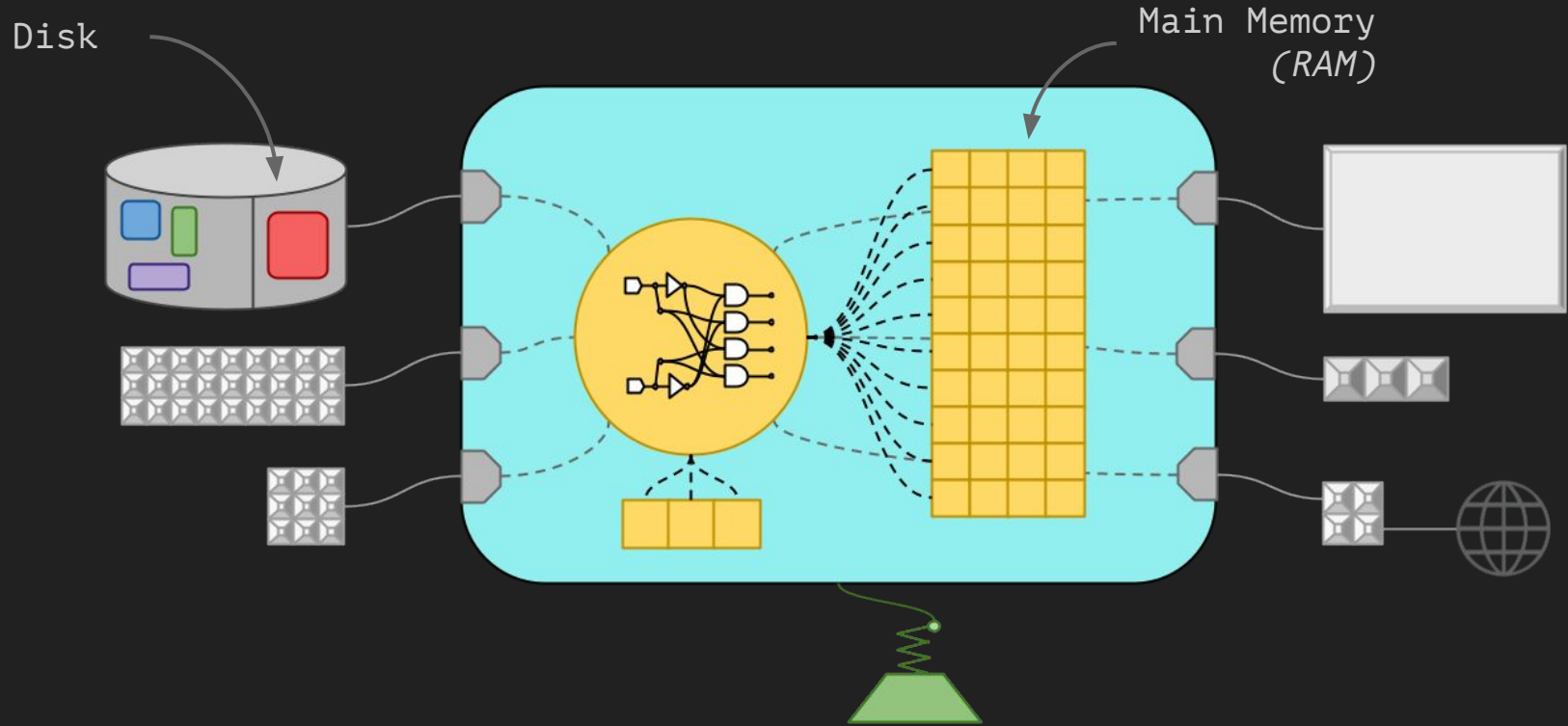
What is a Computer: *Electronic Digital Hardware Device*
to *Store and Execute Software*
in Response to User Interaction



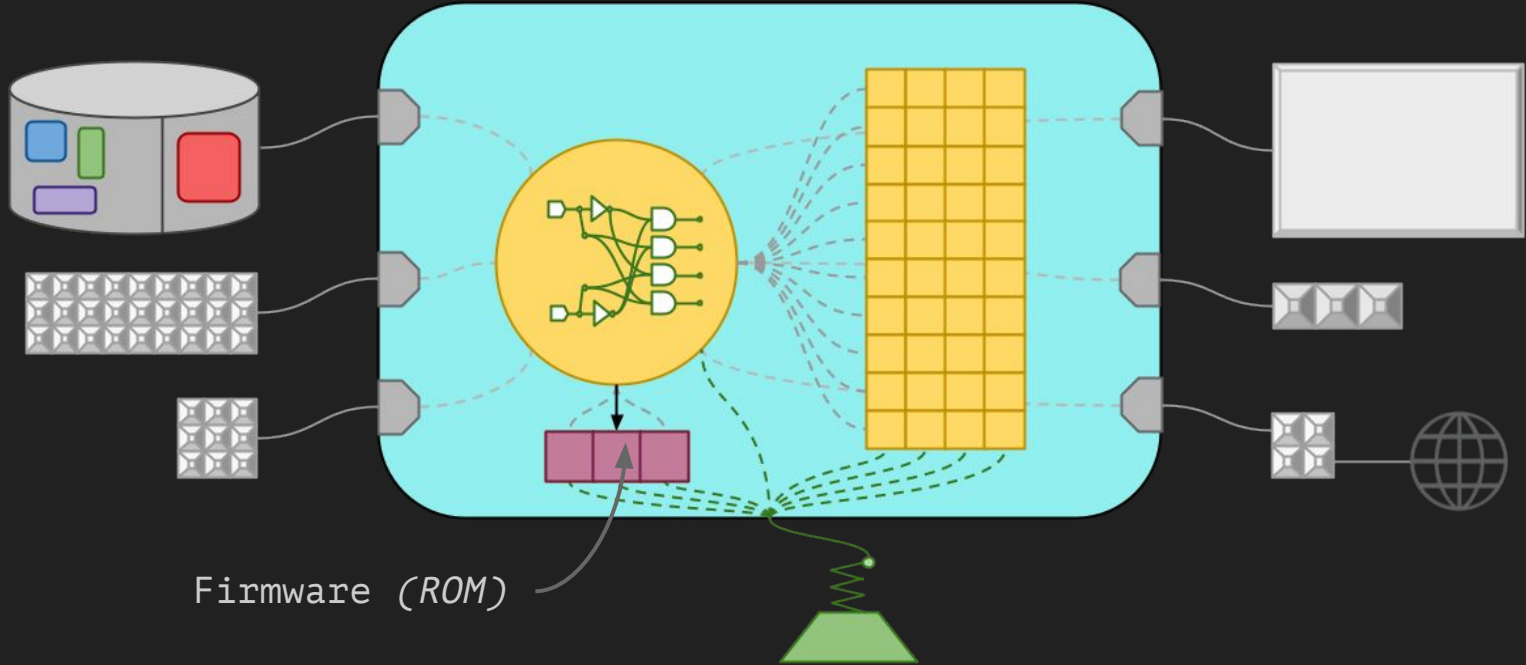
How does a computer work?

The Operating System (OS)

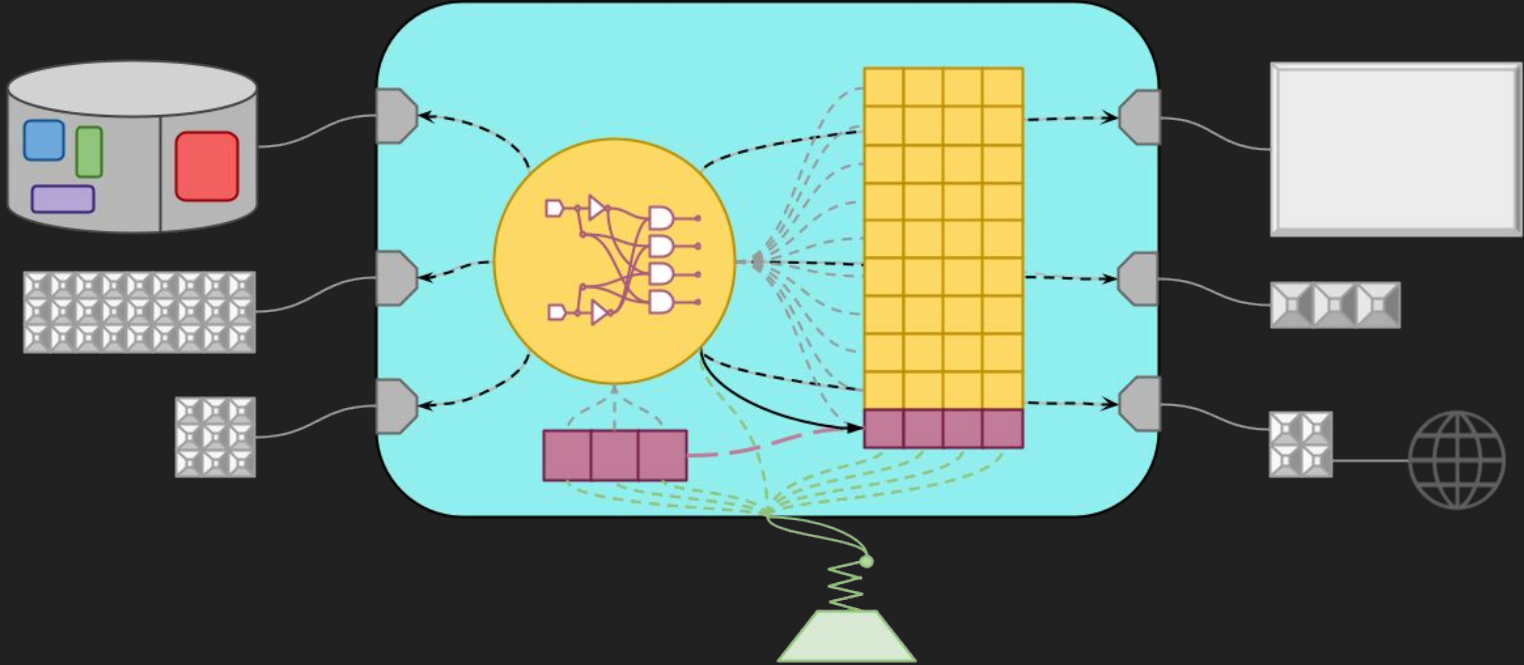
What Happens on Startup? | *software on disk...*



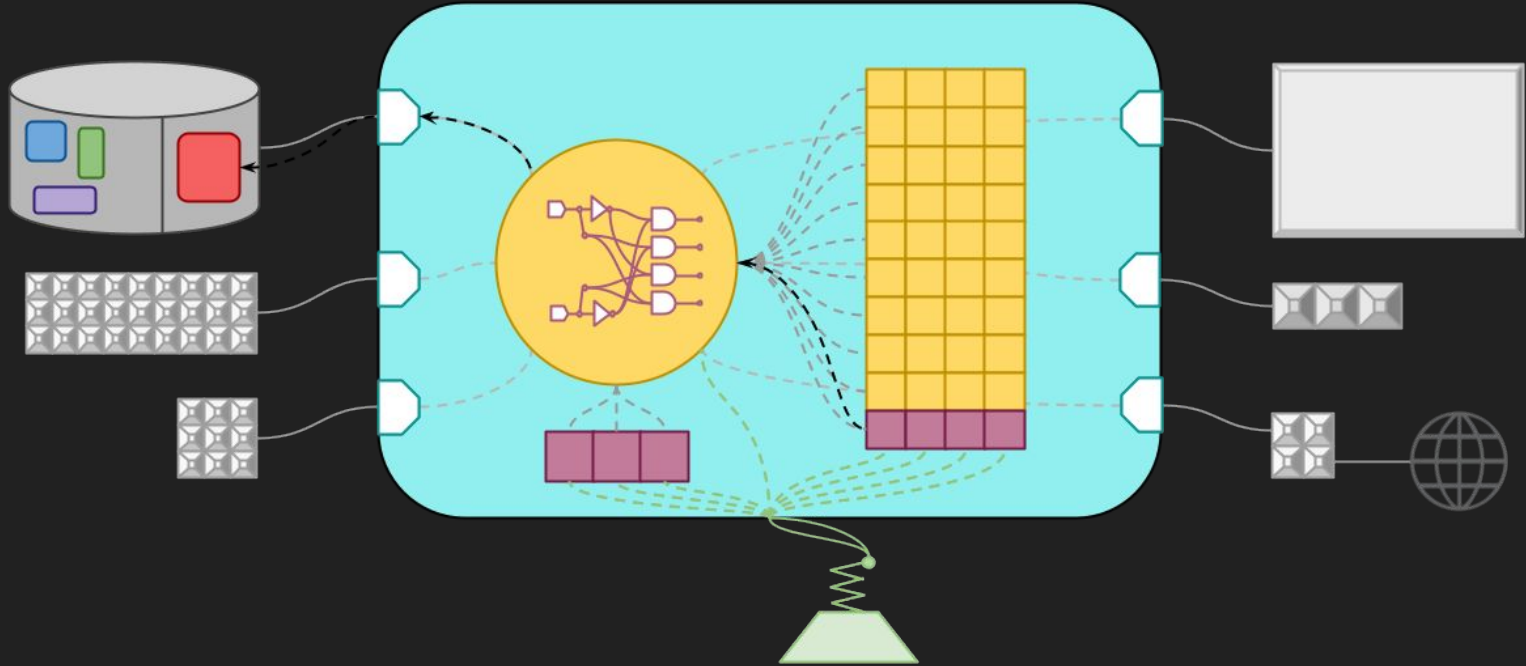
What Happens on Startup? | *BIOS on stand-by...*



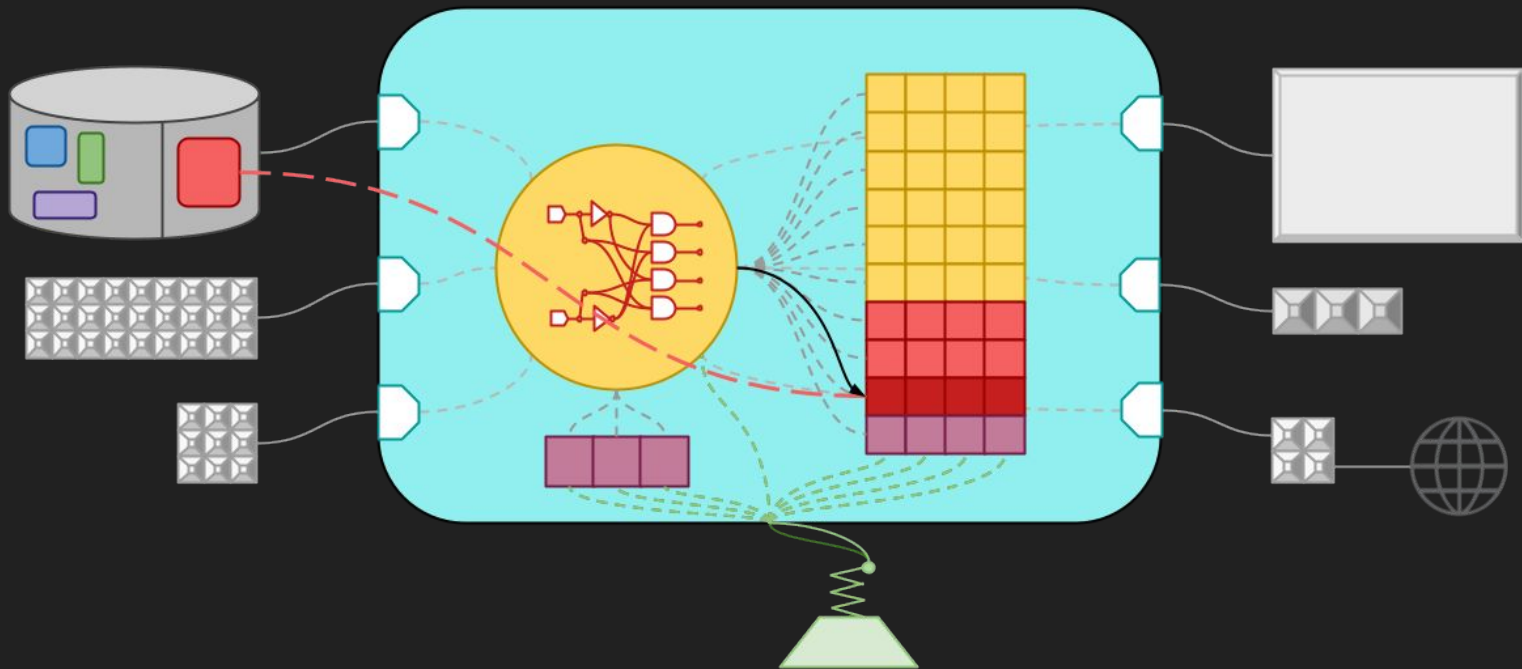
What Happens on Startup? | *BIOS ready...*



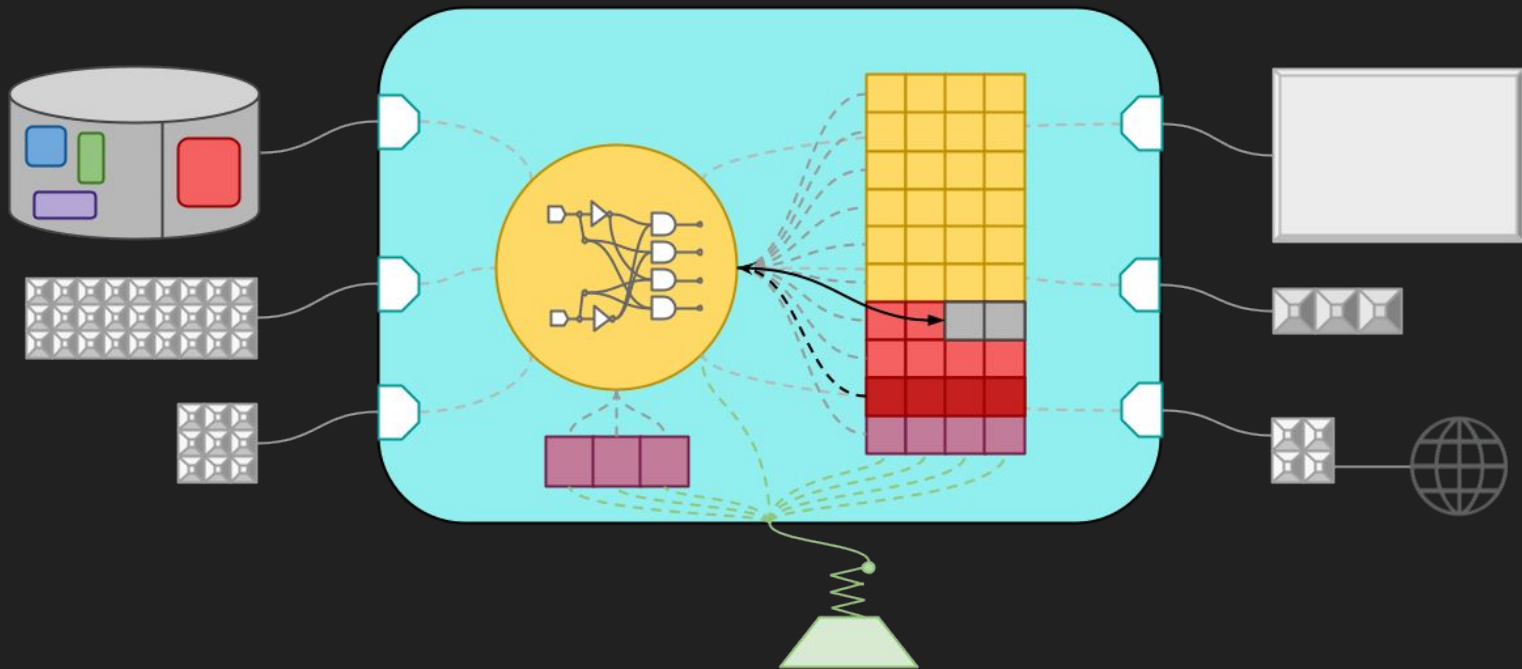
What Happens on Startup? | *BIOS fetching OS...*



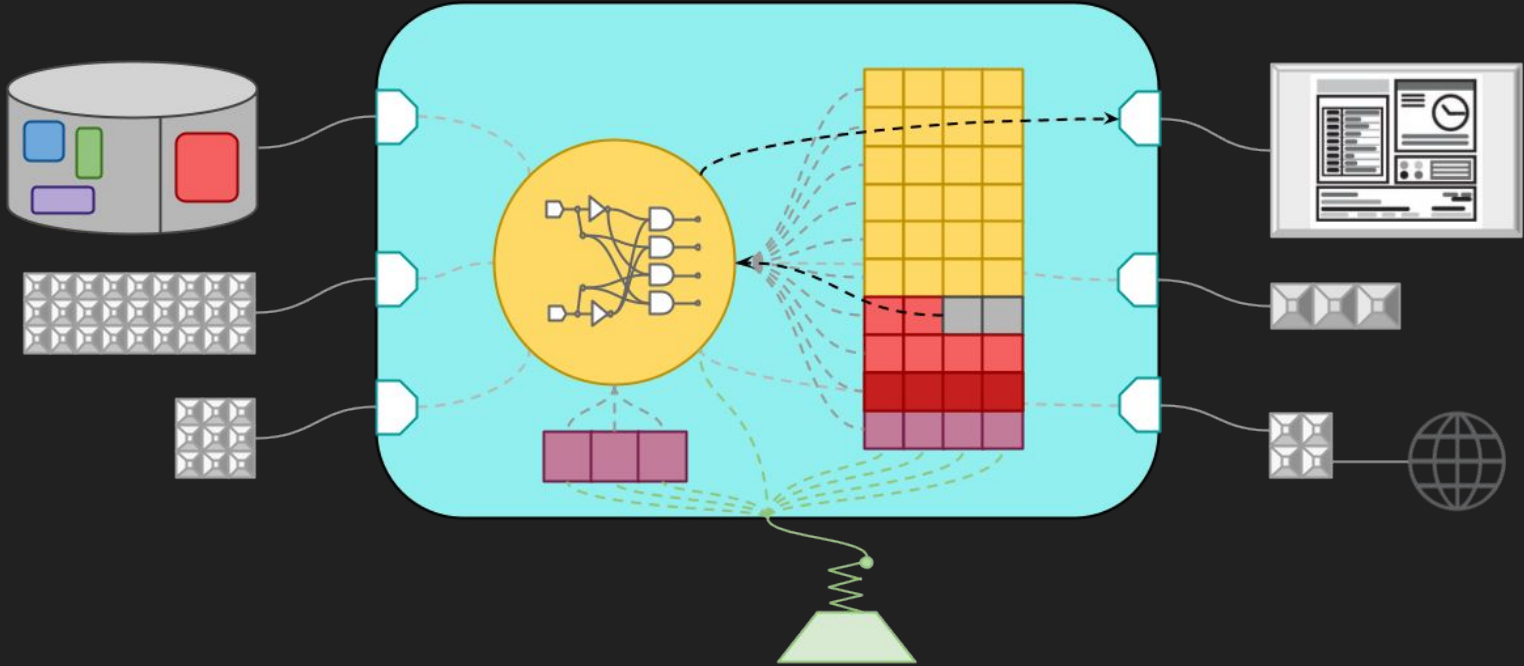
What Happens on Startup? | *OS ready...*



What Happens on Startup? | *GUI ready...*



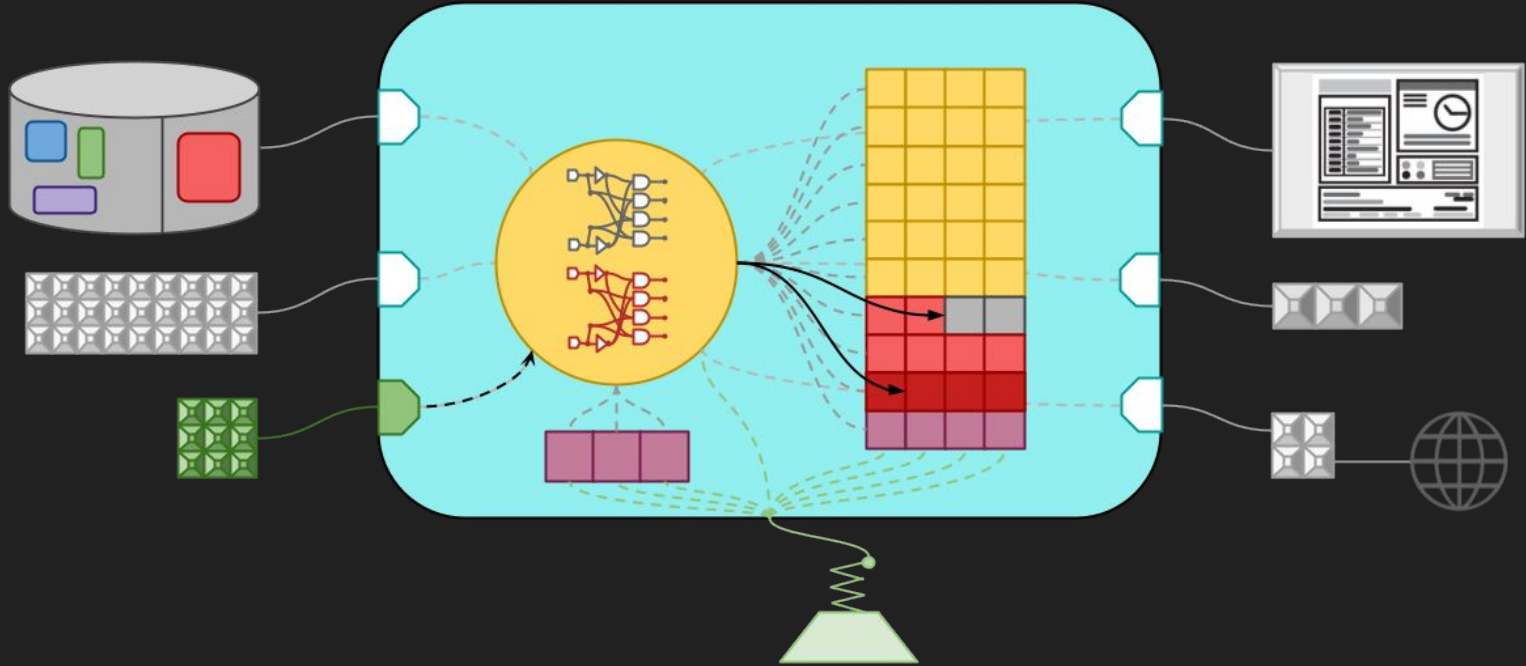
What Happens on Startup? | *GUI running...*



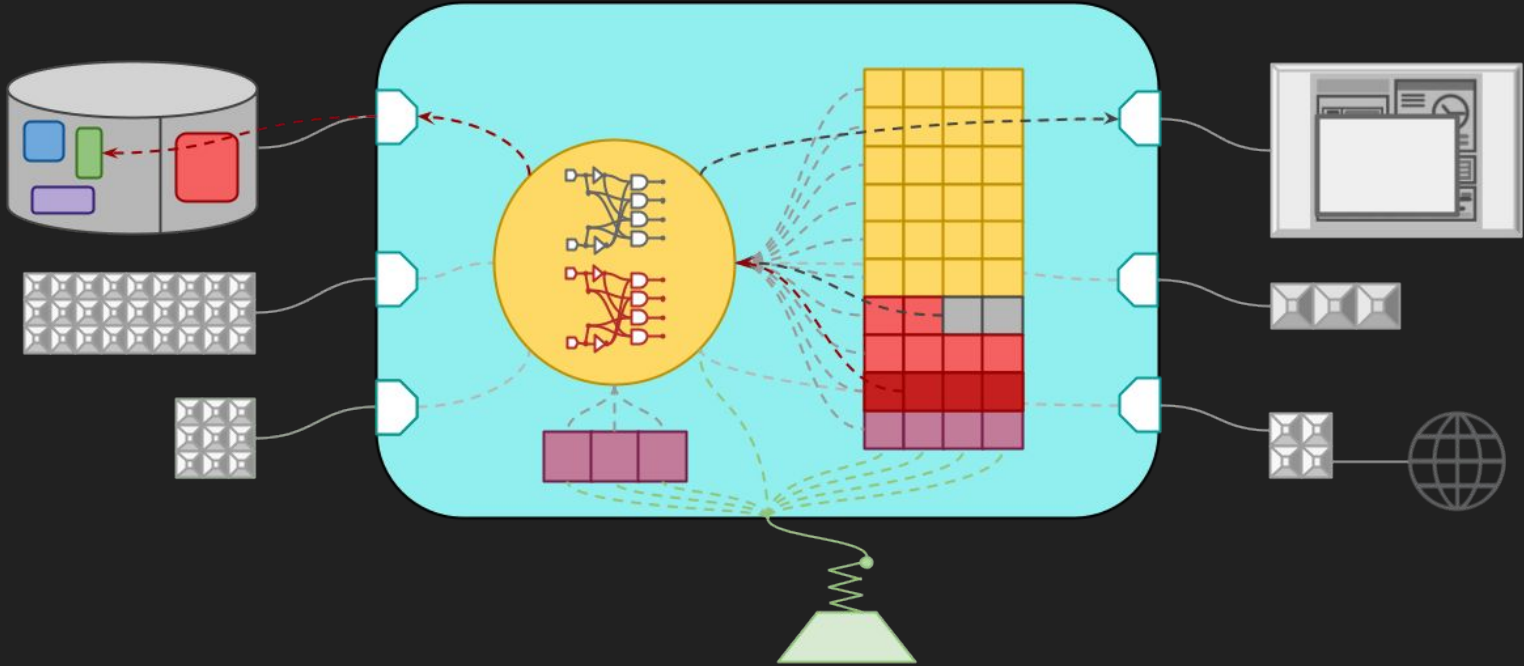
How does a computer work?

Software (SW)

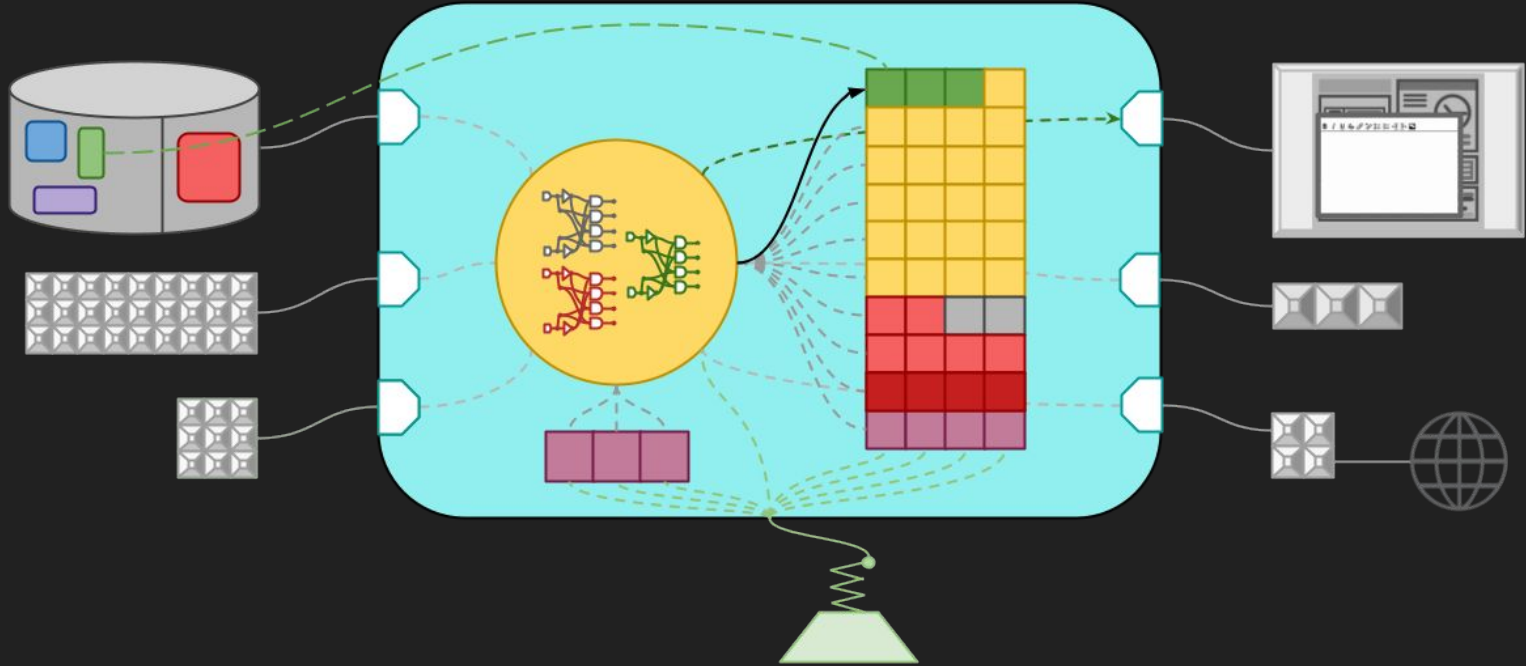
What Happens after Startup? | *OS ready...*



What Happens after Startup? | *OS & GUI running...*



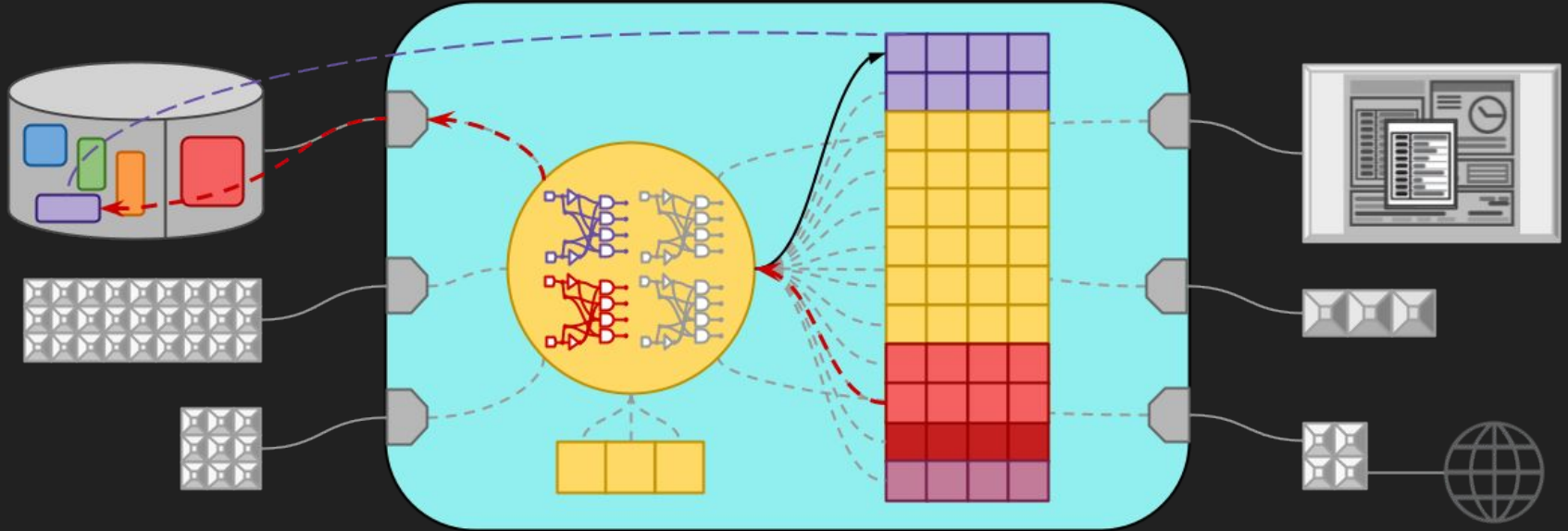
What Happens after Startup? | *SW ready...*



How does a computer work?

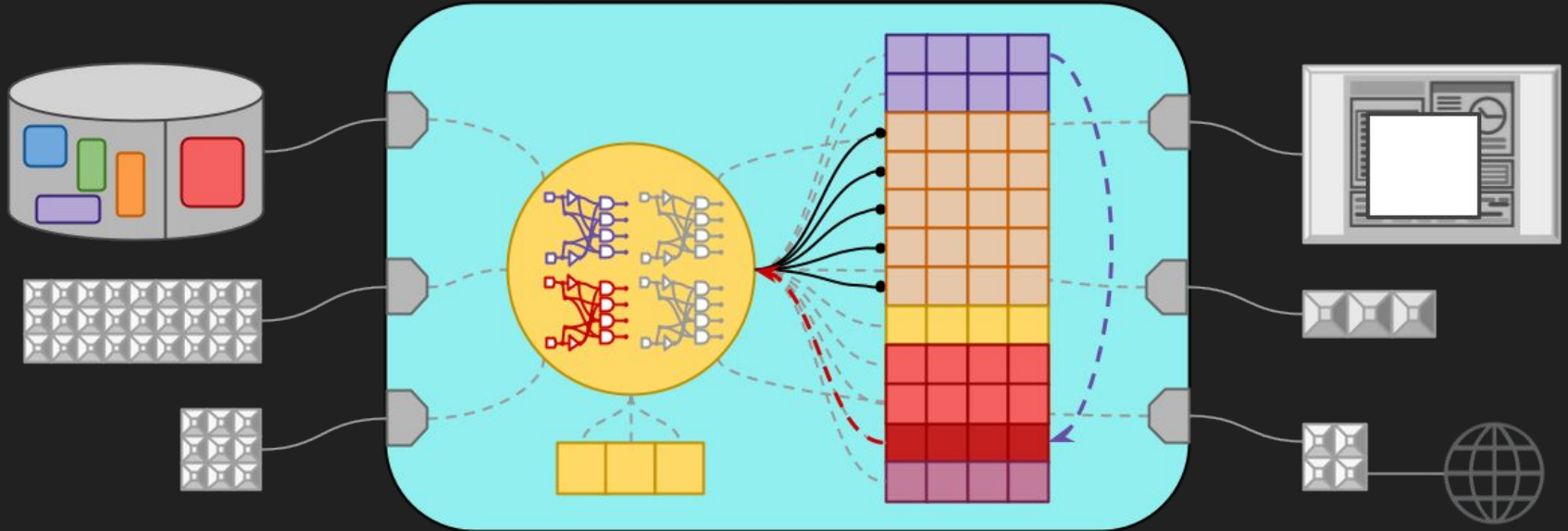
The Virtual Machine (VM)

The Virtual Machine Monitor (VMM)

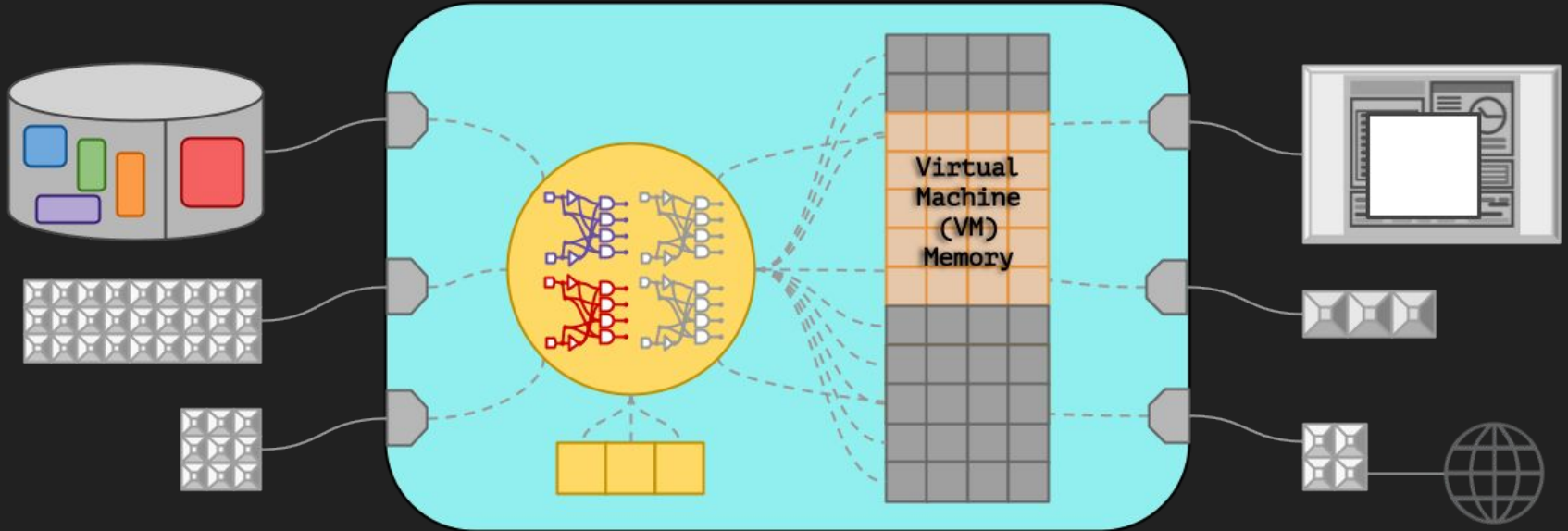


The Virtual Machine Monitor (VMM)

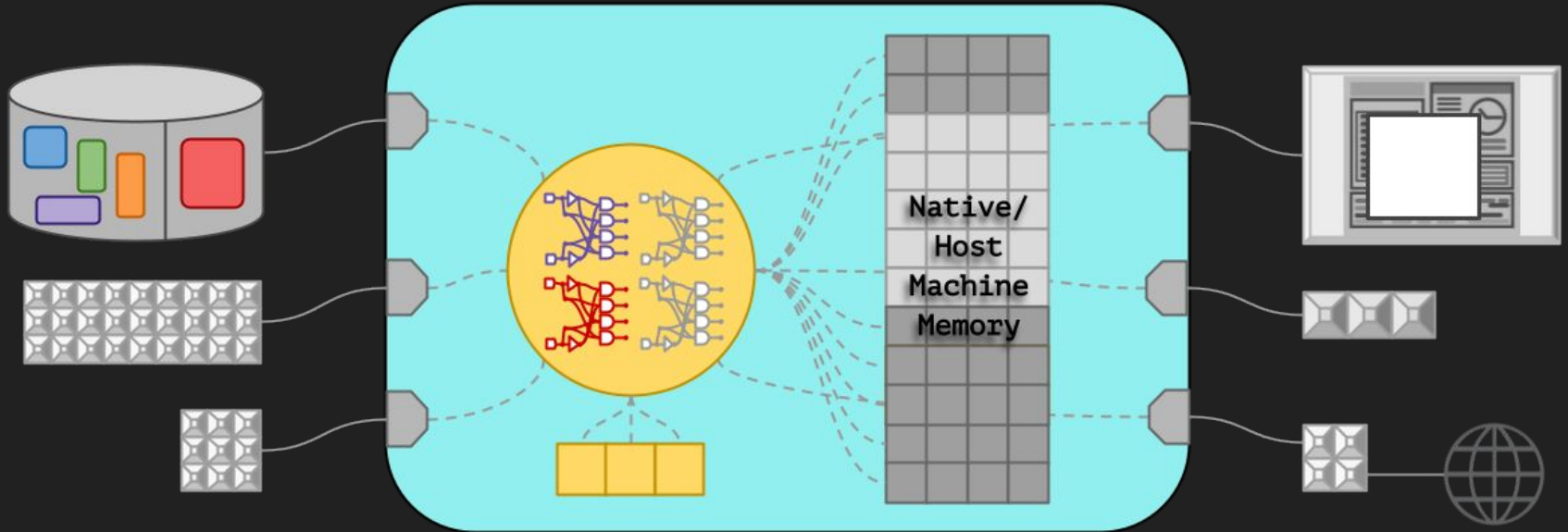
- preparing to run the 'guest' OS



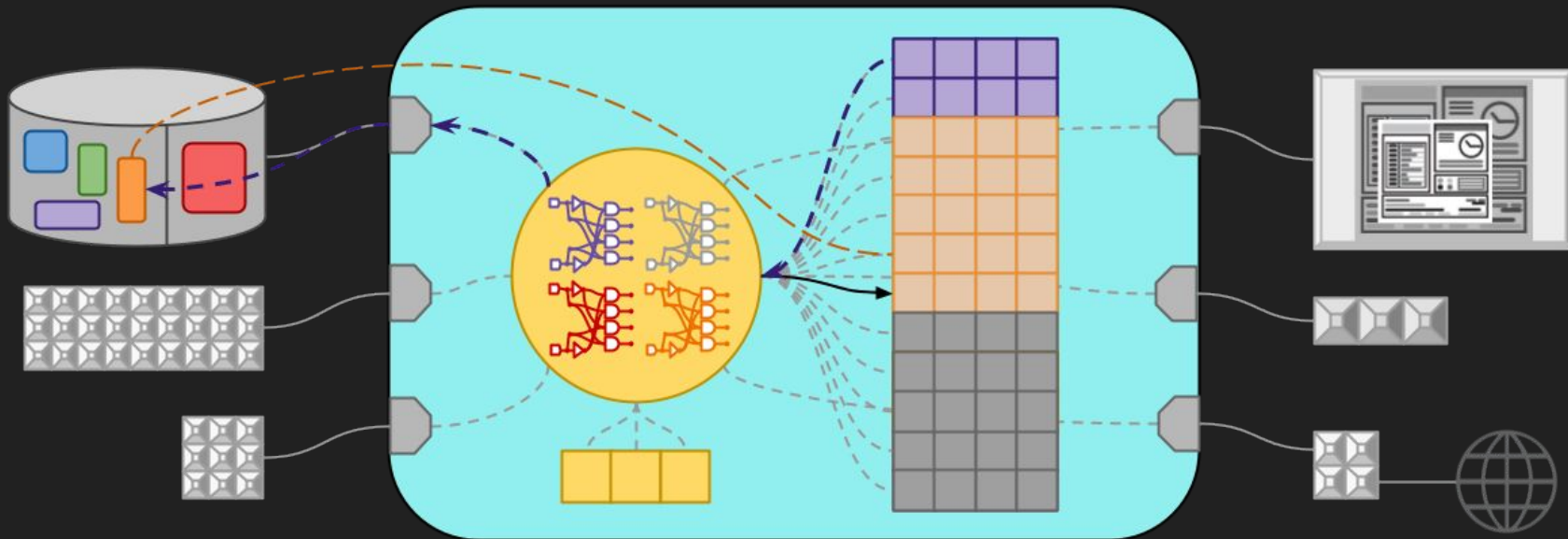
The Virtual Machine



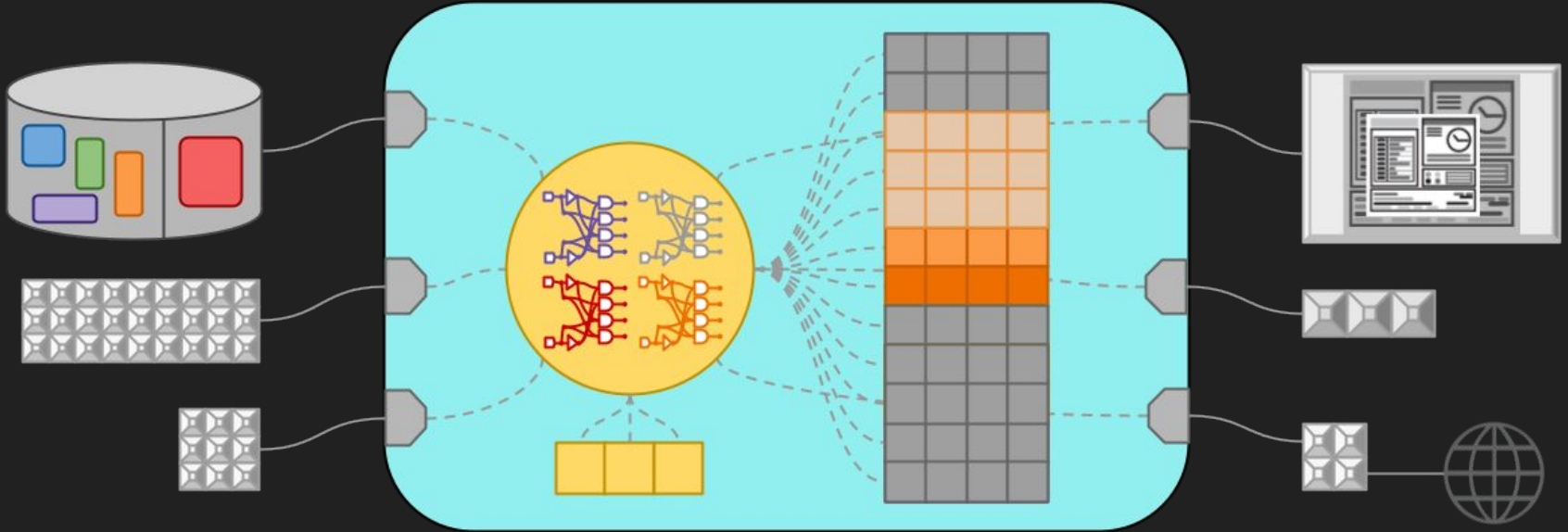
The Virtual Machine



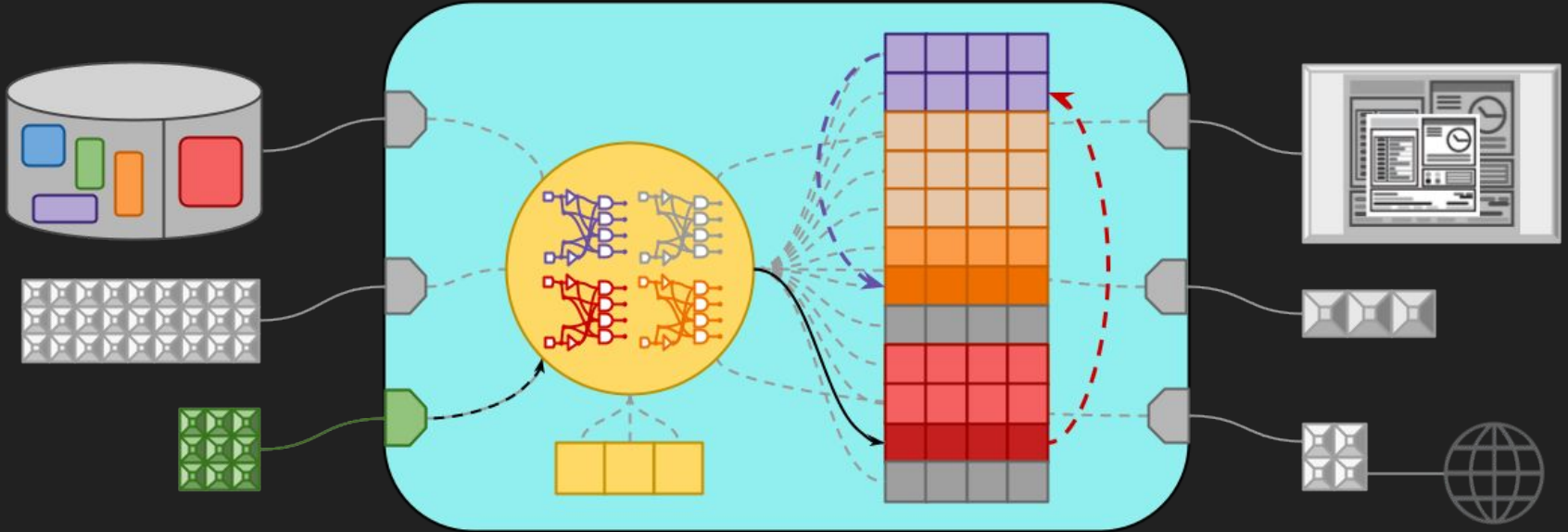
The Virtual Machine: *Startup*



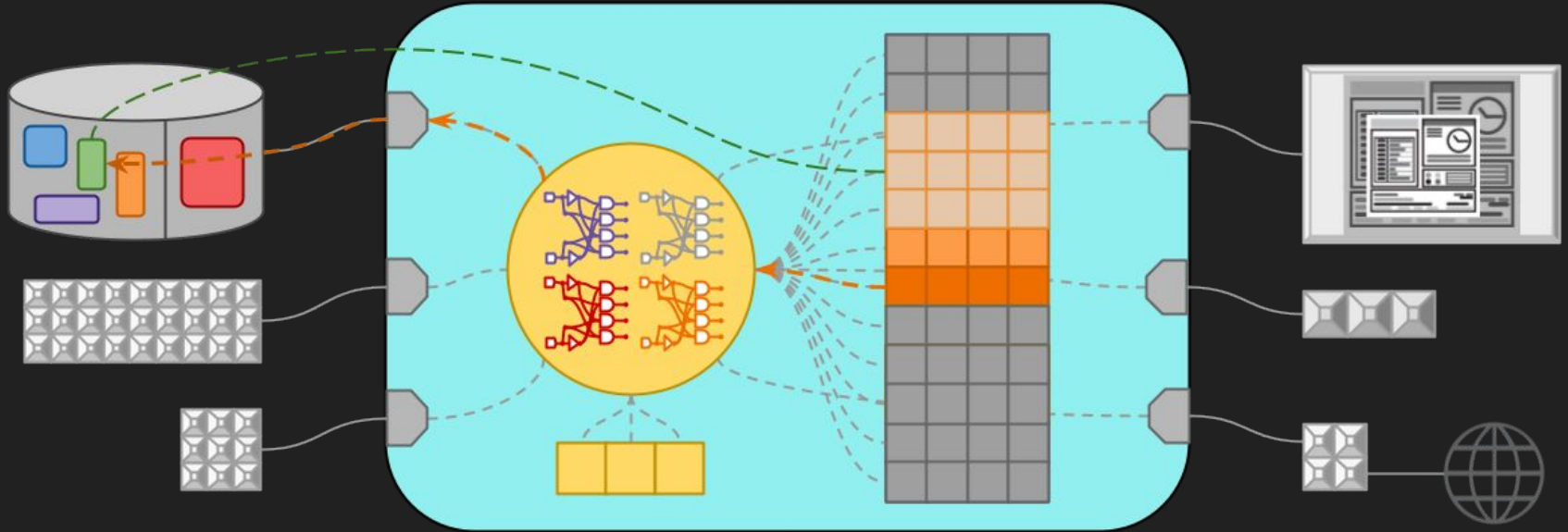
The Virtual Machine: *Startup*



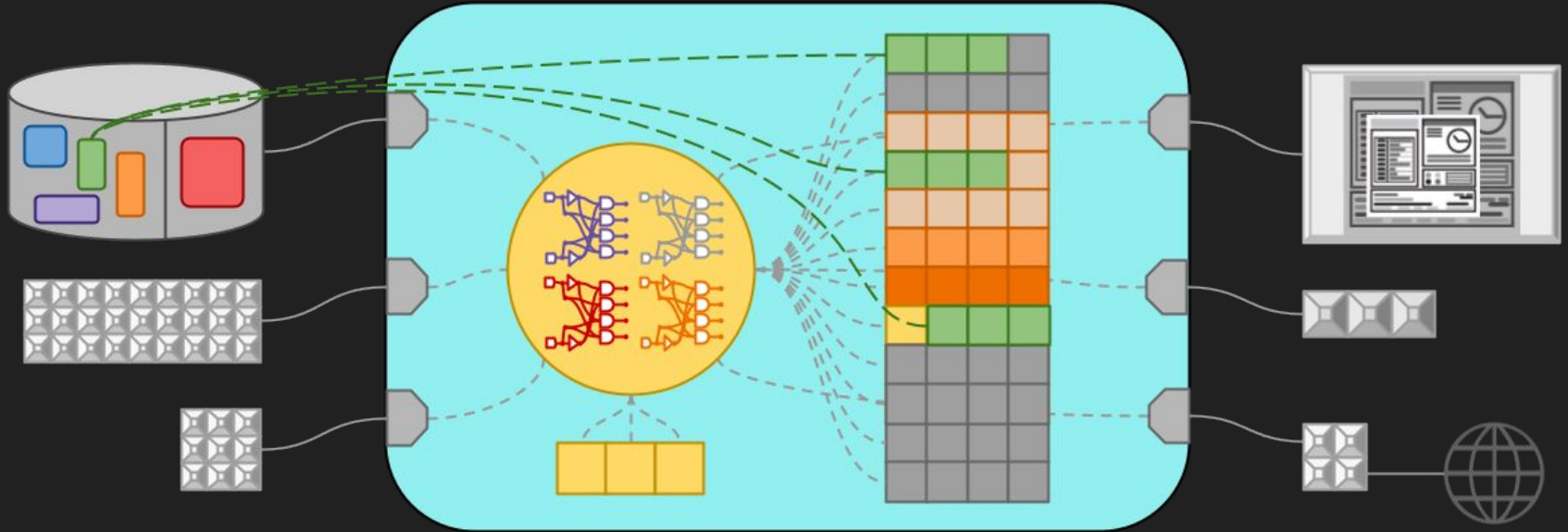
Virtualization: *Sophisticated Indirection*



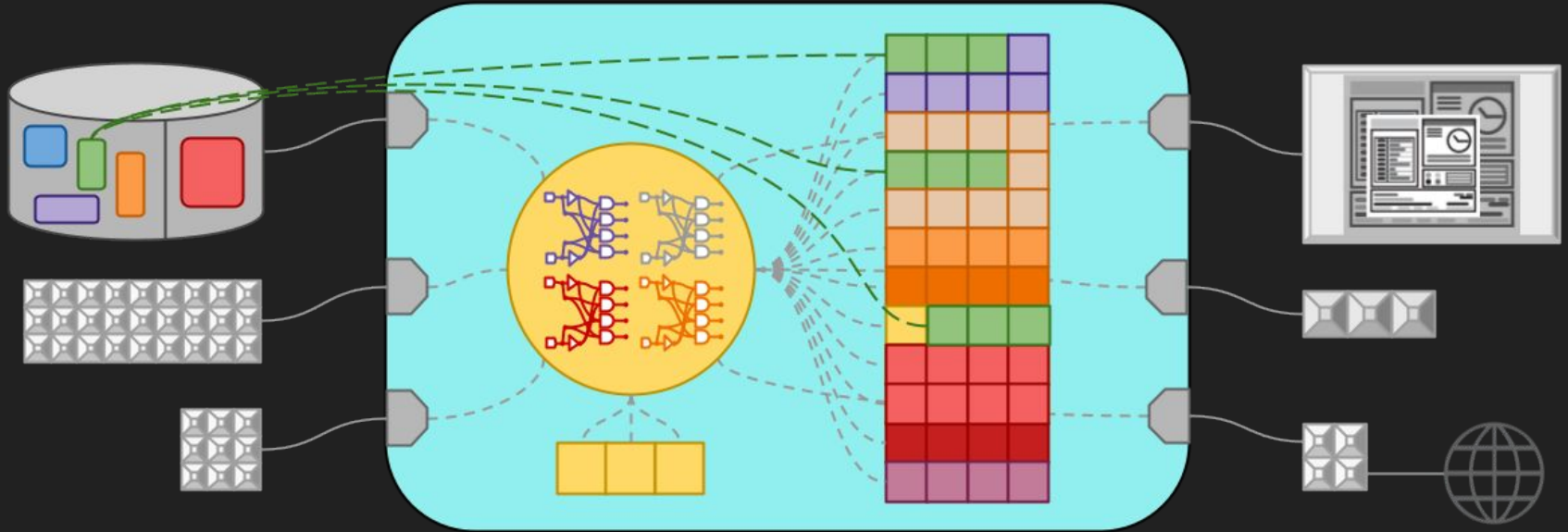
The Virtual Machine: *After Startup*



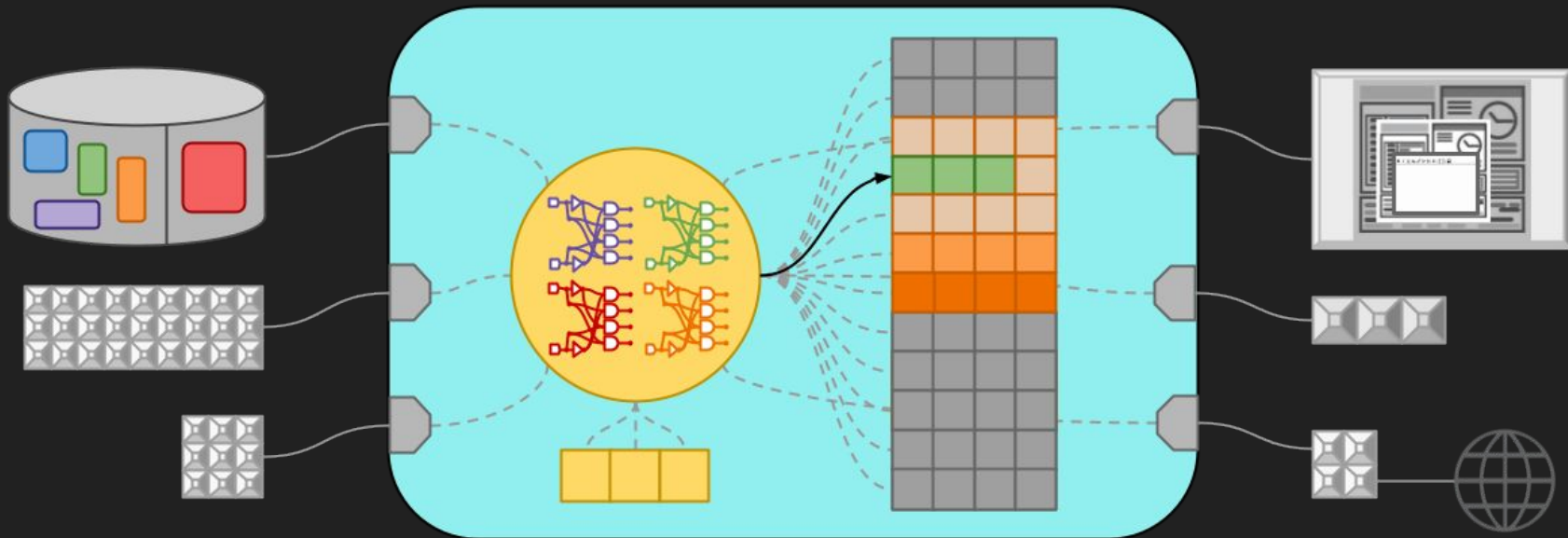
The Virtual Machine: *After Startup*



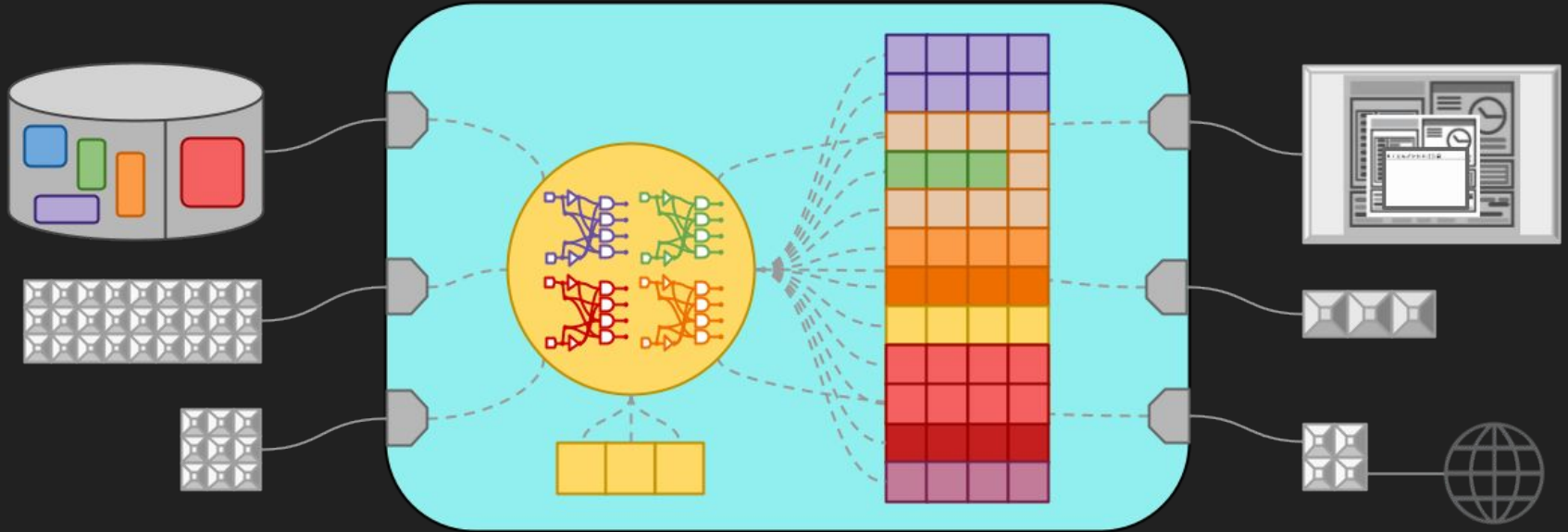
The Virtual Machine: *After Startup*



The Virtual Machine: *After Startup*



Virtualization - The Illusion of Multiple Machines on One



How does a computer work?

The Terminal

Decoding the Mouse Click Event ...

e.g. opening a text file to edit

- *OS detects mouse coordinates*
- *GUI helps OS translate coordinates to a SW name*
 - *GUI maps mouse coordinates to the id of the corresponding GUI window*
 - *GUI maps window id to corresponding SW id*
- *OS finds location of SW (editor) and file on disk*
- *OS loads SW and file to main memory*

Decoding the Terminal Command ...

COMMAND OPTIONS TARGET

e.g. editor open file

- ~~• OS detects mouse coordinates~~
- ~~• GUI helps OS translate coordinates to a SW name~~
- OS finds location of SW (editor) and file on disk
- OS loads SW and file to main memory

Linux Terminal: Basic Commands

General structure of a terminal command: **COMMAND OPTIONS TARGET**

- | | |
|--------------------------------------|---|
| 1. Browse home folder contents: | ~\$ ls -a |
| | ~\$ ls ./ |
| 2. Check type of content: | ~\$ file <content_path> |
| 3. Browse directory content: | ~\$ ls <dir_path> |
| 4. Enter a directory: | ~\$ cd <dir_path> |
| i. Enter parent directory: | ~\$ cd ../ |
| 5. Create a directory: | ~\$ mkdir <dir_path> |
| 6. Auto-complete command: | ~\$ [TAB] |
| 7. Create an empty file: | ~\$ touch <file_path> |
| 8. Edit a file: | ~\$ <editor> <file_path> |
| 9. Display contents of a file: | ~\$ cat <file_path> |
| 10. Copy a file: | ~\$ cp <file_path> <dest_path> |
| i. Copy a directory: | ~\$ cp -r <dir_path> <dest_path> |
| 11. Move a file or directory: | ~\$ mv <src_path> <dest_path> |
| 12. Stop a running software/process: | ~\$ [Ctrl-C] |

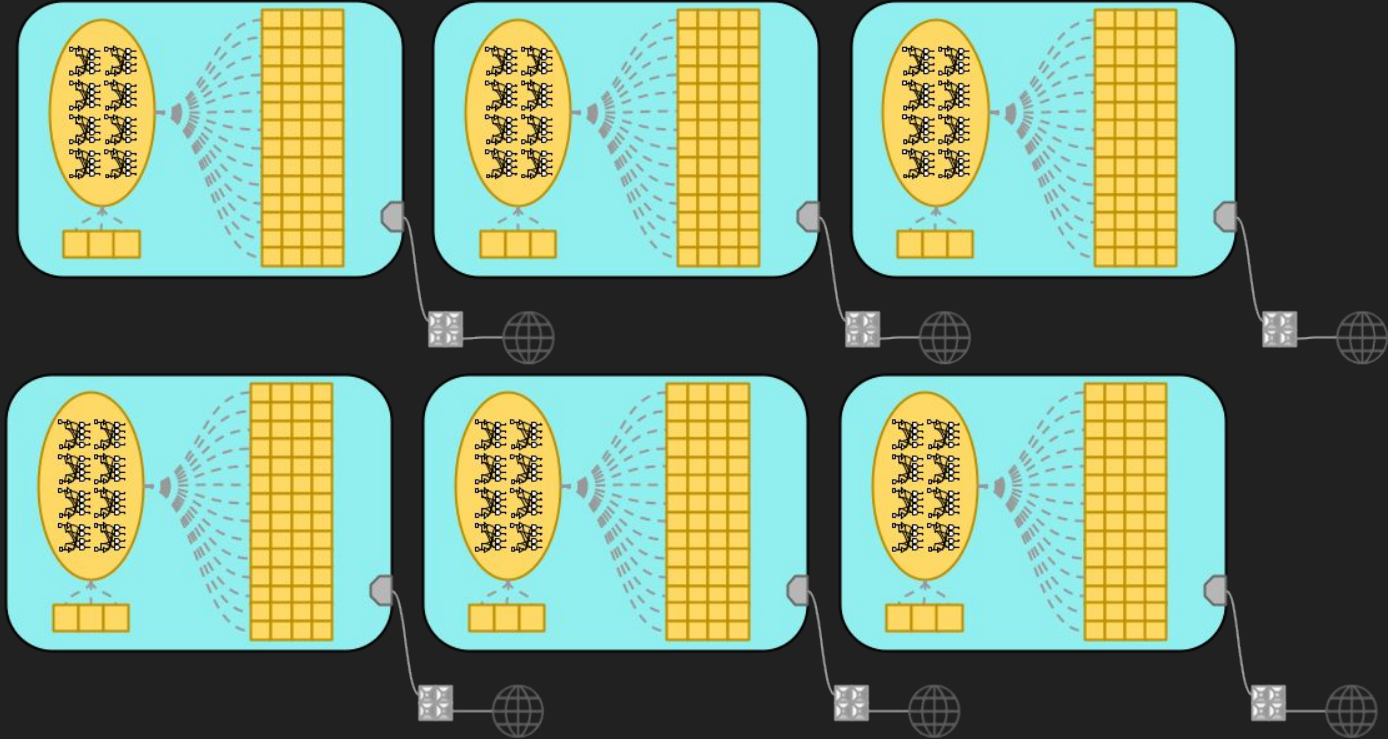
Vim: Basic Commands

- | | | |
|----|-----------------------------|---------|
| 1. | Start typing: | [i] |
| 2. | Stop typing: | [ESC] |
| 3. | Save edits to current file: | :w |
| 4. | Exit: | :q |
| | a. Save and exit: | :wq |
| 5. | Exit without saving: | :q! |

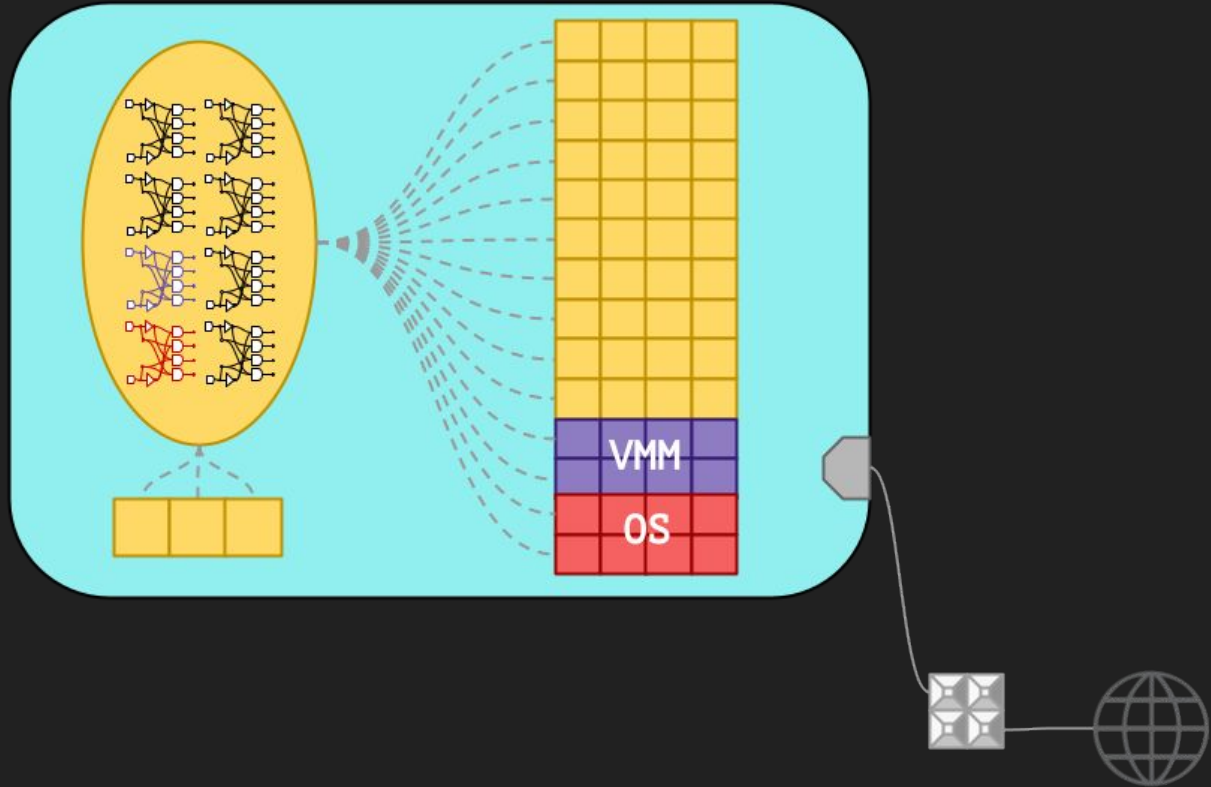
How does a computer work?

The 'Cloud'

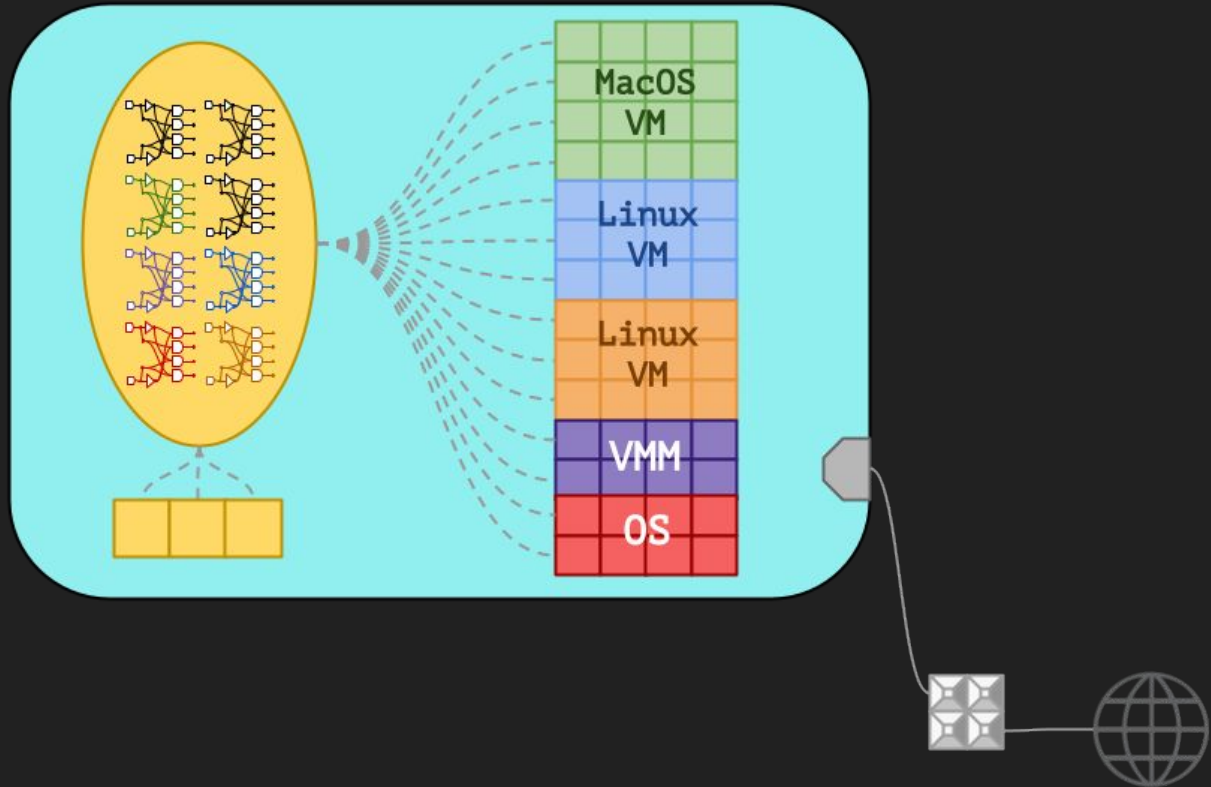
What is the Cloud?



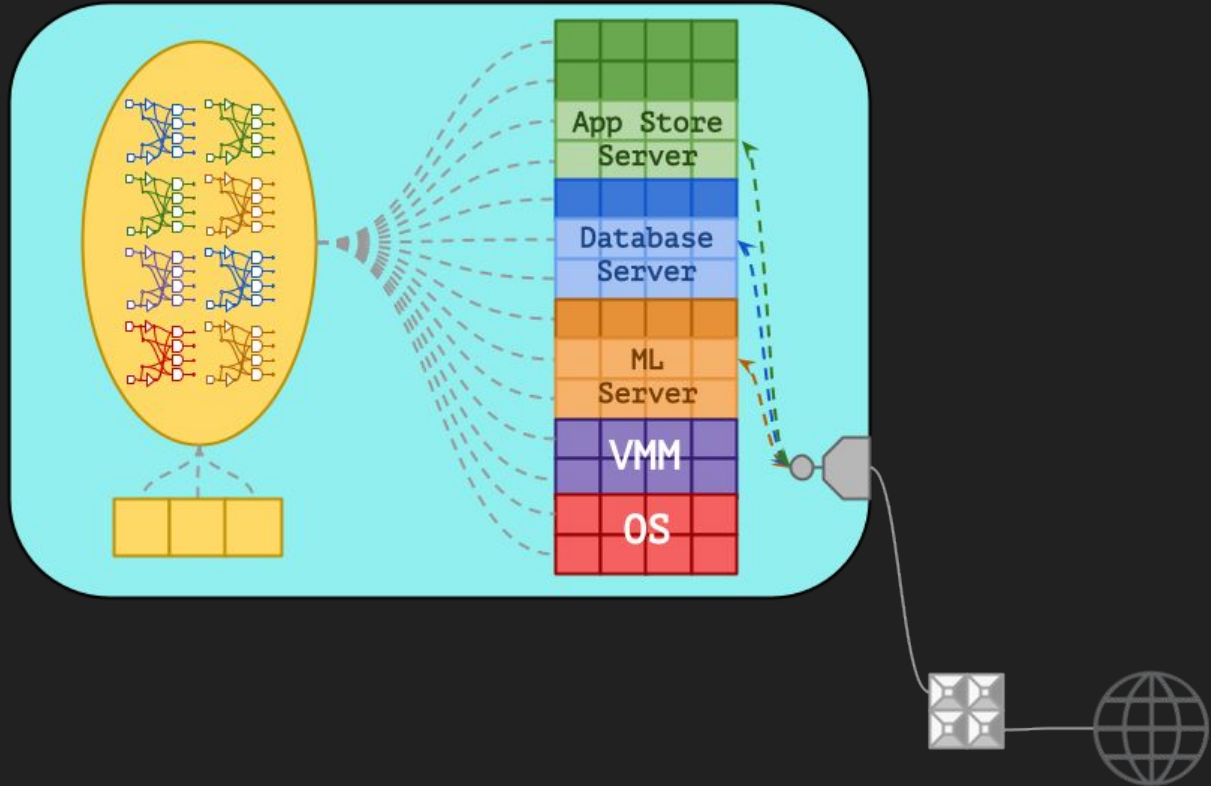
What is the Cloud?



What is the Cloud?



What is the Cloud?



What is the File System?