

Technology environment report

The report was prepared within the framework of the project "Development of an educational program with tools for digital HRM in VET" benefits from a grant of 174,000.00 EUR received from Iceland, Liechtenstein and Norway under the EEA Funds. The goal is to improve the quality of VET institutions by improving the quality of management and competence of managers and providing tools for remote management of educational systems, resources, including competence development in accordance with EQVET requirements.

Business and IT challenges facing education

1

Automation of management processes in education:

- How to use IT tools to automate education management processes?
- What are the advantages and limitations of using systems to manage education?
- What are the implications for education workers ?

2

Employee Data Management:

- How to effectively manage employees' personal data as required by data protection regulations (e.g., RODO/GDPR).
- What IT tools and systems can help collect, store and manage employee data?

3

E-learning and online training:

- How to use e-learning technologies to train employees?
- What are the advantages and challenges of implementing e-learning platforms in education?
- How to evaluate the effectiveness of online training and monitor the progress of participants?

4

Data analysis and reporting:

- What analytical tools can help you analyze data and draw conclusions?
- What are the best practices for report writing and data visualization in education?
- How to use data to make decisions and optimize HR processes?

Business and IT challenges facing education

5

Performance management and employee development:

- What are the best practices for monitoring employee performance and evaluation through information systems?
- How to ensure fair and effective employee evaluations using HR tools?

6

Talent Management:

- What tools and systems can help identify, recruit and develop talent in education?
- What are the strategies related to employee retention and engagement building that can be implemented through information technology?

7

Time and Attendance Management:

- What systems can be used to monitor employee time and attendance?
- How to effectively manage flexible work arrangements and remote workers using IT tools?

8

Cyber Security in Education:

- What are the risks associated with cyber security in the education field?
- What measures do you take to secure the personal data of employees and candidates?

What does a computer scientist and IT specialist do?

The role of an IT specialist can vary widely and depends mainly on the specific area of specialization, the type of company and the needs of the organization. In general, IT specialists deal with a wide range of tasks related to information technology. Here are some of the main areas that IT specialists can deal with

Software development:

- Software design, programming and testing.
- Development of web, mobile, desktop applications and embedded systems.
- Maintaining and updating existing applications.

Computer systems administration:

- Installation, configuration and management of operating systems (e.g. Windows, Linux, macOS).
- Management of computer networks, servers and IT infrastructure.
- Monitoring system performance and security.

Technical support and helpdesk:

- Provide technical assistance to end users in resolving software and hardware problems.
 - Installation and configuration of software and devices.
-

What does a computer scientist and IT specialist do?

IT Security:

- Ensure protection of systems, networks and data from cyber threats.
- Detecting and responding to hacking attacks and security incidents.
- Implementing security policies, security audits and employee training.

Databases:

- Design, development and management of databases.
- Database and query performance optimization.
- Backup and restore data.

Data analytics:

- Analyze and interpret data to detect trends, forecast and make business decisions.
- Create reports and data visualizations.
- Implementation and maintenance of analytical tools.

Software Engineering:

- Project management, implementation of software development methodologies and processes.
- Procedural vs. object-oriented programming

- Containerization and why is it so popular?
- Linux servers and administration
- Development tools
- Administrative tools
- How was the SmartManager programming, interesting cases and features?

Popular programming languages

JavaScript/Typescript/Node.js

1

- It is widely used to create interactive websites and web applications.
- It has grown in popularity thanks to frameworks such as React.js, Angular.js and Vue.js.
- TypeScript Is an extension to JavaScript that adds static typing and other new features.
 - A tool to increase code quality and readability.

Java

3

- It is used to develop desktop applications, mobile applications, web services and in the financial industry.
- The language is also popular in corporations because of its reliability and scalability.

Python

2

- It is gaining popularity because of its readability and simplicity, making it an ideal language for learning and rapid prototyping.
- It is used in fields such as data analysis, artificial intelligence, machine learning, biomedical data analysis, web development and many others.

PHP

4

- It is widely used in the development of websites and dedicated web applications, especially in combination with MySQL/MariaDB database.
- PHP's popularity has grown thanks to popular frameworks such as Symfony, Laravel.
- Nearly 80 percent of the pages are written in this language.

Popular programming languages

5

C#

- It was created by Microsoft and is mainly used to develop applications for the Windows platform and games in the Unity engine.
- It has many similarities to Java and is relatively easy to learn for programmers with experience in other C family languages.

6

C++

- It is used to develop system applications, computer games, game engines, real-time applications and embedded software.
- The language is more advanced and efficient than many others, but can be difficult for novice programmers.

7

RUST

- A modern programming language created by Mozilla Research that aims to provide performance, security and parallelism while minimizing the risk of code errors.

8

SQL

- A database query language used to manage, manipulate and process data in relational databases.
- Essential for any programmer or data analyst working with databases.

Open source vs. Closed source

Open source (open source) and closed code tools have their own advantages and disadvantages, and the choice between them depends on the specific needs and preferences of the user.

Open Source

Advantages

1. Source code availability: Users have access to the software's source code, allowing them to understand how it works, modify it, and customize it.
2. Community and support: Open source software often enjoys the support of a large community of developers and users, which means you can count on a quick response to bugs, updates and new features.
3. No licensing costs: Open source software is often provided free of charge, which can save money compared to commercial software licenses.
4. Flexibility and customization: Users have the ability to adapt and modify the software to their individual needs and requirements.
5. Greater transparency and security: The availability of source code allows the community to audit security, which can help detect and fix bugs and increase confidence in the software.

Disadvantages

1. Lack of technical support: Despite the existence of a support community, the lack of official technical support can be a problem for some companies and organizations.
2. Lack of warranty: The lack of warranty and liability from the software vendor can be a problem for some users, especially for business-critical systems.

Closed Source

Advantages

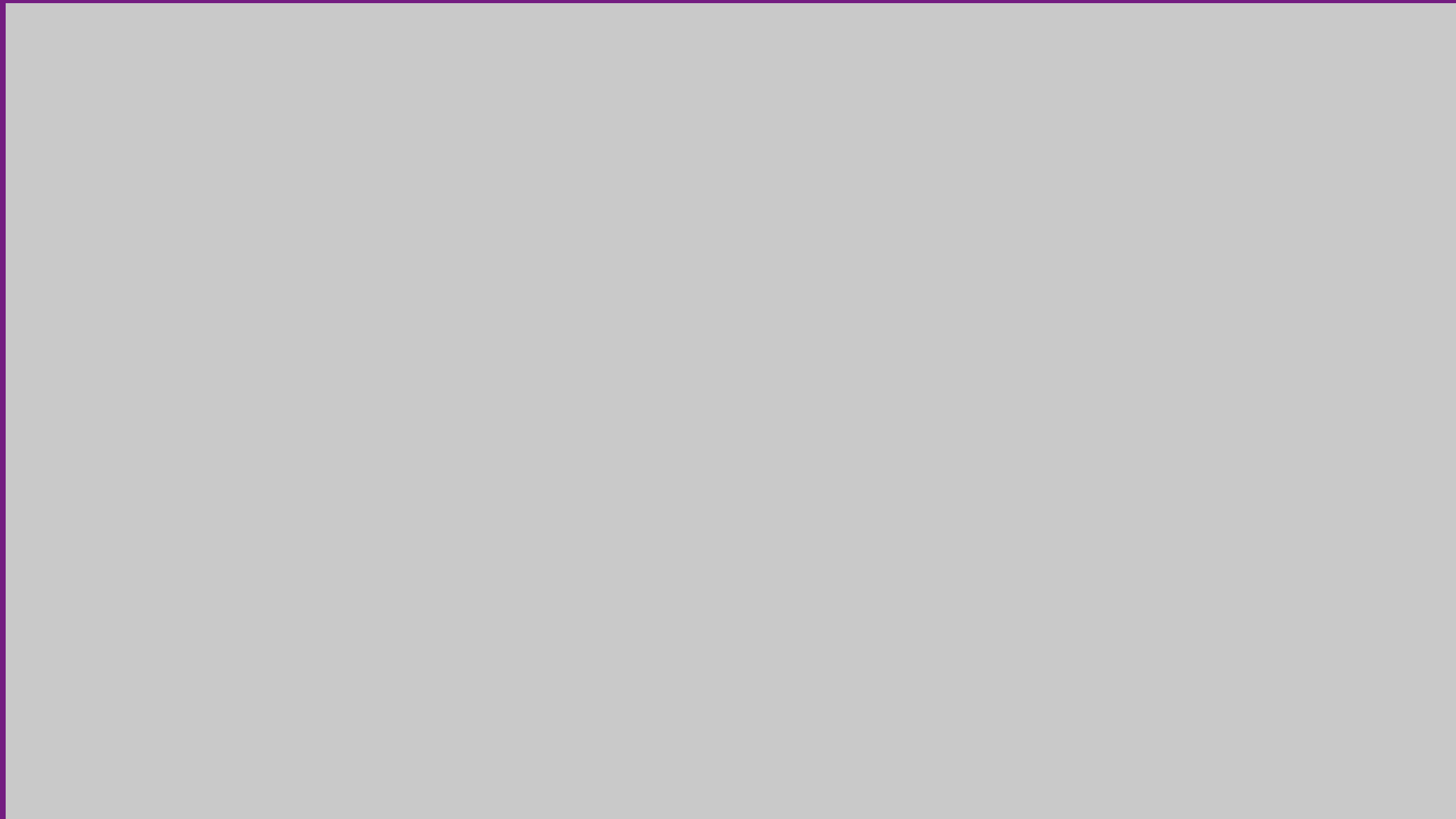
1. **Technical support:** closed-code software providers often offer technical support, which is useful for companies and organizations that require quick and professional solutions to problems.
2. **Stability and reliability:** Closed-code software can often be more stable and reliable than open source, due to the vendor's tight control over its development and quality.
3. **Ease of deployment:** Closed-code software vendors often offer easy deployment and installation, which is useful for users who are looking for quick solutions.

Disadvantages

1. **License costs:** Closed-code software typically requires the purchase of licenses, which can generate additional costs for companies and organizations.
2. **Lack of flexibility and customization:** Users do not have the ability to modify the source code or customize the software to suit their individual needs.
3. **Vendor dependency:** Users are dependent on the software vendor, which can lead to problems with upgrades, technical support, and termination of support for older software versions.



DrupalTM



DO SOMETHING AMAZING FOR EVERYONE

Drupal is a content management software. It is used to create web applications. The standard installation of the system provides a multitude of features, such as easy content creation, reliable performance and excellent security. But what sets it apart is its flexibility; modularity is one of its core principles. Its tools help create the comprehensive, structured content needed for dynamically changing web requirements.

It is also an excellent choice for creating integrated digital platforms. Drupal can be extended with many modules that extend Drupal's functionality. It is possible to integrate Drupal with external services and other applications in the company's infrastructure. No other content management software is as powerful and scalable.

The Drupal project is open source software. Anyone can download it, use it, work on it and share it with others.

WHY DRUPAL?

- Effective content creation tools
- Security-oriented
- Multiplicity of modules
- Oriented towards people with disabilities
- Multilingual
- Flexible architecture
- Ability to integrate with other systems
- Open source project

The latest version of Drupal, 10, is the most powerful and accessible version to date.

WHAT MAKES DRUPAL A RELIABLE SOLUTION?

- Drupal is a platform used by many government agencies in the United States, London, France and many other countries to communicate with citizens.
- It's a platform that media companies such as the BBC, NBC and MTV UK rely on to inform and entertain the world.

This is part of an effort by organizations and universities, such as Amnesty International and Oxford University, to make the world a better place.

Drupal supports the business and innovation of such well-known brands as:
TESLA, NBA, Pfizer, NOKIA, Kinder.
KGHM, LINK4, InPost, patient.gov.pl, Leviathan and many others....

Security is the foundation

Critical sites and applications choose Drupal, testing its security to the most rigorous standards. Banking, governments, public administration and healthcare are the fastest growing industries implementing Drupal, primarily because of its rigorous security.

The European Commission program funds the development of Drupal as a return investment in its entities, where Drupal is also widely used.

Drupal security provides:

- User access control
- Database encryption
- Automatic updates and core verification work in collaboration with GitHub
- Prevention of malicious data entry
- Mitigating denial of service (DoS) attacks.



Drupal is open source

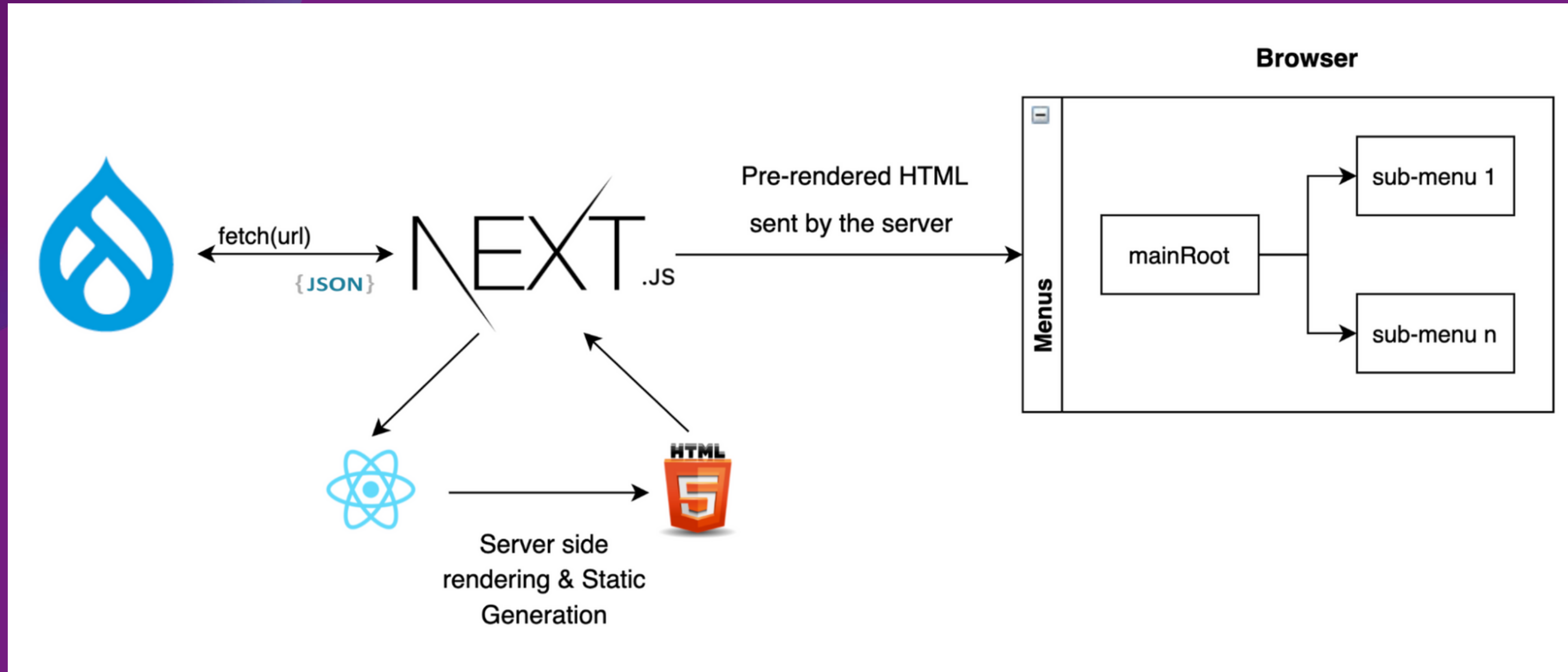
As an open source project, Drupal has the advantage of control, maintenance and ongoing input from developers around the world, as well as a dedicated team of security experts who consistently collaborate to develop and release security patches.

The commitment of more than 1,000,000 developers worldwide - including a large ecosystem of professional service providers - has resulted in one of the most secure and stable platforms on the market.

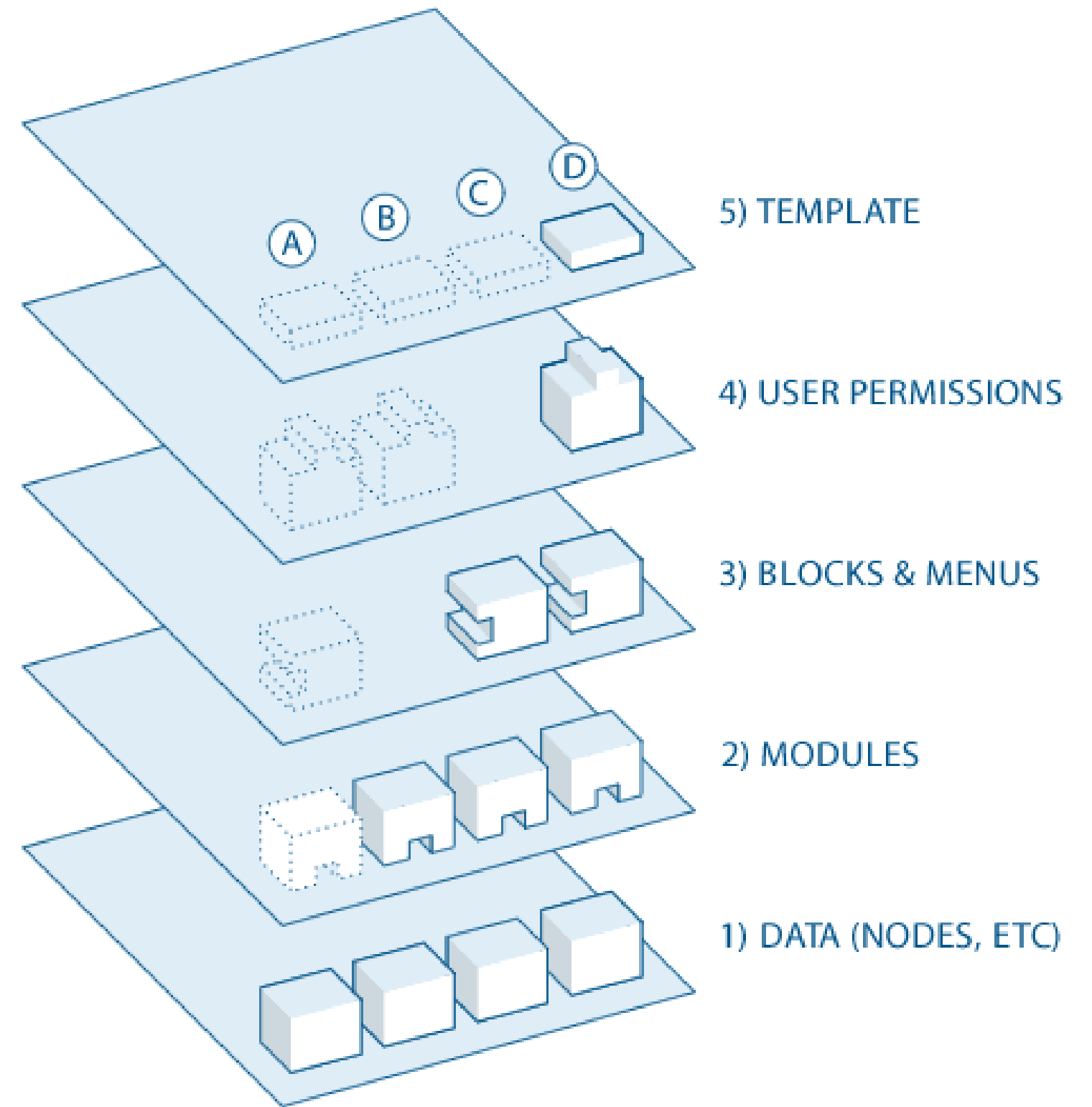
Drupal is resilient to critical Internet security vulnerabilities - as evidenced by the dedicated security team's more than 15 years of experience in identifying and mitigating potential vulnerabilities.



Drupal

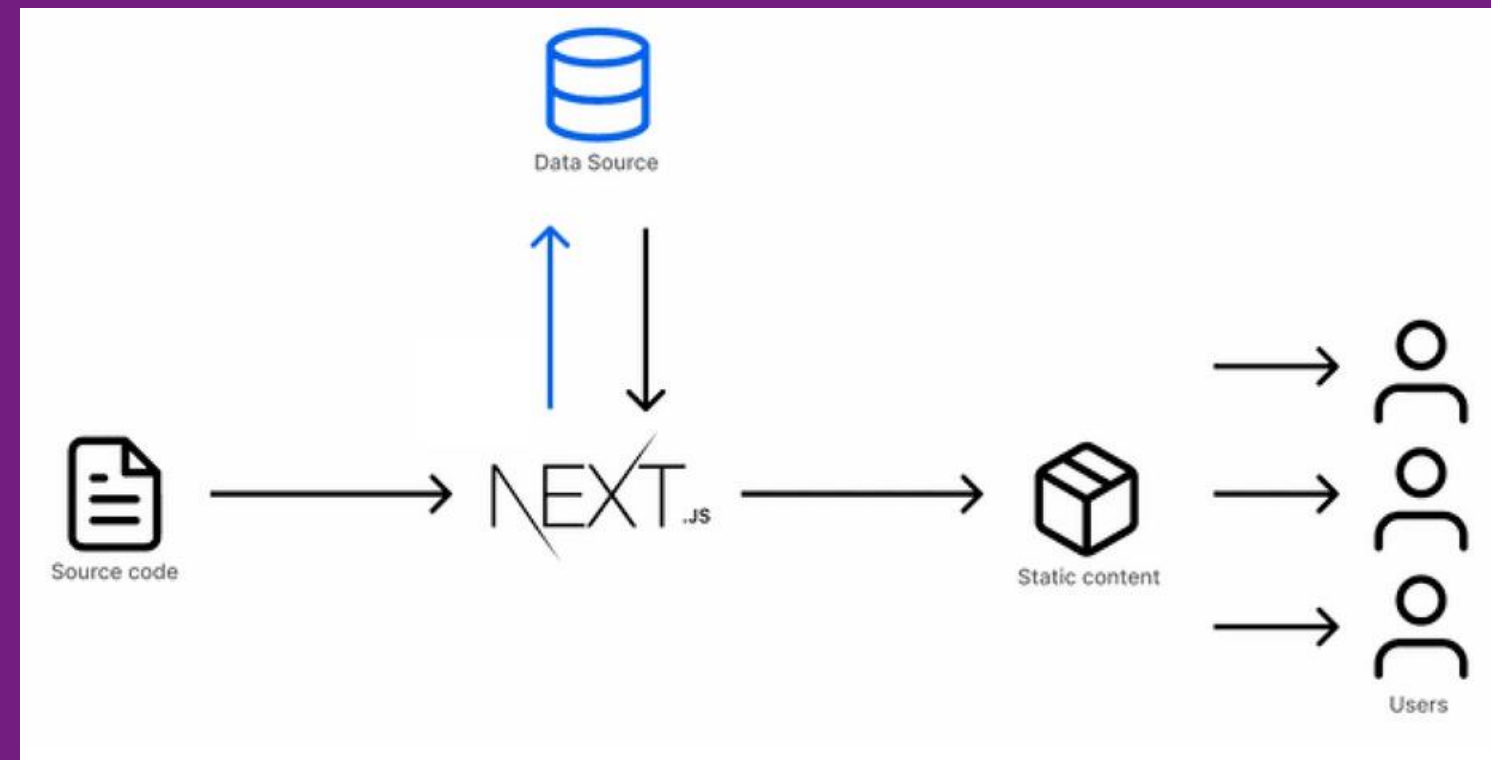


Drupal



Drupal

data flow on the frontend side (Next.js)

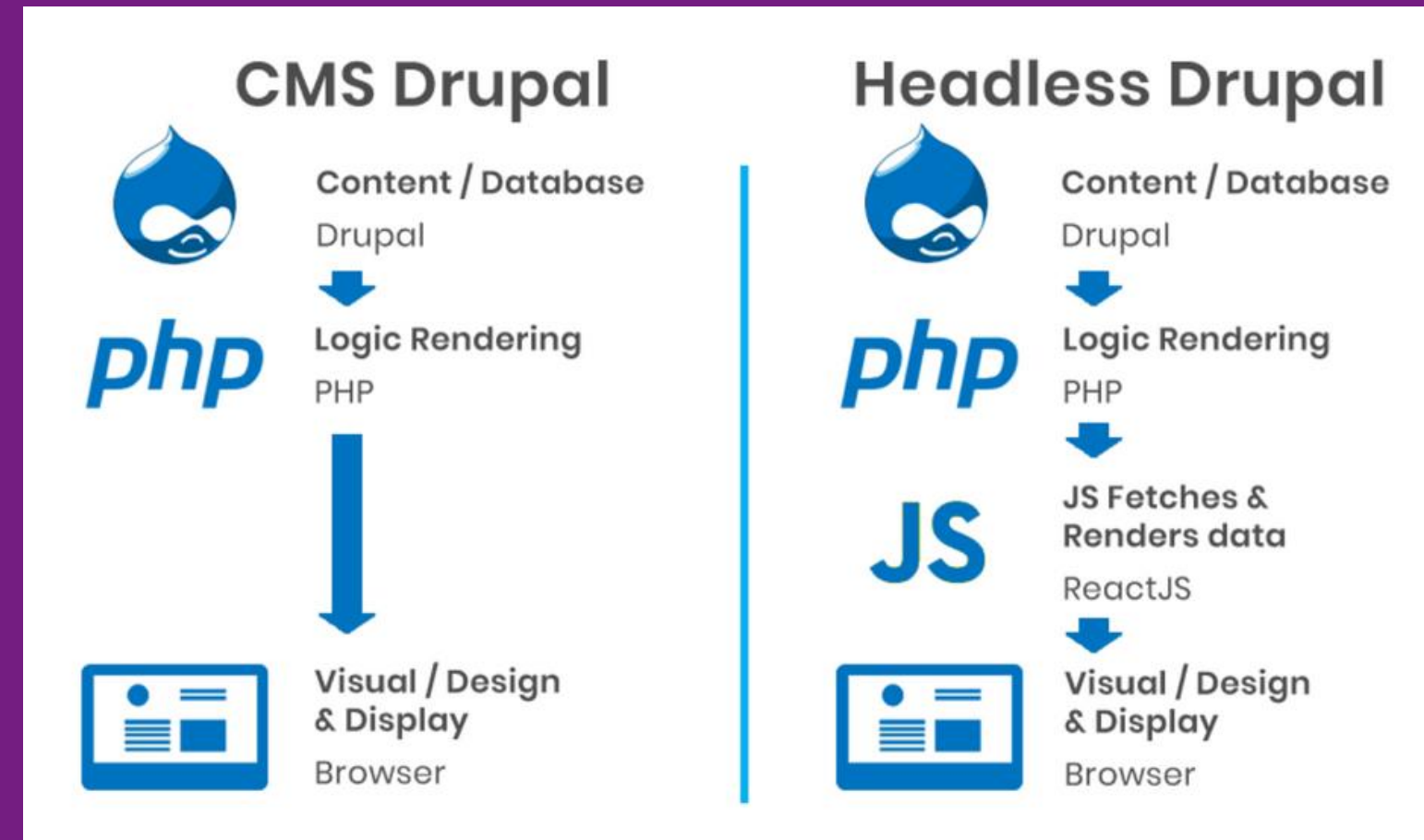


Monolithic vs. Headless

Monolithic – a traditional approach to building web applications. In this architecture, all components of the application are tightly coupled and work together as one application. Front-end, back-end, database and other services are part of the same application, talking to each other directly, without any abstraction layer.

Headless (Decoupled) – the front-end is completely separated from the back-end. The front-end communicates with the back-end via APIs, but can also communicate with third-party services.

Monolithic vs. Headless



Monolithic vs. Headless

Monolithic

Pros:

- Simple architecture
- Less dependence

Minuses:

- Hard to scale
- All elements are closely interconnected
- Difficulty in improving individual components
- Limited flexibility

Headless

Pros:

- Most flexible
- The most scalable
- Separation of responsibilities
- Easy integration with 3rd party
- No rendering process during application bootstrap

Minuses:

- The most complex
- Most dependencies

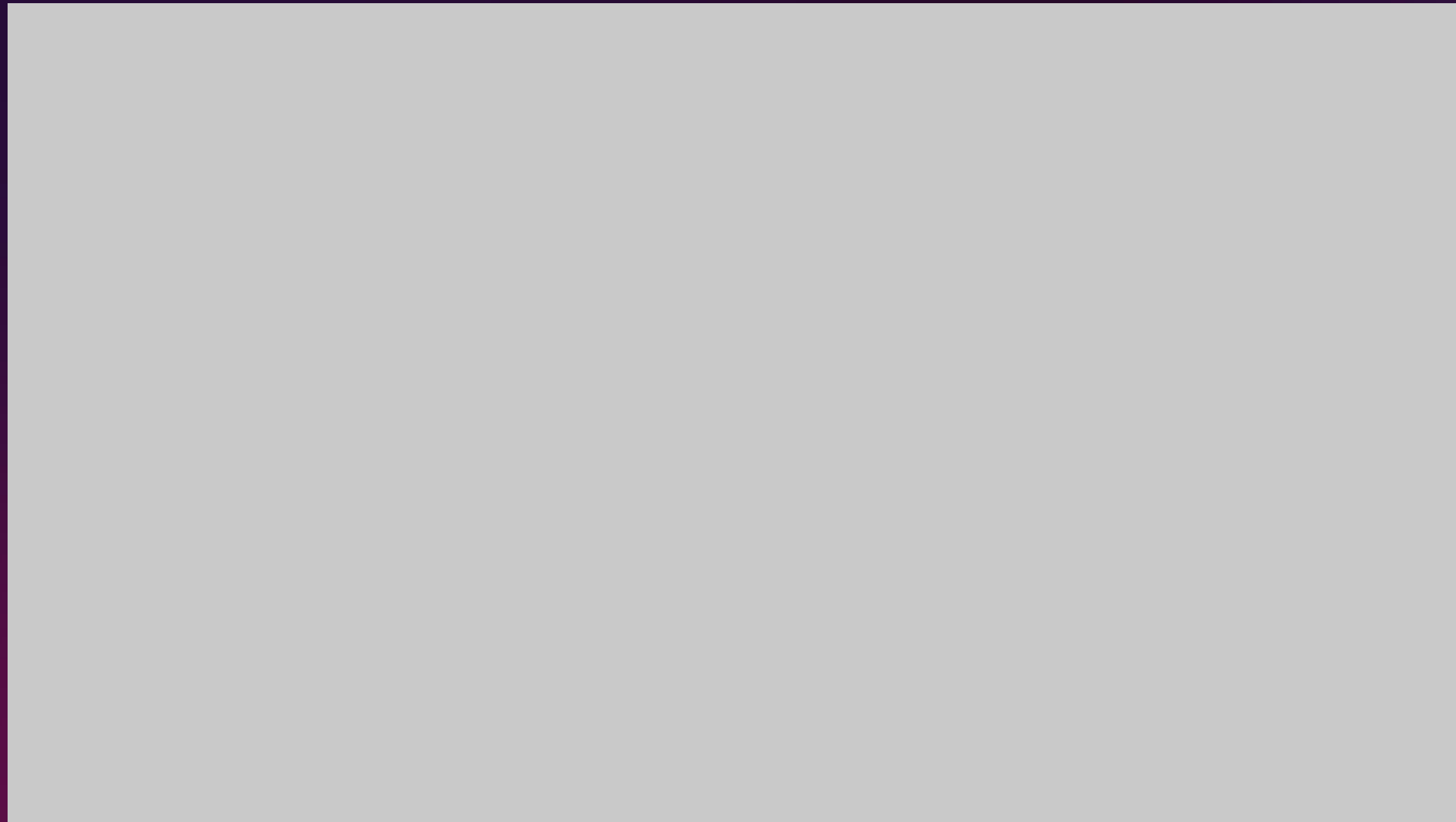
Communication is key

Drupal's path to Headless (API-First Initiative)

Integrate with other systems, use your content anywhere, display it the way you want.

Creating Drupal's API in the first place means making the power and flexibility of Drupal that we love available through HTTP protocol APIs. In this way, Drupal will be able to power ambitious applications of all kinds using the latest frontend frameworks such as React, Vue and Angular.

Cyber(in)security



Cyber(in)security

1

Computer security basics:

- The importance of computer security and data protection.
- Recognizing online threats such as malware, phishing, ransomware attacks, etc.

2

Security of passwords and user accounts:

- Create strong passwords and store them securely.
- Using two-step authentication to enhance protection of online accounts.

3

Antivirus and firewall software:

- Installation and configuration of antivirus software.
- Using a firewall to control network traffic and secure the system.

4

System updates and patches:

- The importance of regular software and operating system updates.
- Automate the update process to ensure the latest security patches.

Cyber(in)security

5

Securing wireless networks:

- Configure a strong password for Wi-Fi networks.
- Set network access restrictions and MAC address filtering.

6

Safe use of the Internet:

- Recognizing suspicious websites and emails.
- Avoid sharing sensitive personal information online.

7

Data Backup:

- Make regular backups of data to external media or the cloud.
- Planning a disaster recovery or attack strategy.

8

Recognizing security attacks and incidents:

- Symptoms and symptoms of malware attacks.
- How to respond to suspicious activity in the system or on devices.

Cyber(in)security

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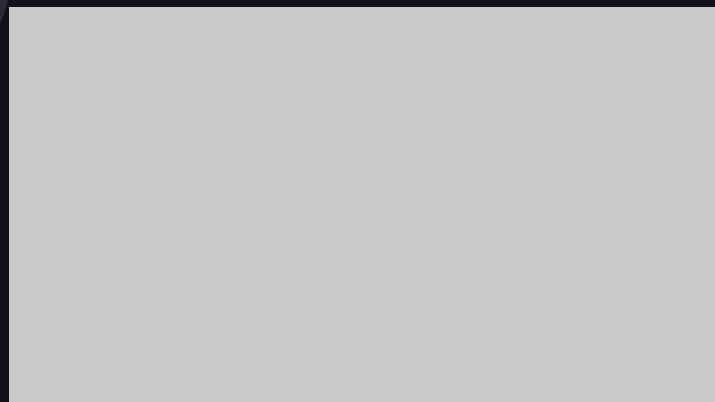
Law and safety rules:

- Knowledge of basic data protection regulations such as RODO (GDPR) in Europe.
- Ethical principles in the use of security tools and techniques.

11

U2F (dongle)

<https://www.youtube.com/watch?v=ZrOPffkN09w>



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Continuing Education:

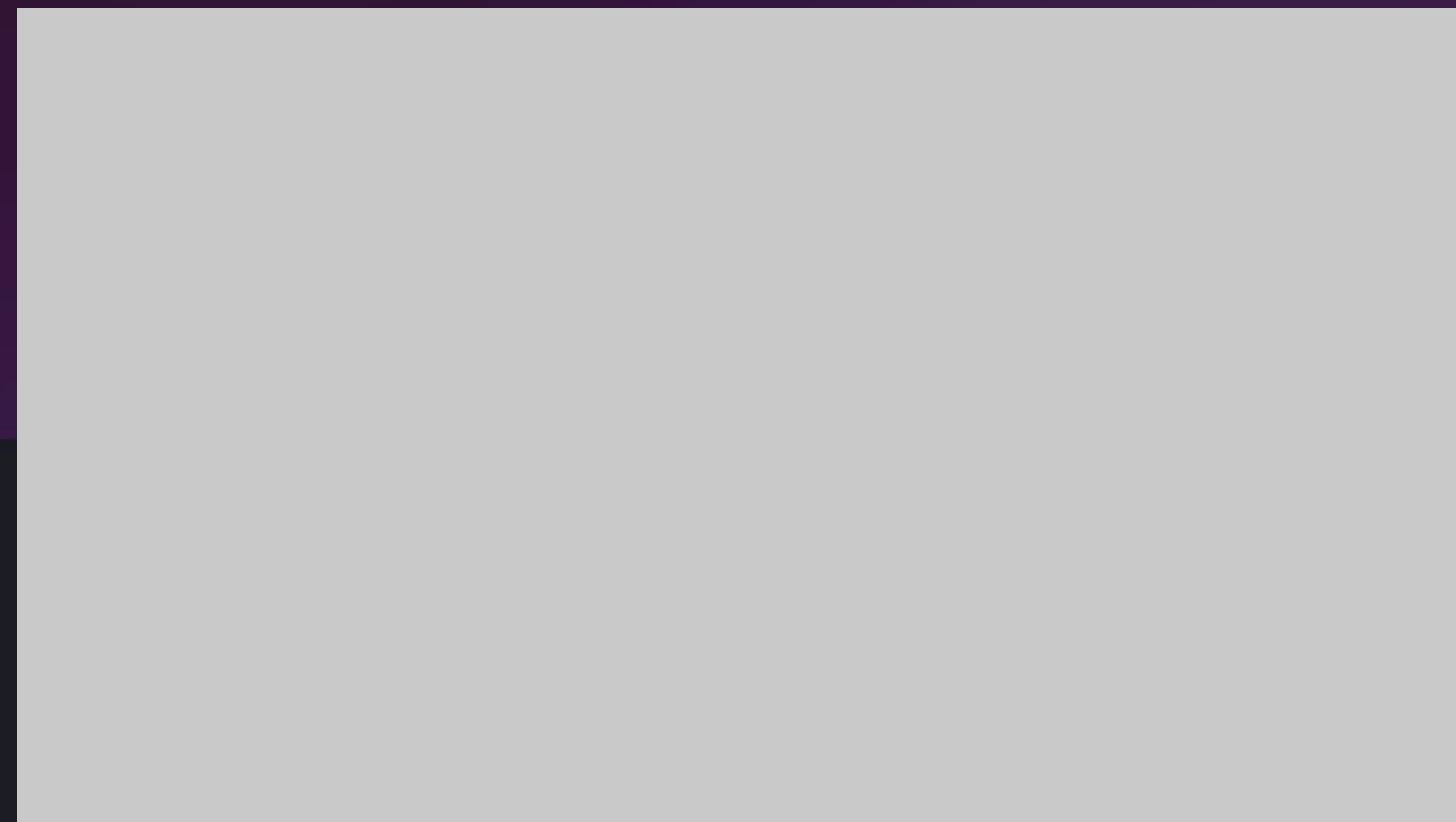
- Keeping abreast of cyber security news by reading articles, attending webinars, online courses, etc.

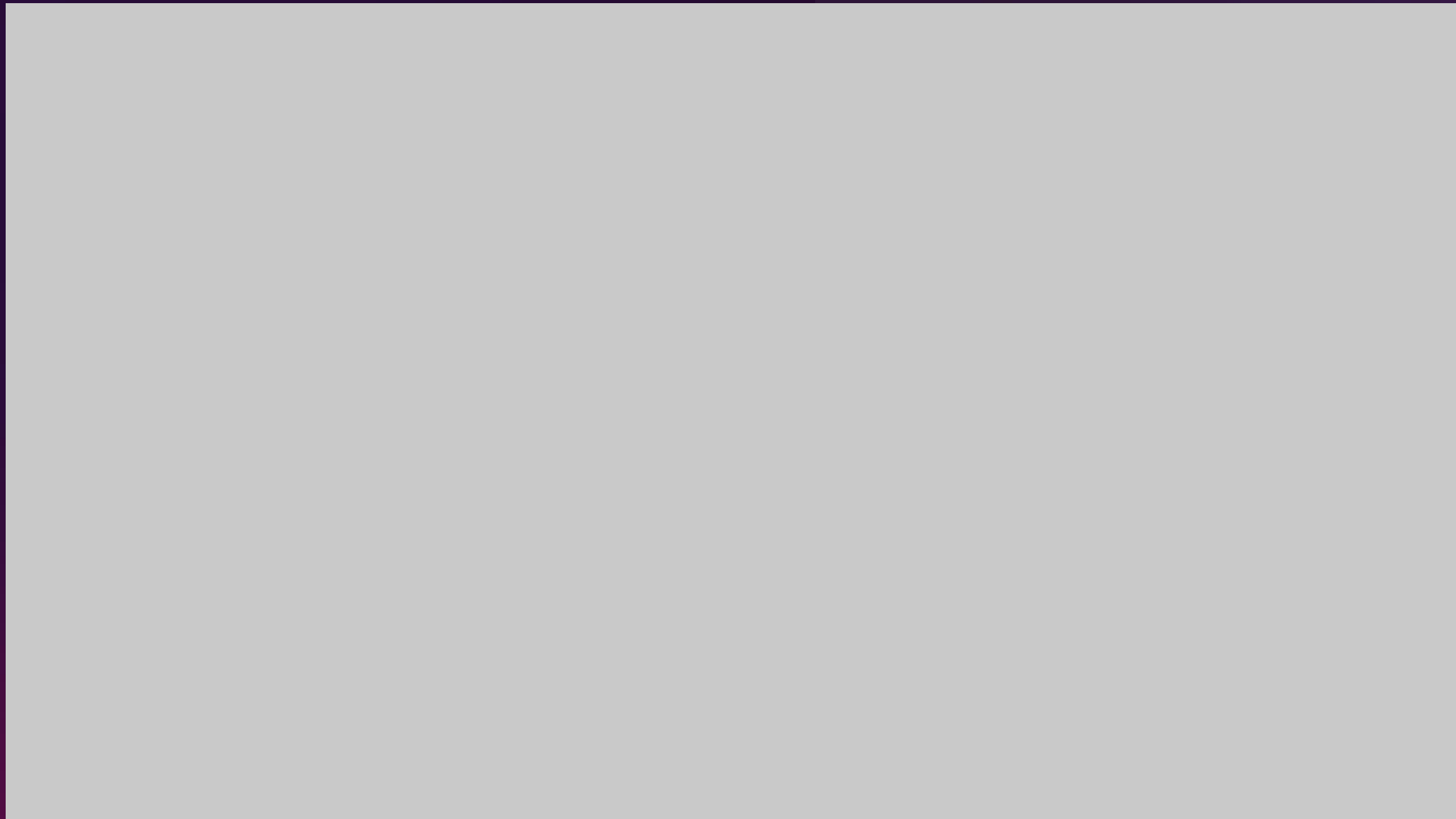
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- Password managers
- Disk encryption
- Internet surfing safety
- 2FA
- VPN/SSH

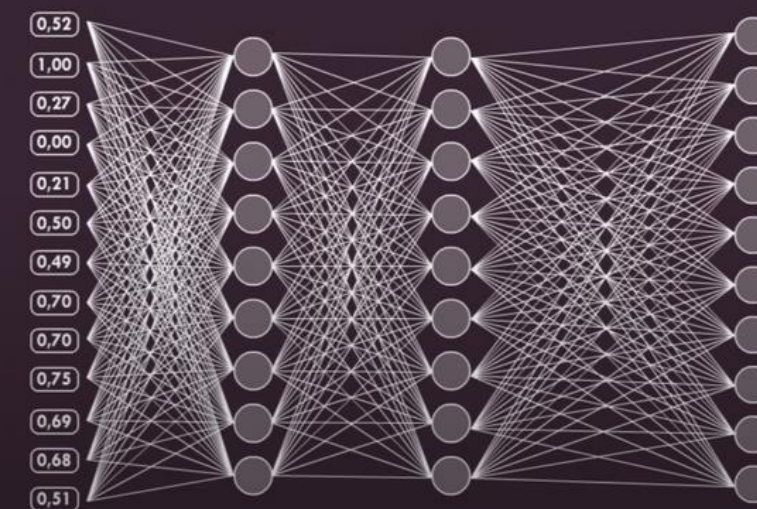
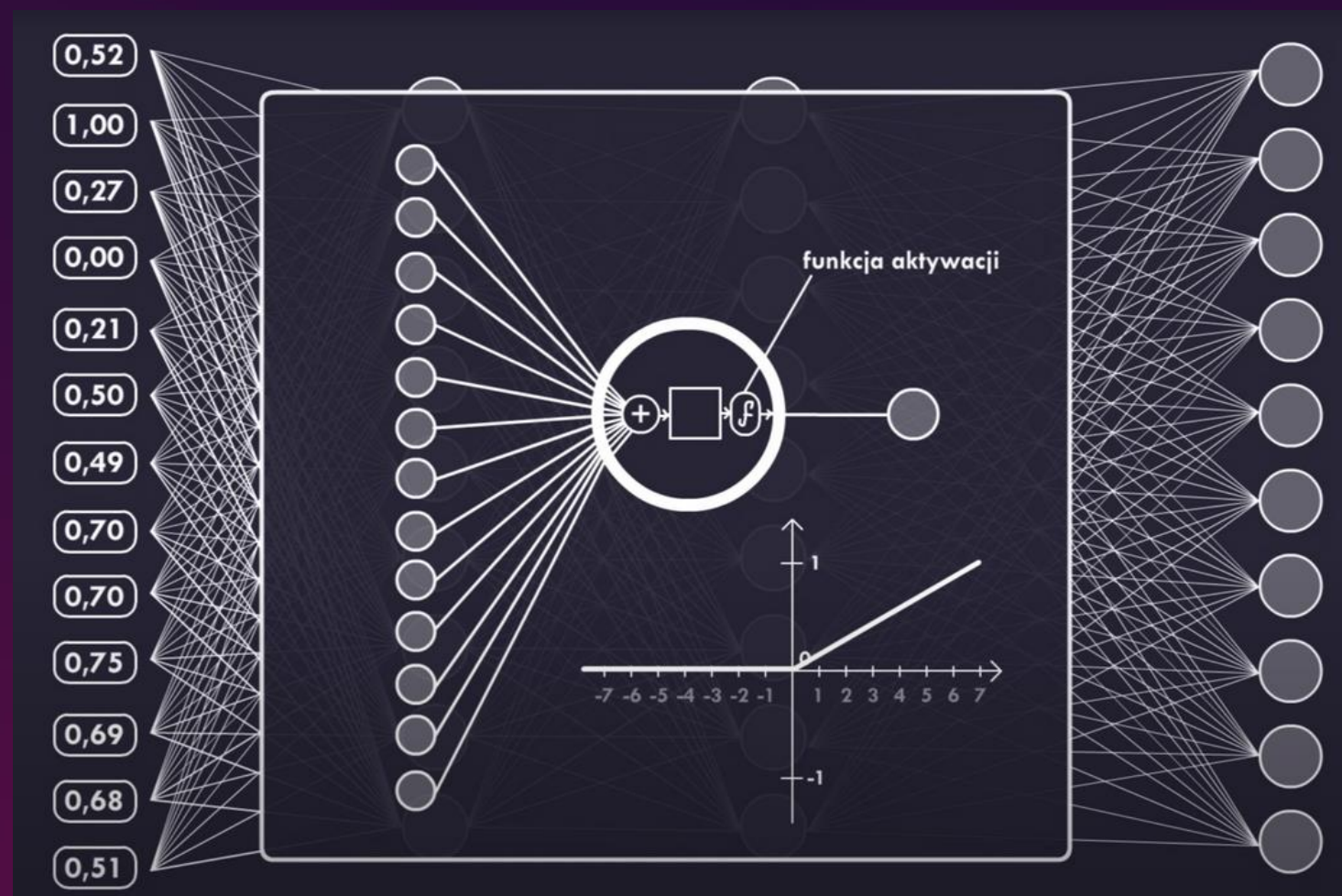
AI, what is it based
on?

AI, what is it based
on?





uczenie głębokie deep learning





$$\begin{array}{r} 100\ 000\ 000\ 000 \\ \times \quad \quad \quad 10\ 000 \\ \hline \end{array}$$

1 000 000 000 000 000
połączeń nerwowych

≈ 1 000 000 000 GB
(licząc 1kB na 1 połączenie)

(1 komputer ma dysk ok 1000 GB)

RECOMMENDATIONS:

- We recommend the development of educational tools using open source tools, due to the openness of the code and the possibility of easy development by individual users,
- We recommend placing great emphasis on cyber security solutions and concern for ongoing updates, assurance, SSL tokens and other solutions to protect against unauthorized access, etc.,
- We recommend caution in the use of AI. It is developing rapidly Chat 3.5 is announced, but there is a lack of regulation of data use and access by unauthorized persons. The use of specialized solutions that are not widely used remains to be considered.
- A review of available tools (Excel Table) shows that they are not welded to the needs of education and include partial automation of some HR processes . In addition, they are often built on closed code, meaning they prevent open access and development.

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