

# Technologies changing how we think

Aurelijus Banelis





# Aurelijus Banelis

## Software Engineer

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PGP 0x320205E7**539B6203**  
130D C446 1F1A 2E50 D6E3  
3DA8 3202 05E7 539B 6203



home<sup>24</sup>





# Aurelijus Banelis

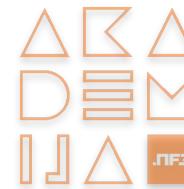
## Technology enthusiast

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PGP 0x320205E7**539B6203**  
130D C446 1F1A 2E50 D6E3  
3DA8 3202 05E7 539B 6203



home<sup>24</sup>





Artejantis

Pranešimai

Apie

Slack

English

## Buvę susitikimai

Migrations: Hacks or architecture

Aurelijus Banelis [in](#)

How AWS handles security

Aurelijus Banelis [in](#)

Dockerizing PHP apps

Aurelijus Banelis [in](#)

Coroutines in PHP

Aurelijus Banelis [in](#)

Real-time metrics with netdata

Aurelijus Banelis [in](#)

Inverting client-server architecture

Aurelijus Banelis [in](#)

Docker on VDS

Aurelijus Banelis [in](#)

Mutation testing

Aurelijus Banelis [in](#)

Headless browsers and friends

Aurelijus Banelis [in](#)

Multi-Model Databases

Aurelijus Banelis [in](#)

Išlipus iš vieno PHP failo

Aurelijus Banelis [in](#)

Svetainių pritaikymas akliesiems

Aurelijus Banelis [in](#)

OrientDB in practice

Aurelijus Banelis [in](#)

Denormalizacija ir kiti SQL optimizavimo būdai

Aurelijus Banelis [in](#)

Funkcinis programavimas su PHP

Aurelijus Banelis [in](#)

WHAT THE  
INTERNET  
IS DOING TO  
OUR BRAINS

**THE SHALLOWS**

Nicholas Carr

AUTHOR OF *THE BIG SWITCH*

# Technologies



# thinking

# **For humans**

**Brain evolution  
Intellectual technologies  
Neuroplasticity**

# **For developer**

**Encode  
Abstract  
Associate**

# **Added value**

**For teams  
For users  
For humanity**

# **For humans**

Brain evolution  
Intellectual technologies  
Neuroplasticity

# **For developer**

Encode  
Abstract  
Associate

# **Added value**

For teams  
For users  
For humanity

-4K years



Now



# Primitive Advanced civilization



# Primitive Advanced civilization



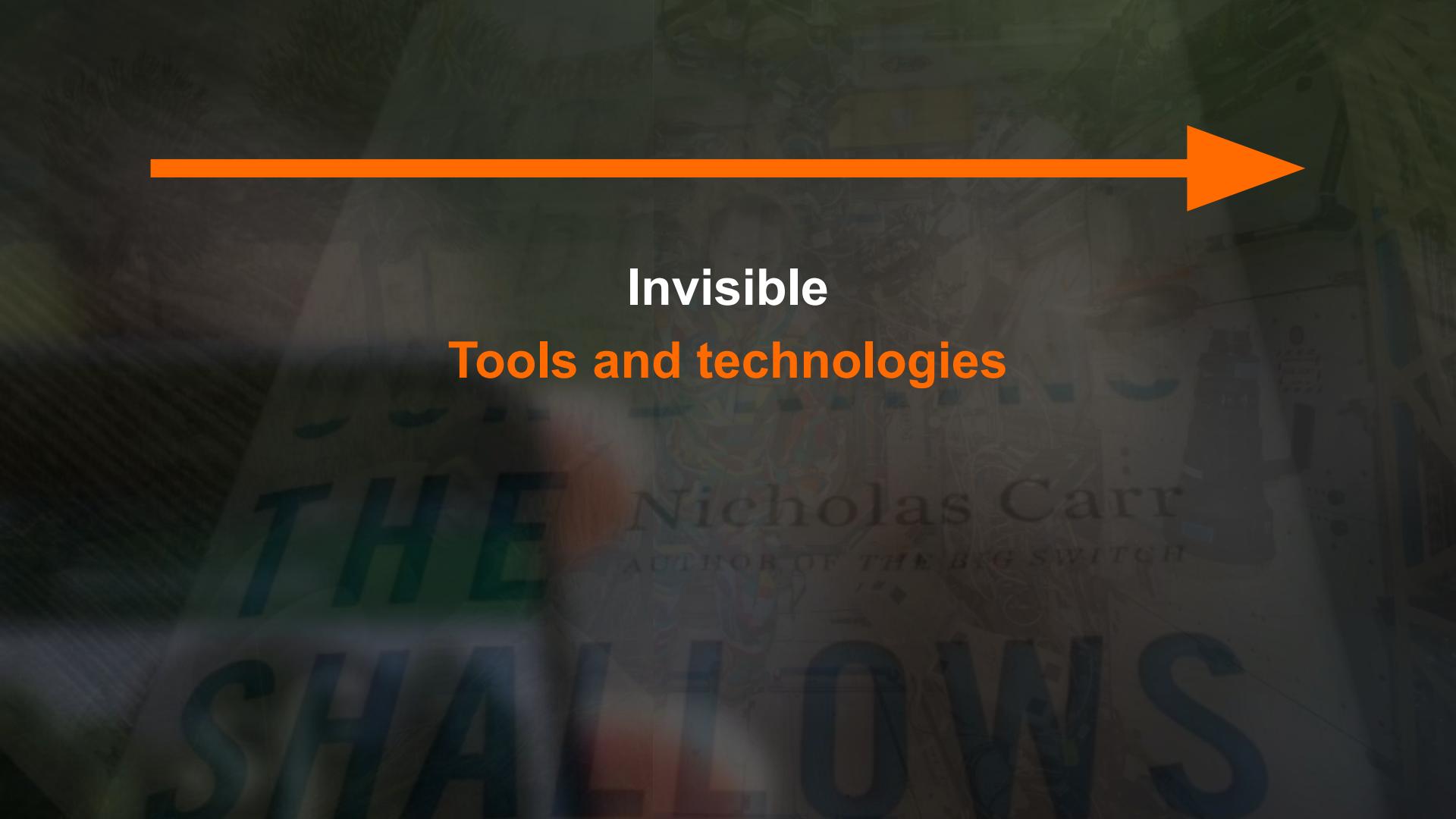
Tools and technologies





# Visible Tools and technologies

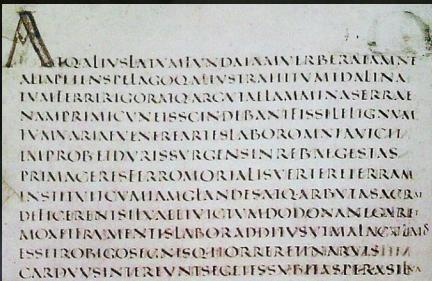




Invisible

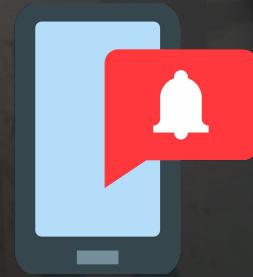
Tools and technologies

# Intellectual technologies



Spaces between words

Ticking of the clock



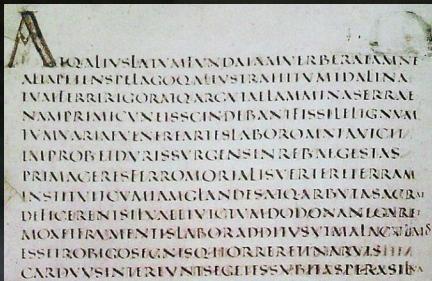
Multitasking

Encode

Abstract

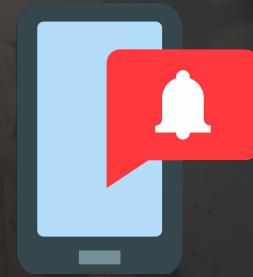
Associate

## Intellectual technologies



Spaces between words

Ticking of the clock



Multitasking

# **For humans**

**Brain evolution**

Intellectual technologies

Neuroplasticity

# **For developer**

Encode

Abstract

Associate

For teams

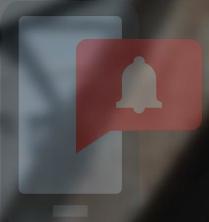
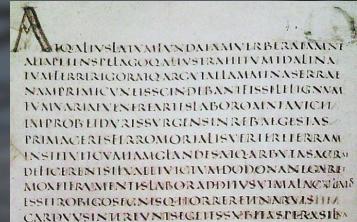
For users

For humanity

# **Added value**

# For humans

# Brain evolution Intellectual technologies



## Neuroplasticity

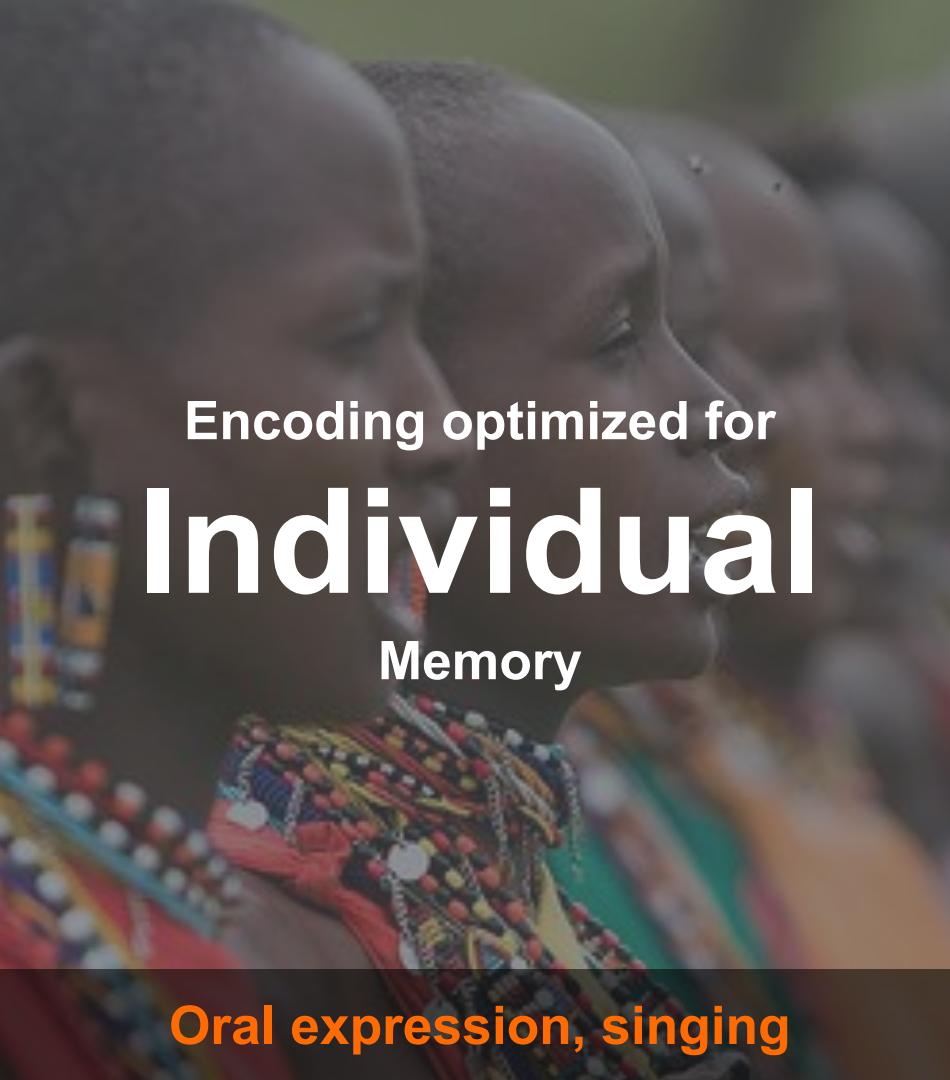
## Added value

## Encode, Abstract, Associate

## Added value

## For teams, users, humanity

THROUGH THE MILLENNIA OF MAN'S PRELITERATE HISTORY, LANGUAGE EVOLVED TO AID THE STORAGE OF COMPLEX INFORMATION IN INDIVIDUAL MEMORY AND TO MAKE IT EASY TO EXCHANGE THAT INFORMATION WITH OTHERS. **THROUGH SPEECH**, THE ORAL WORLD OF OUR DISTANT ANCESTORS MAY WELL HAVE HAD EMOTIONAL AND INTUITIVE DEPTHS THAT WE CAN NO LONGER APPRECIATE. CLUHAN BELIEVED THAT PRELITERATE PEOPLES MUST HAVE ENJOYED A PARTICULARLY INTENSE SENSATION OF INVOLVEMENT WITH THE WORLD WHEN WE LEARNED TO READ. HE ARGUED WE SUFFERED A CONSIDERABLE DETACHMENT FROM THE FEELINGS OF EMOTIONAL INVOLVEMENT THAT A NON-LITERATE MAN OR SOCIETY WOULD EXPERIENCE.<sup>57</sup> IT IS HARD FOR US TO IMAGINE TODAY BUT NO SPACES SEPARATED THE WORDS IN NEARLY WRITING IN THE BOOKS INKED BY SCRIBES. WORDS RAN TOGETHER WITHOUT ANY BREAK ACROSS EVERY LINE, ONE EVERY PAGE. IN WHAT SNOW REFERRED AS **SCRIPTURA CONTINUA**, THE LACK OF WORD SEPARATION REFLECTED LANGUAGE'S ORIGINS IN SPEECH. THE LACK OF WORKED-SEPARATION COMBINED WITH THE ABSENCE OF WORD ORDER CONVENTIONS PLACED AN EXTRA COGNITIVE BURDEN ON ANCIENT READERS. EXPLAINS PAUL SAENGER IN *SPACE BETWEEN WORDS*: HIS HISTORY OF THE SCRIBAL BOOK READING WAS LIKE WORKING OUT A PUZZLE.<sup>61</sup>



# Encoding optimized for Individual Memory

Oral expression, singing

Internet Engineering Task Force (IETF)  
Request for Comments: 6265  
Obsoletes: 2965  
Category: Standards Track  
ISSN: 2070-1721

A. Barth  
U.C. Berkeley  
April 2011

## HTTP State Management Mechanism

### Abstract

This document defines the HTTP Cookie and Set-Cookie header fields. These header fields can be used by HTTP servers to store state (called cookies) at HTTP user agents, letting the servers maintain a stateful session over the mostly stateless HTTP protocol. Although cookies have many historical infelicities that degrade their security and privacy, the Cookie and Set-Cookie header fields are widely used on the Internet. This document obsoletes RFC 2965.

### Status of This Memo

This document is an Internet Standard. This document

# Encoding optimized for Generations Remembrance

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Barth

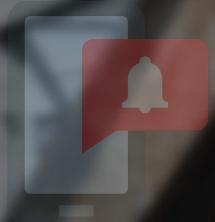
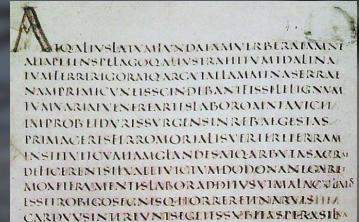
Spaces between words<sup>[1]</sup>

**For developers**

**Added value**

**For humans**

# **Brain evolution Intellectual technologies**



**Neuroplasticity**

**Encode, Abstract, Associate**

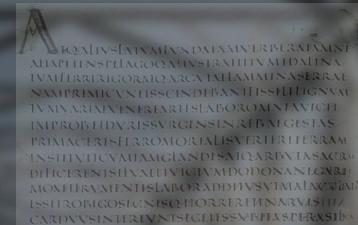
**For teams, users, humanity**

**For developers**

**Added value**

**For humans**

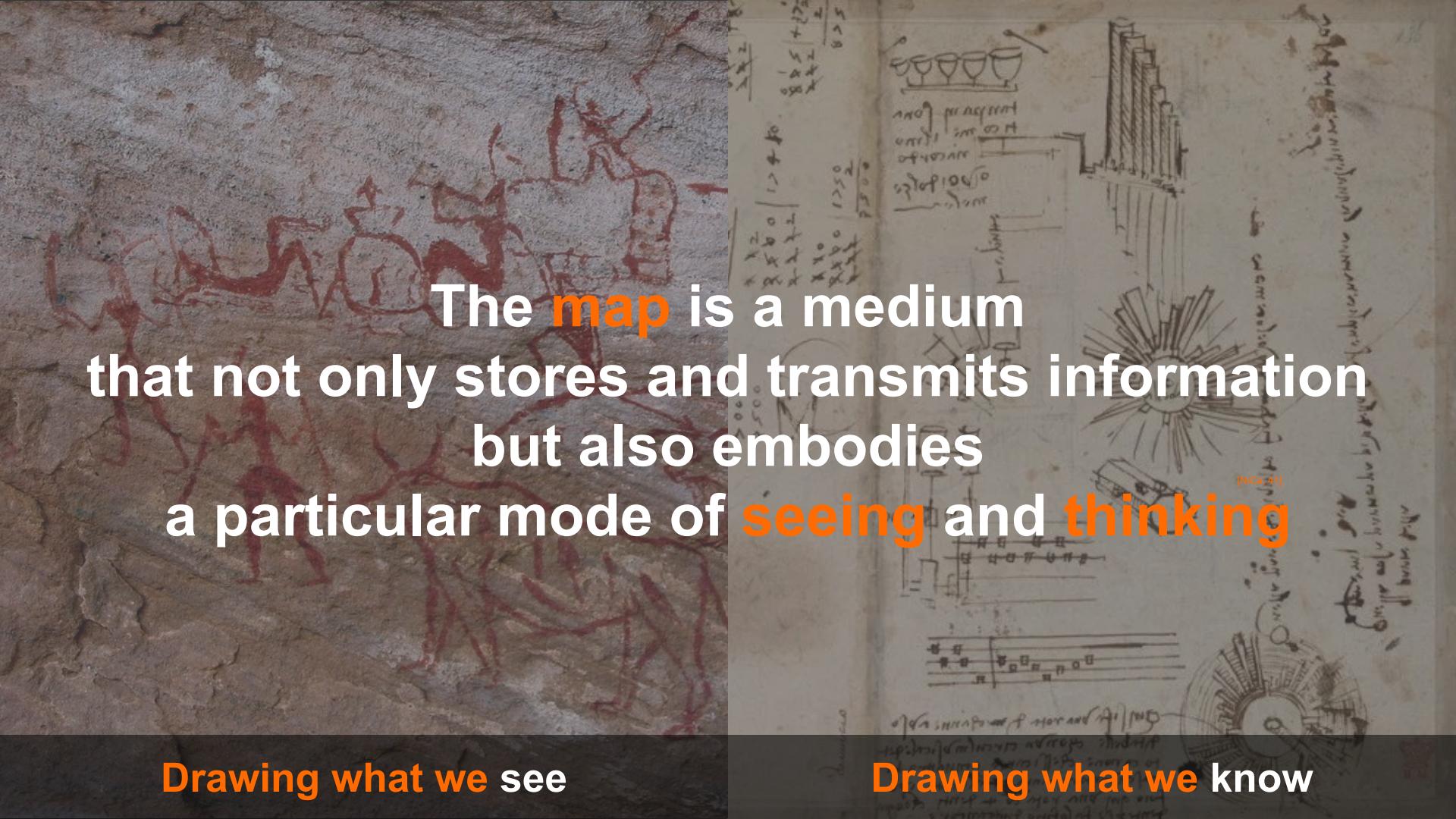
**Brain evolution  
Intellectual technologies**



**Neuroplasticity**

**Encode, Abstract, Associate**

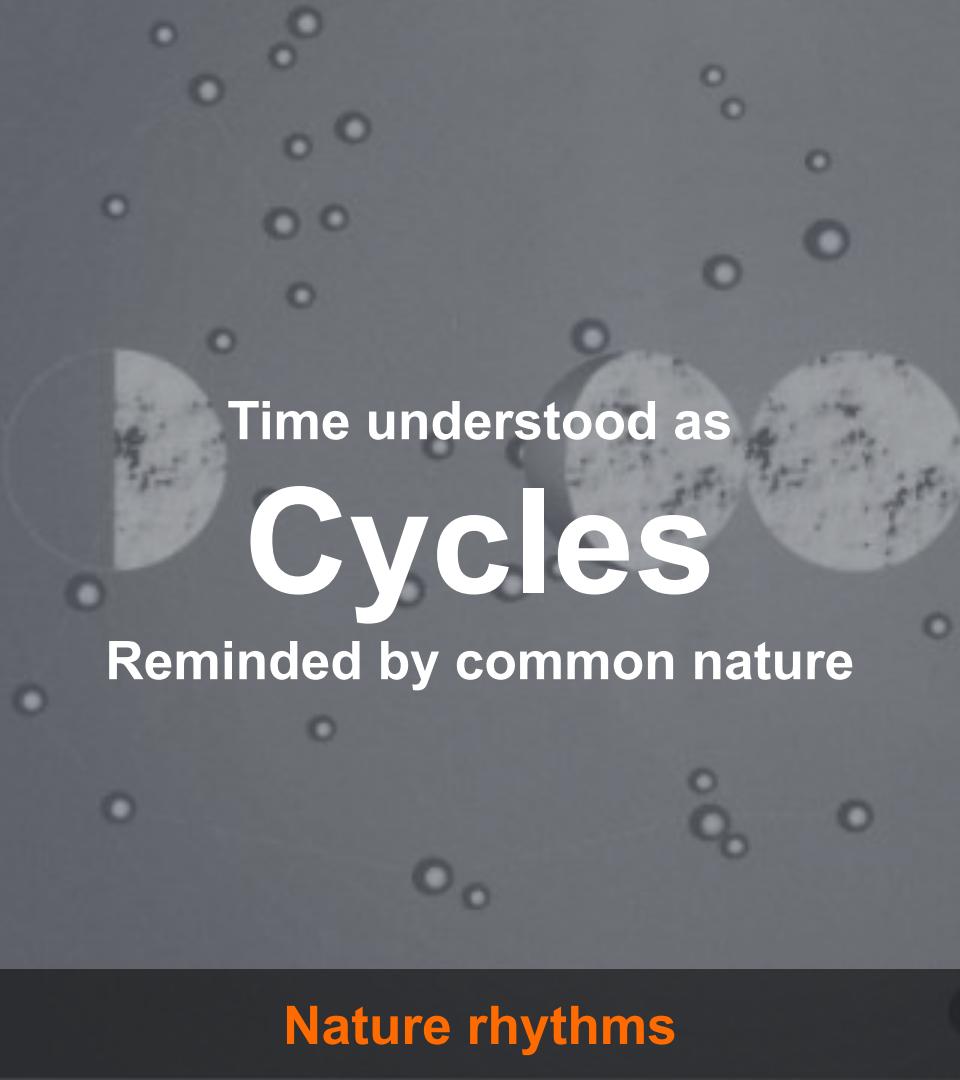
**For teams, users, humanity**



The map is a medium  
that not only stores and transmits information  
but also embodies  
a particular mode of seeing and thinking

Drawing what we see

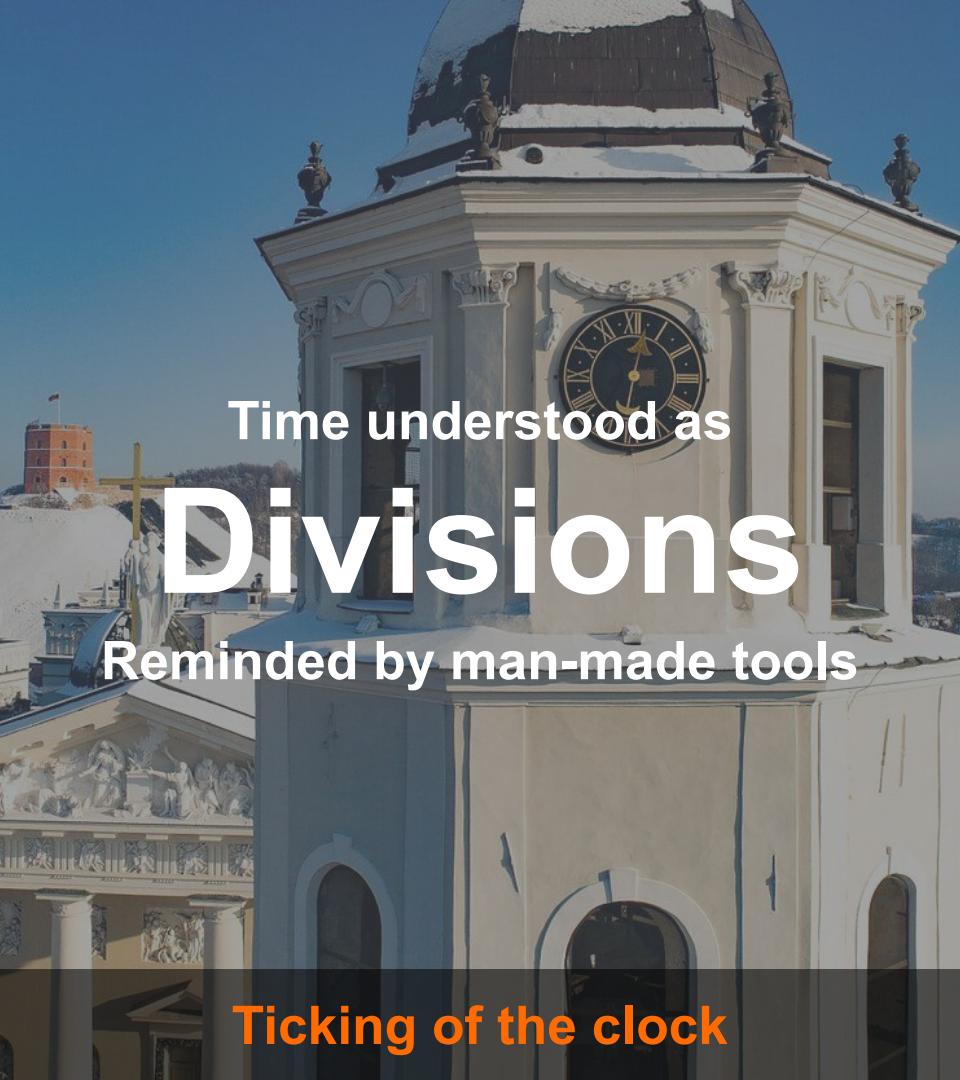
Drawing what we know



Time understood as  
**Cycles**

Reminded by common nature

Nature rhythms



Time understood as  
**Divisions**

Reminded by man-made tools

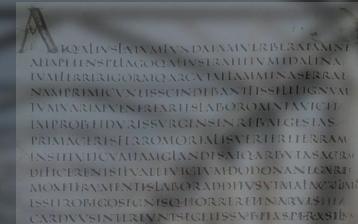
Ticking of the clock

**For developers**

**Added value**

**For humans**

**Brain evolution  
Intellectual technologies**



**Neuroplasticity**

**Encode, Abstract, Associate**

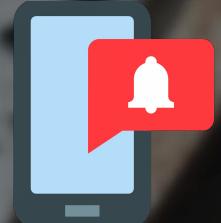
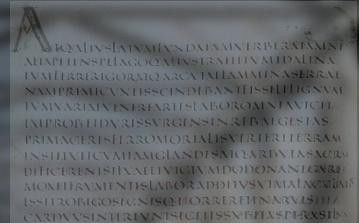
**For teams, users, humanity**

**For developers**

**Added value**

**For humans**

**Brain evolution  
Intellectual technologies**



**Neuroplasticity**

**Encode, Abstract, Associate**

**For teams, users, humanity**

1==Demo=

## Switch Windows

When you have several programs open, it's easy to go back and forth between programs. You just tell DESQview to Switch Windows.

**Why in the world would you want to be interrupted – and distracted – by e-mail while programming**

2—Sample Document

Joe:

First Operating system that supported multitasking  
Mid-1970, Palo Alto Research Center

When we were talking last week, you mentioned buying a house. I went through that exercise program to help me sort out my options. I can see how your monthly payments would vary with lengths of mortgage. Here it is:

```
100 PRINT:PRINT:INPUT "What principal am
```

3—Sample Sp

## ASSETS

Accts Rece  
Cash  
Unsold Goo  
**TOTAL ASSE**

## HABILITIES

Assets Page  
Storage Co  
Bank  
Materials

## NIBT

Allowance  
Taxable Income  
Taxes(30%)

## NET INCOME

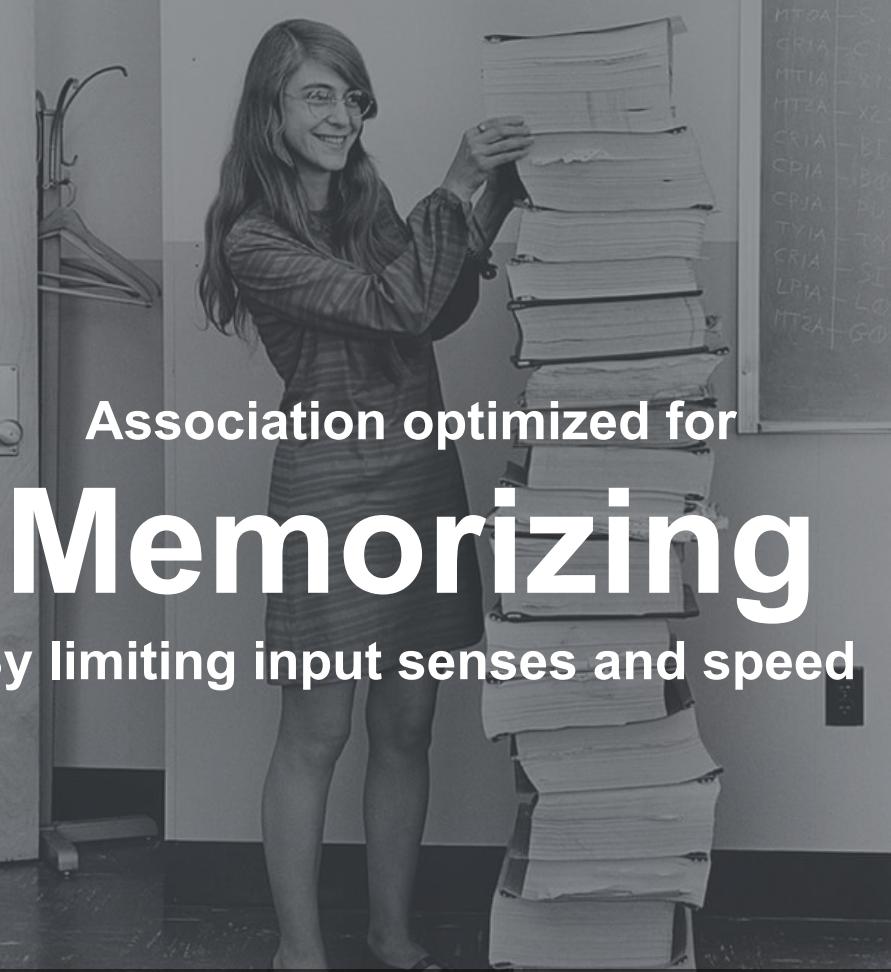
## DESQview

Open Window  
Switch Windows  
Close Window

Rearrange  
Zoom  
Mark  
Transfer

Help  
Quit DESQview

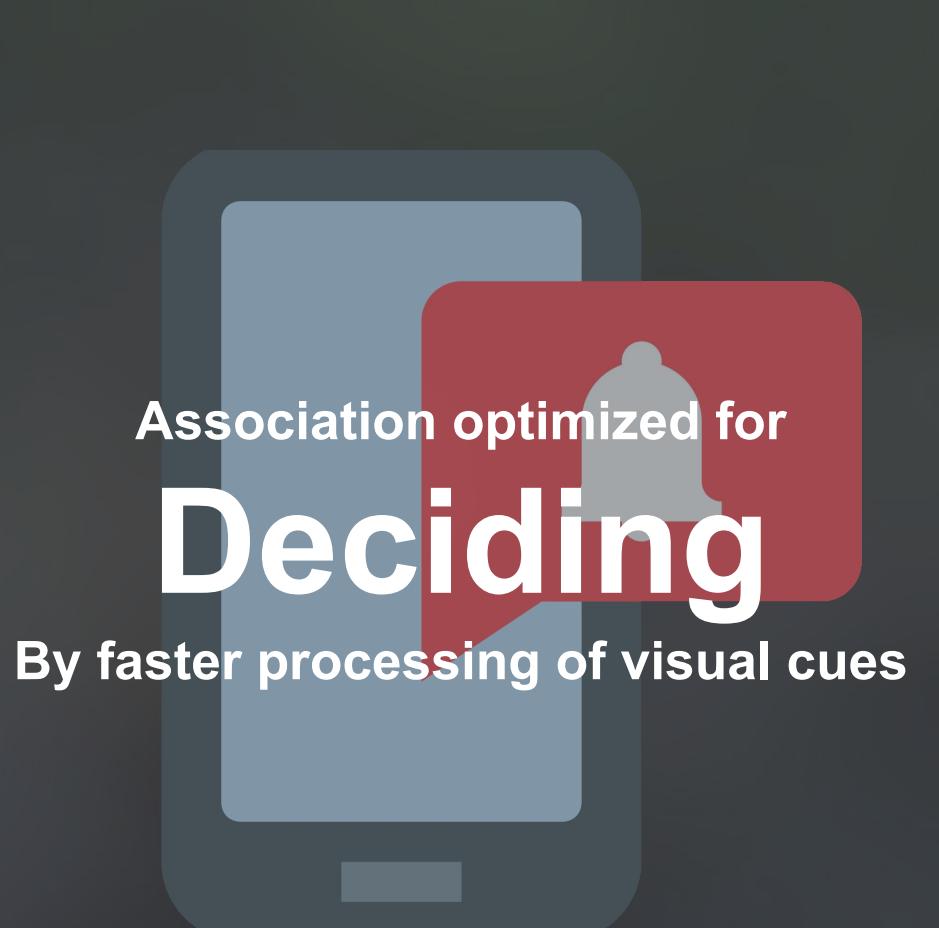
	100	10
Allowance	100.0	10
Taxable Income	250.0	58
Taxes(30%)	75.0	17
<b>NET INCOME</b>	\$ 275.0	\$ 51



Association optimized for  
**Memorizing**

By limiting input senses and speed

Linear deep reading



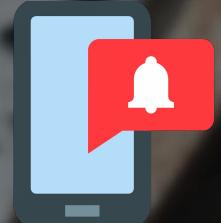
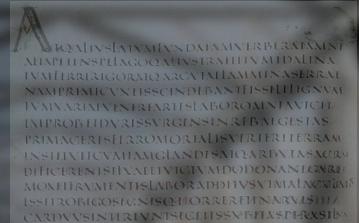
Multitasking, Browsing

**For developers**

**Added value**

**For humans**

**Brain evolution  
Intellectual technologies**



**Neuroplasticity**

**Encode, Abstract, Associate**

**For teams, users, humanity**

# For humans

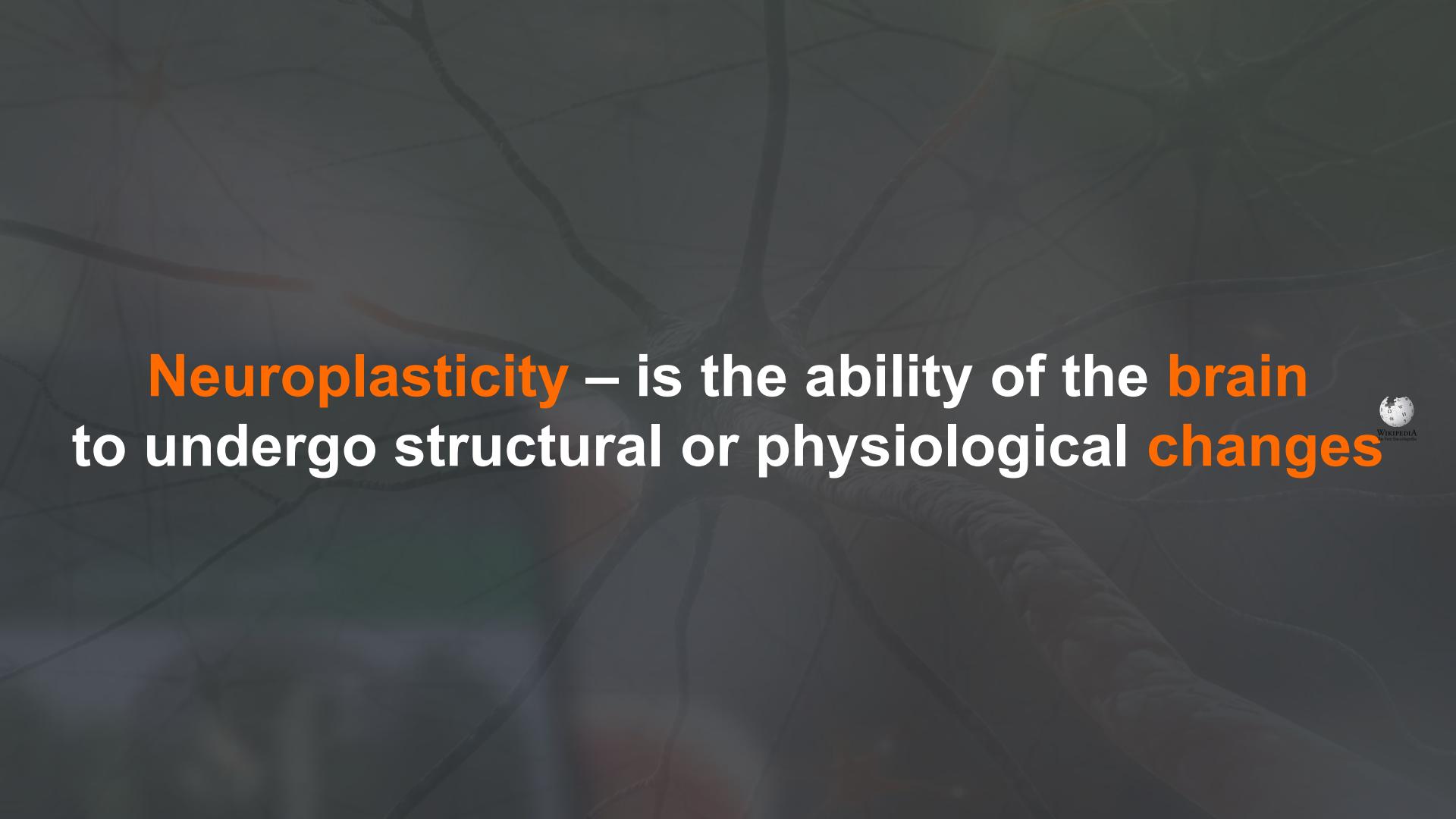
Brain evolution  
Intellectual technologies  
**Neuroplasticity**

# For developer

Encode  
Abstract  
Associate

# Added value

For teams  
For users  
For humanity



**Neuroplasticity** – is the ability of the brain  
to undergo structural or physiological **changes**



WIKIPEDIA  
The free encyclopedia

Not technology

Is technology

**Neuroplasticity – is the ability of the brain  
to undergo structural or physiological changes**

The best technology



A child learns to talk  
without instructions

Not technology   Is technology

The best technology

Internet Engineering Task Force (IETF)  
Request for Comments: 6265  
Obsoletes: 2965  
Category: Standards Track  
ISSN: 2070-1721

A. Barth  
U.C. Berkeley  
April 2011

## HTTP State Management Mechanism

### Abstract

**Reading, writing, abstract thinking requires schooling and practice**

This document describes the mechanism for maintaining state information across multiple HTTP requests. These header fields can be used by HTTP servers to store state (called "cookies") at HTTP user agents, letting the servers maintain a stateful session with the client. This document obsoletes RFC 2965. Cookies have many historical inefficiencies that degrade their security and privacy, the Cookie and Set-Cookie header fields are widely used on the Internet. This document obsoletes RFC 2965.

### Status of This Memo

This is an Internet Standards Track document.

This document is a product of the Internet Engineering Task Force (IETF). It represents the consensus of the IETF community. It has received public review and has been approved for publication by the Internet Engineering Steering Group (IESG). Further information on



The Net delivers precisely the kind of sensory and cognitive stimuli  
– repetitive, intensive, interactive, addictive –  
that have shown to result in strong and rapid alterations  
In brain circuits and functions [NICa, 116]

Pranešimai

Apie



# For humans

Brain evolution  
Intellectual technologies  
**Neuroplasticity**

# For developer

Encode  
Abstract  
Associate

# Added value

For teams  
For users  
For humanity



# For humans

Brain evolution  
Intellectual technologies  
Neuroplasticity

# For developer

Encode  
Abstract  
Associate

# Added value

For teams  
For users  
For humanity

# Old web development

1994-1995

```
<html><head><title>Form Example</title></head>
<body><h1>My Example Form</h1>
<form action="form.phtml" method="POST">
Name: <input type="text" name="name">
Age: <input type="text" name="age">
<br><input type="submit">
</form>
<if($name):?>
Hi <?echo $name?>, you are <?echo $age?> years old
<endif?>
</body></html>
```

25 Years of PHP

# Modern web development

```
<?php
declare(strict_types=1);

namespace Examples;

class ExampleClass
{
    public function doSomething(): void
    {
        print_r($this->filter());
    }

    private function cleanString(string $string, string $except): string
    {
        return str_replace($except, '', $string);
    }

    /**
     * @return array|string[]
     */
    private function filter(): array
    {
        $stringValues = [
            'foo',
            'bar',
        ];

        return array_filter(
            $stringValues,
            fn (string $value): string => $this->cleanString($value, 'b')
        );
    }
}
```

25 Years of PHP

# Readable

Code as text book

```
<html><head><title>Form Example</title></head>
<body><h1>My Example Form</h1>
<form action="form.phtml" method="POST">
Name: <input type="text" name="name">
Age: <input type="text" name="age">
<input type="submit">
</form>
<if( $name )>
<? no_name , i a <?e o ( e?> ea old
</endif>
</body></html>
```

1994-1995

<?php

```
declare(strict_types=1);

namespace Examples;

class ExampleClass
{
    public function doSomething(): void
    {
        print_r($this->filter());
    }

    private function cleanString(string $string, string $except): string
    {
        return str_replace($except, '', $string);
    }

    /**
     * @return array
     */
    private function filter(): array
    {
        $stringValues = [
            'foo',
            'bar',
        ];

        return array_filter(
            $stringValues,
            fn (string $value): string => $this->cleanString($value, 'b')
        );
    }
}
```

# Stepping

Code as visual boxes



# For humans

Brain evolution  
Intellectual technologies  
Neuroplasticity

# For developer

Encode  
Abstract  
Associate

# Added value

For teams  
For users  
For humanity



# For humans

Brain evolution  
Intellectual technologies  
Neuroplasticity

# For developer

Encode  
**Abstract**  
Associate

# Added value

For teams  
For users  
For humanity

Common programming paradigms include:<sup>[1][2][3]</sup>

- **imperative** in which the programmer instructs the machine how to change its state,
  - **procedural** which groups instructions into procedures,
  - **object-oriented** which groups instructions together with the part of the state they operate on,
- **declarative** in which the programmer merely declares properties of the desired result, but not how to compute it
  - **functional** in which the desired result is declared as the value of a series of function applications,
  - **logic** in which the desired result is declared as the answer to a question about a system of facts and rules,
  - **mathematical** in which the desired result is declared as the solution of an optimization problem

```
1 # Be more productive
2
3     ````php
4         $a = count([]);
5
6     ````javascript
7         let a = [].length;
8
9     ````twig
10        {{ a|length }}
11
12    ````go
13        a := len([]string{})
14
```

Common programming paradigms include:[1][2][3]

- imperative in which the programmer instructs the machine how to change its state,
- procedural which groups instructions into procedures,
- object-oriented which groups instructions together with the part of the state they operate on,
- declarative in which the programmer merely declares properties of the desired result, but not how to compute it

# Complex

- **Patterns to think easier**  
declared as the value of a series of function applications,
- **logic** in which the desired result is declared as the answer to a question about a system of facts and rules,
- **mathematical** in which the desired result is declared as the solution of an optimization problem

1 # Be more productive

2

3 `` `php

4 \$a = count([]);

5 ...

6 `` `javascript

7 let a = []  
...  
a.length

8 ...

9 `` `swift

10 {{ a.length }}

11 ...

12 `` `go

13 a := len([]string{})

14 ...

# Simple

Characters to observe easier



# For humans

Brain evolution  
Intellectual technologies  
Neuroplasticity

# For developer

Encode  
**Abstract**  
Associate

# Added value

For teams  
For users  
For humanity



# For humans

Brain evolution  
Intellectual technologies  
Neuroplasticity

# For developer

Encode  
Abstract  
**Associate**

# Added value

For teams  
For users  
For humanity

```
docker run -it -v $PWD:/data php:zts-alpine3.11 sh
```

```
/ # nano  
sh: nano: not found
```

```
/ # vim  
sh: vim: not found
```

```
/ # phpstorm
```

```
sh: phpstorm: not found
```

```
/ # bash
```

```
sh: bash: not found
```

```
/ # echo "works"
```

```
works
```

```
/ # # But I know PHP
```

```
/ # # I can (?) still
```

```
/ # # Code in PHP
```

The screenshot shows the PHPStorm IDE interface. The top menu bar includes File, Edit, View, Navigate, Code, Refactor, Run, Tools, VCS, Window, and Help. Below the menu is a breadcrumb navigation path: demo > src > Controller > Admin > BlogController.php. The title bar of the code editor is "BlogController.php". The code editor displays the following PHP code:

```
48     *      * 'admin_index' is a nice shortcut to th  
49     *      to create simpler links in the template  
50     *      could move this annotation to any other  
51     *      the route name and therefore, without  
52     *  
53     * @Route("/", methods="GET", name="admin_index")  
54     * @Route("/{author}", methods="GET", name="admin_posts")  
55     */  
56 class PostRepository extends Doctrine\Bundle\DoctrineBundle\Repository\ServiceEntityRepository {  
57     public function index(PostRepository $posts):  
58         $authorPosts == $posts->findBy(['author'  
59             return $this->render('admin/blog/index');  
60         }  
61     }  
62     /** Creates a new Post entity. ... */  
63     public function new(Request $request): Response  
64     {  
65         $post = new Post();  
66         $form = $this->createForm(PostType::class);  
67         $form->handleRequest($request);  
68         if ($form->isSubmitted() && $form->isValid()) {  
69             $post->setTitle($form->get('title')->getData());  
70             $post->setContent($form->get('content')->getData());  
71             $post->setAuthor($this->getUser());  
72             $post->setCreatedAt(new \DateTime());  
73             $em = $this->getDoctrine()->getManager();  
74             $em->persist($post);  
75             $em->flush();  
76             $this->addFlash('success', 'Post created successfully!');  
77             return $this->redirectToRoute('admin_posts');  
78         }  
79     }  
80 }
```

The code editor features several annotations and highlights: "BlogController.php" is underlined in blue, indicating it's a file reference. The class definition "class PostRepository extends Doctrine\Bundle\DoctrineBundle\Repository\ServiceEntityRepository" is highlighted in yellow. The method "index" is highlighted in blue. The variable "\$authorPosts" is highlighted in red. The route annotations "@Route" are highlighted in green. The code editor also includes standard Java-like syntax highlighting for PHP keywords and punctuation.

```
docker run -it -v $PWD:/data php:zts-alpine3.11 sh
```

```
/ # nano
```

```
sh: nano: not found
```

```
/ # vim
```

```
sh: vim: not found
```

```
/ # phpstorm
```

```
sh: phpstorm: not found
```

```
/ # bash
```

```
In mind compilation  
sh: bash: not found
```

```
/ # echo "works"
```

```
works
```

```
/ # # But I know PHP
```

```
/ # # I can (?) still
```

```
/ # # Code in PHP
```

The screenshot shows the PhpStorm IDE interface with the following details:

- File Menu:** File, Edit, View, Navigate, Code, Refactor, Run, Tools, VCS, Window, Help.
- Current File:** demo > src > Controller > Admin > BlogController.php
- Code Editor:** The file contains PHP code for a controller. It includes annotations like `@Route` and `return $this->render(...)`.
- Toolbars:** Z-Structure, Project, Favorites.
- Side Panels:** Git, Terminal, TODO.
- Status Bar:** App\Controller\Admin > BlogController, Externally added files can be added to Git // View Files // Always Add // Don't Ask Again (12 minutes ago).

The main title of the slide is "From others" and there is a subtitle "Depend on tools/peers to help".



# For humans

Brain evolution  
Intellectual technologies  
Neuroplasticity

# For developer

Encode  
Abstract  
**Associate**

# Added value

For teams  
For users  
For humanity



# For humans

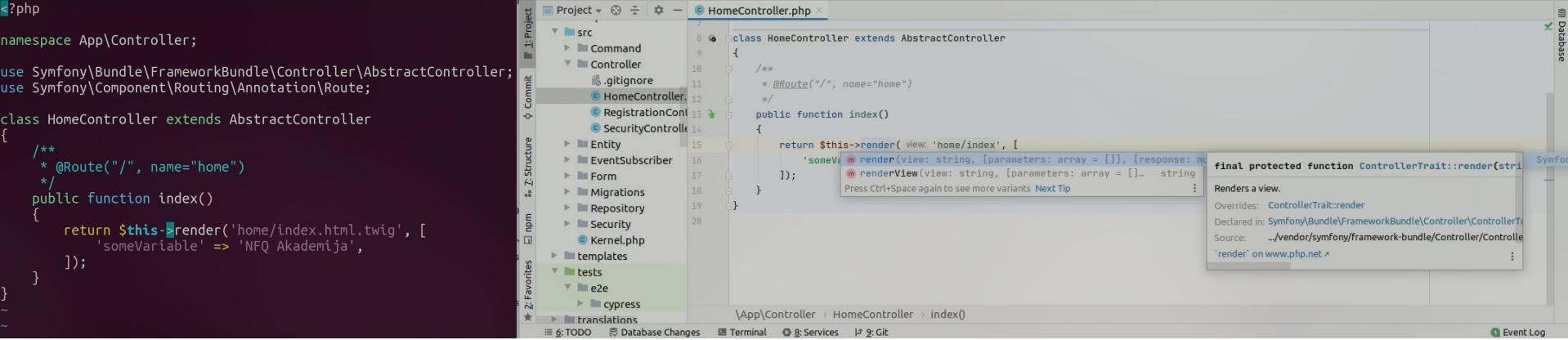
Brain evolution  
Intellectual technologies  
Neuroplasticity

# For developer

Encode  
Abstract  
Associate

# Added value

For teams  
For users  
For humanity



PHP code:

```
<?php  
namespace App\Controller;  
  
use Symfony\Bundle\FrameworkBundle\Controller\AbstractController;  
use Symfony\Component\Routing\Annotation\Route;  
  
class HomeController extends AbstractController  
{  
    /**  
     * @Route("/", name="home")  
     */  
    public function index()  
    {  
        return $this->render('home/index.html.twig', [  
            'someVariable' => 'NFQ Akademija',  
        ]);  
    }  
}
```

IDE interface showing the `render` method being completed:

- Completion dropdown: `final protected function ControllerTrait::render(string $view, array $parameters = [], array $response = null)`
- Description: `Renders a view.`
- Overrides: `ControllerTrait::render`
- Declared in: `Symfony\Bundle\FrameworkBundle\Controller\ControllerTrait`
- Source: `.../vendor/symfony/framework-bundle/Controller/ControllerTrait.php`
- Tip: `Press Ctrl+Space again to see more variants Next Tip`

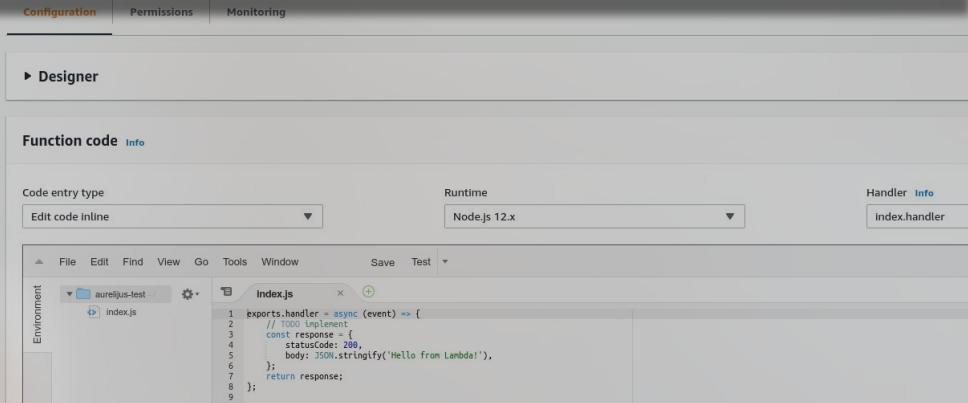


Yesterday 17:16 • Edited •

PS: still would love to have consistent tooling across the teams



|    | K     | L | M | N | O | P | Q | R | S | T | U    | V | W | X | Y |
|----|-------|---|---|---|---|---|---|---|---|---|------|---|---|---|---|
| 14 | Green |   | 6 | 6 | % |   |   |   |   |   |      |   |   |   |   |
| 15 | Green |   | 6 |   |   |   |   |   |   | % | ,90% |   |   |   |   |
| 16 | Green |   | 6 |   |   |   |   |   |   |   |      |   |   |   |   |
| 17 | Green |   |   |   |   |   |   |   |   |   |      |   |   |   |   |
| 18 | Red   |   |   |   |   |   |   |   |   |   |      |   |   |   |   |
| 21 |       |   |   |   |   |   |   |   |   |   |      |   |   |   |   |



Configuration | Permissions | Monitoring

Designer

Function code [Info](#)

Code entry type: Edit code inline Runtime: Node.js 12.x Handler: index.handler

```
1 exports.handler = async (event) => {  
2     //const response = {  
3     //    statusCode: 200,  
4     //    body: JSON.stringify('Hello from Lambda!'),  
5     //};  
6     //return response;  
7 };  
8  
9
```



# For humans

Brain evolution  
Intellectual technologies  
Neuroplasticity

# For developer

Encode  
Abstract  
Associate

# Added value

For teams  
For users  
For humanity



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For humanity

```
$user = (new FTUserBuilder(a: 'abcdef'))  
->bySpeedOfInteraction()  
->build();
```

Category    Description

| Objective      | Make<br>a Smartwatch                         |
|----------------|--|
| Key Result     |  |
| Key Initiative |  |
| Key Result     |  |
| Key Initiative | Creating a self-service A/B testing solution |
| Key Initiative | Create a concept for a business-metric based |

```
if ($client->variation(variation: "your.flag.key", $user)) {
```

*// application code to show the feature*



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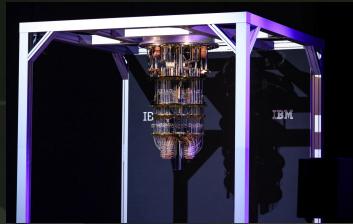
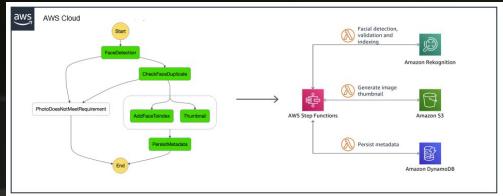
For teams  
For users  
**For humanity**



# AIR FORCE ASSOCIATION



achieve intellectual property protection is by **innovating** fast enough



NEURALINK

Serverless

Quantum supremacy

Brain implants

# Unlearn



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**For humanity**

# **For humans**

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# **For developer**

**Encode  
Abstract  
Associate**

# **Added value**

**For teams  
For users  
For humanity**

# For humans Technologies

For developers  
**and**

Added value  
**thinking**  
For humanity

Brain evolution

Intellectual technologies

Neuroplasticity

Encode

Abstract

Associate

For teams

For users

For humanity

If your mind just bowed,  
I hope it is for the sake of

# Rewiring your brain

(and thinking differently)

If your mind just bowed,  
I hope it is for the sake of

# Rewiring your brain

(and thinking differently)

E.g. more can bring better,  
but limiting can bring different

# Technologies changing how we think

If your mind just bowed,  
I hope it is for the sake of

# Discussion?

(and thinking differently)

E.g. more can bring better,  
but limiting can bring different

Aurelijus Banelis

