Node Essentials

The State of Node for the Enterprise

NODESOURCE®

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https://nodesource.com/resources/whitepapers/nodesource-stateofnode.pdf

Scope

- JavaScript on the Server
- Asynchronous Programming
- Module-driven Development
- Small Core, Vibrant Ecosystem
- The ‘Frontend Backend’

JavaScript on the Server

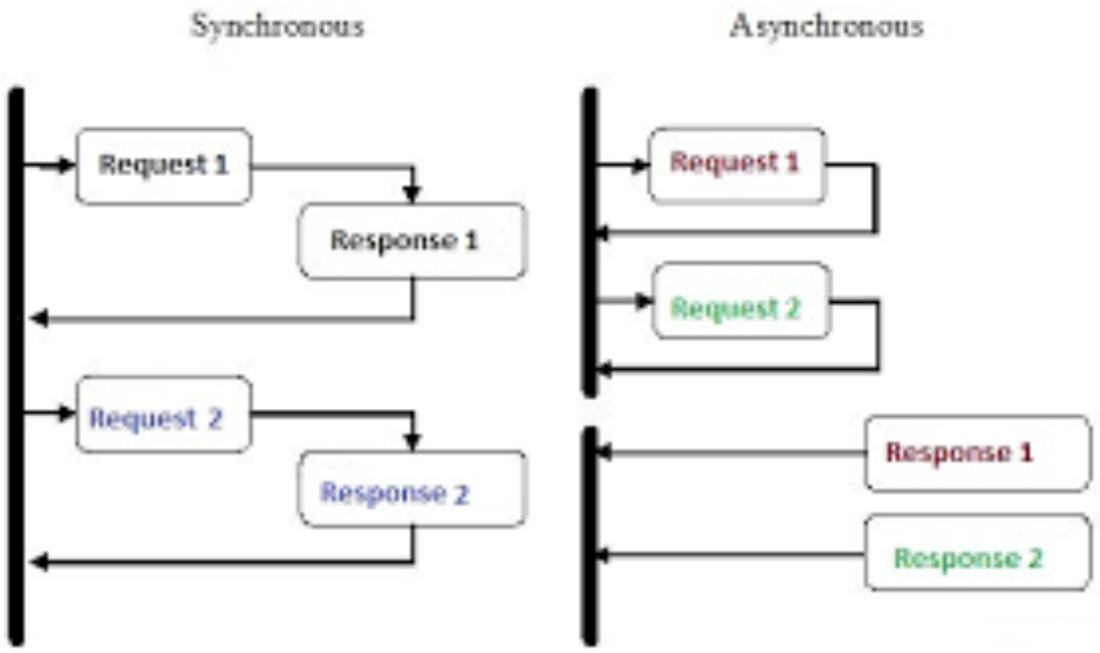
- Large JavaScript developer community already building sophisticated web applications.

- JavaScript consistently ranks among the most popular languages. JavaScript seen as approachable (“Developer joy”)

- JavaScript on the server with Node further establishes it as the language of the web.

- Its new uses on the server are helping to shape the future of the language itself.

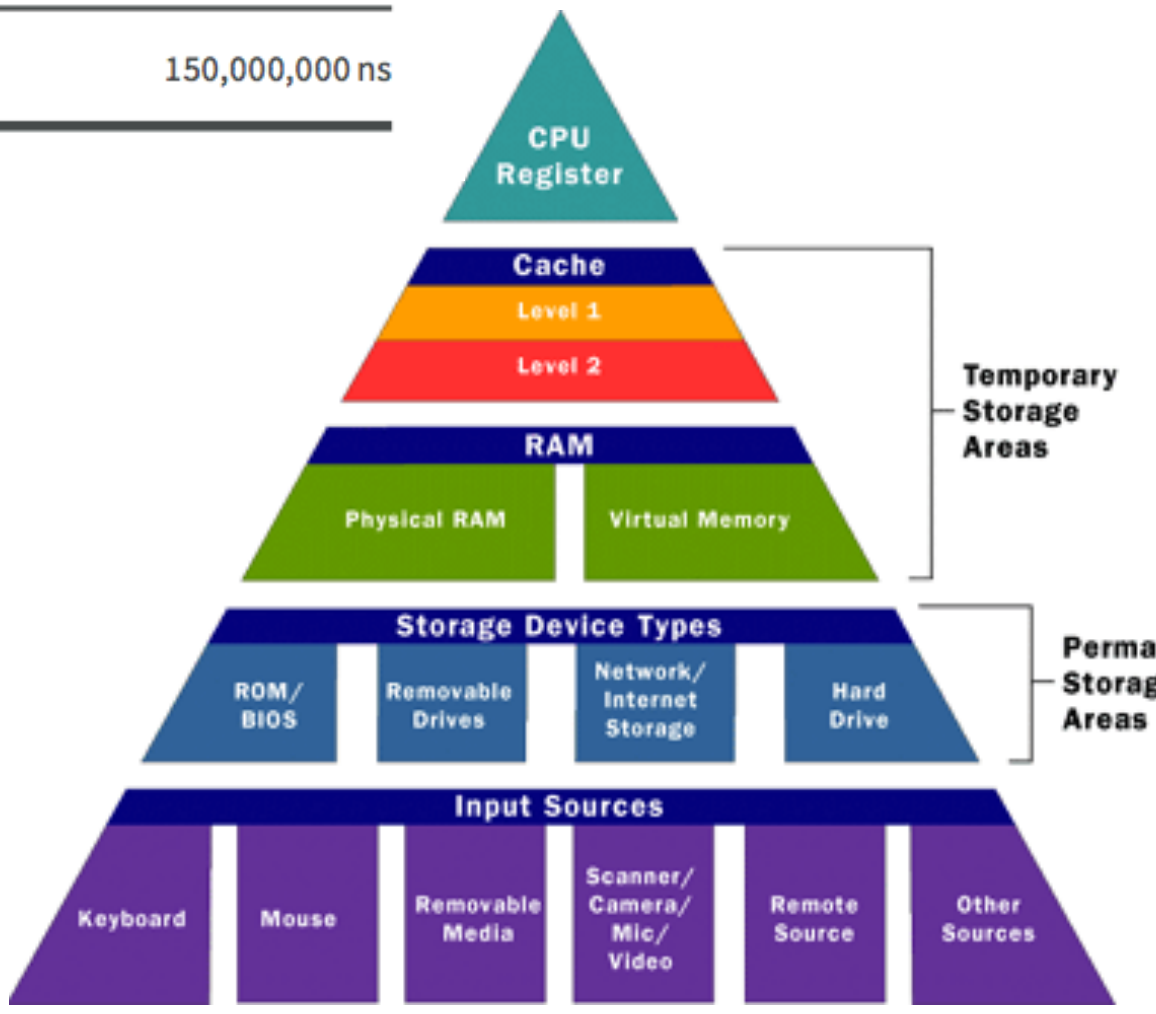
Asynchronous Programming I



- JavaScript was designed for the web and the browser, where nothing is synchronous.
- Asynchronous JavaScript programs can perform many complex, parallel tasks in the browser.
- Node takes asynchronicity to the extreme on the server, making it the perfect choice for I/O-heavy and highly concurrent applications.
- Applications built with Node are built for predictable scalability - design patterns adopted within Node programmes confer robust scalability without the overhead required by complicated synchronization mechanisms

I/O Is Expensive

CLASS	OPERATION	TIME COST
MEMORY	L1 Cache Reference	1ns
	L2 Cache Reference	4ns
	Main Memory Reference	100 ns
I/O	SSD Random Read	16,000 ns
	Round-trip in Same Datacenter	500,000 ns
	Physical Disk Seek	4,000,000 ns
	Round-trip from AU to US	150,000,000 ns

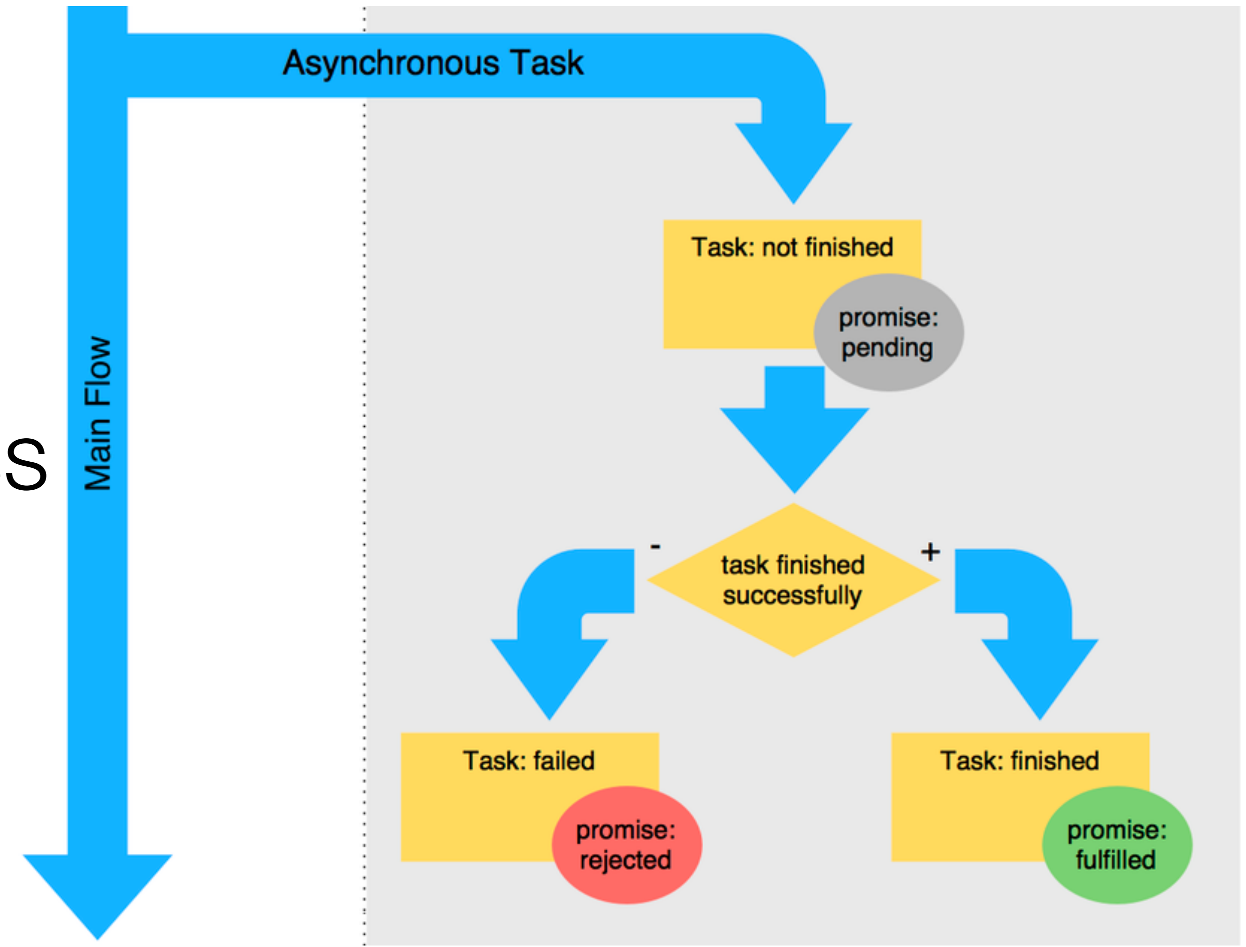


Asynchronous Programming II

- Node requires developers to embrace a different mindset in the form of asynchronous programming

- By treating I/O as a special class of operation, developers must design highly performant applications by default.

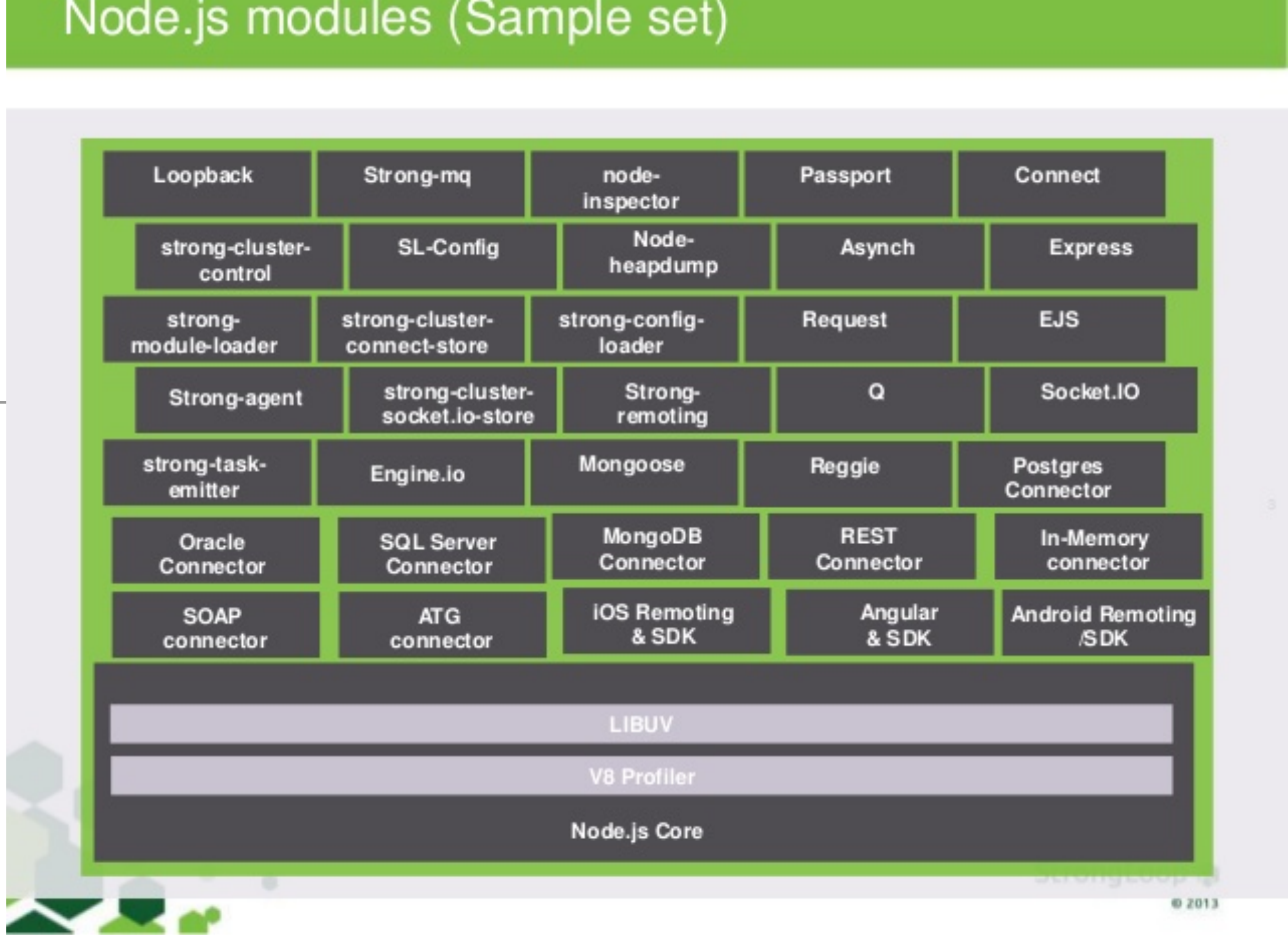
- Node is single-threaded by nature, which is embraced as a part of the application design.



Module-driven Development I

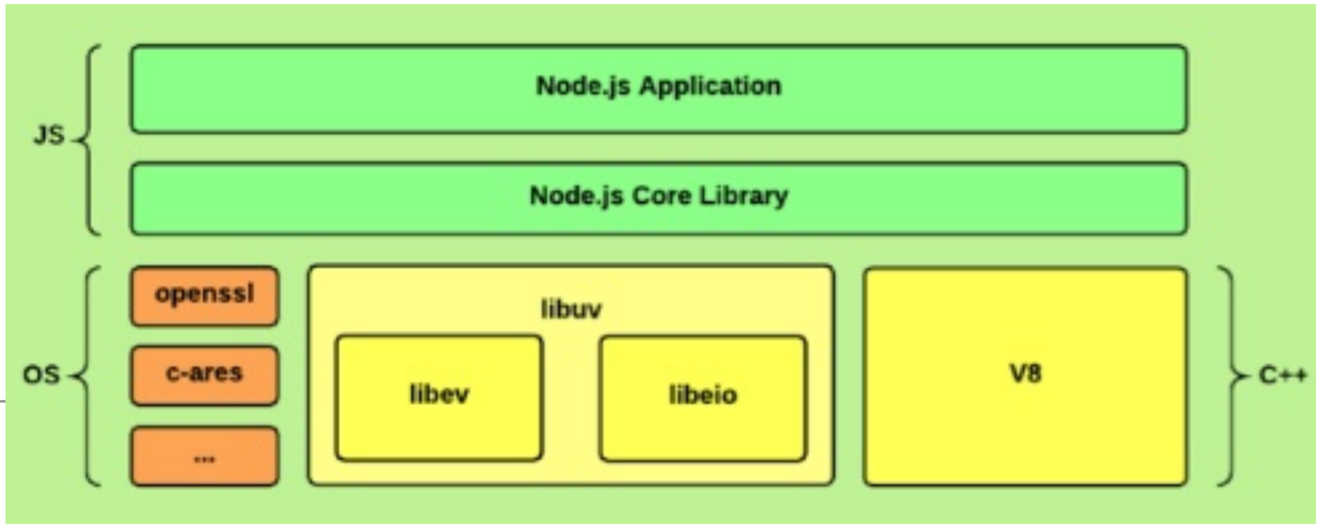
- Node is modular by nature.
- Node embraces a practice of “Throw-awayability” becoming pervasive in the services oriented software design world - i.e. encourage developers to think in terms of creating small services that can be easily replaced or updated when necessary.
- By adopting a module-driven approach, Node developers can deconstruct the functionality of large monolithic applications and redesign them as a series of Node modules, bundled together to form a collection of services.
- This establishes an elegant simplicity in building scalable application functionality that improves both business and developer agility and leads to greater code-reuse.

Module-driven Development



- Having development teams focusing on developing modules enables them to:
    - Maintain focus on essential functionality
    - Better test, validate and document that functionality
    - More easily share and collaborate with other teams

Small Core, Vibrant Ecosystem

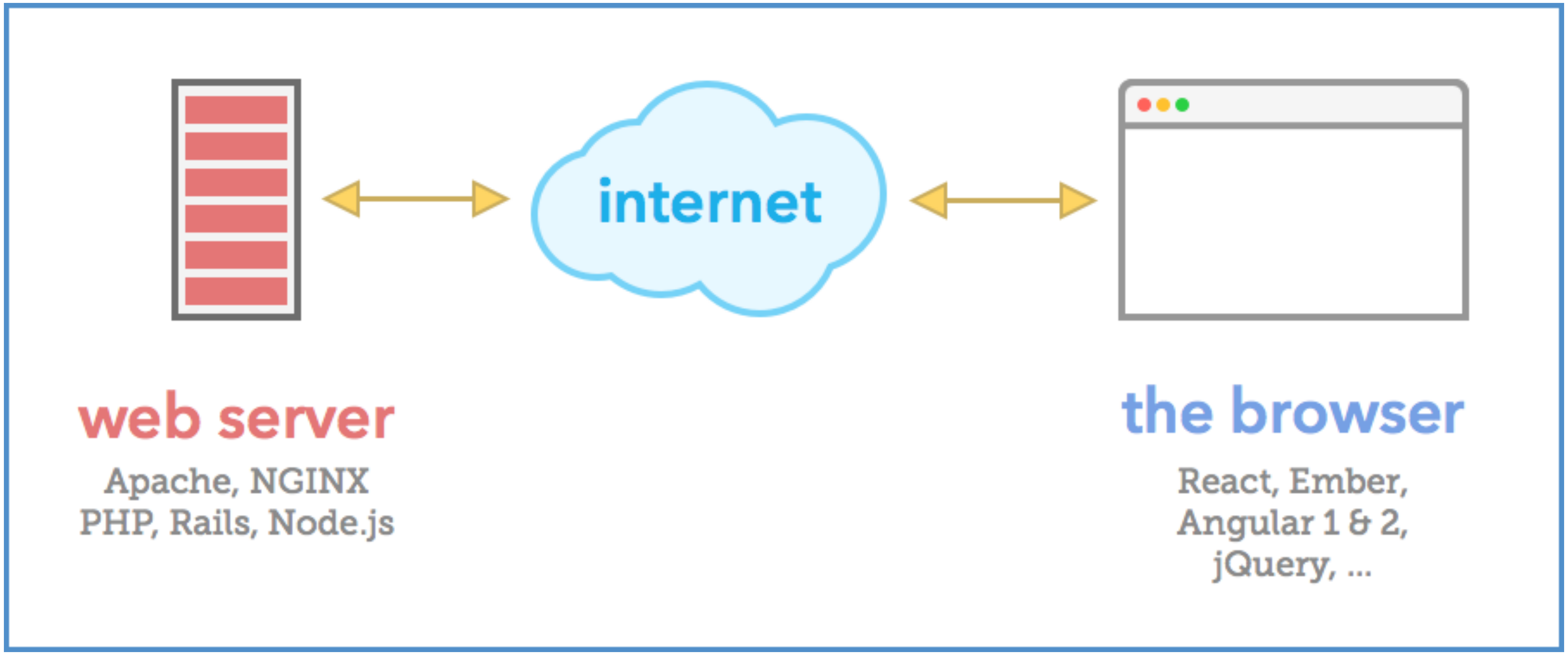


- Large monolithic applications are often subject to "mission creep" of applications and the development environments that build them. Over time this results in feature rich but bloated products.

- Node avoids this scenario by creating a small core of essential functionality that is studiously defended and constantly debated by the Node community. This pushes experimentation to the edges and encourages a vibrant ecosystem and development culture.

- This ethos also extends to Node- style development, with developers constantly thinking about how to keep modules small and focused and splitting apart functionality where the "do one thing well" rule is broken.

Traditional Frontend / Backend



The “Frontend Backend”

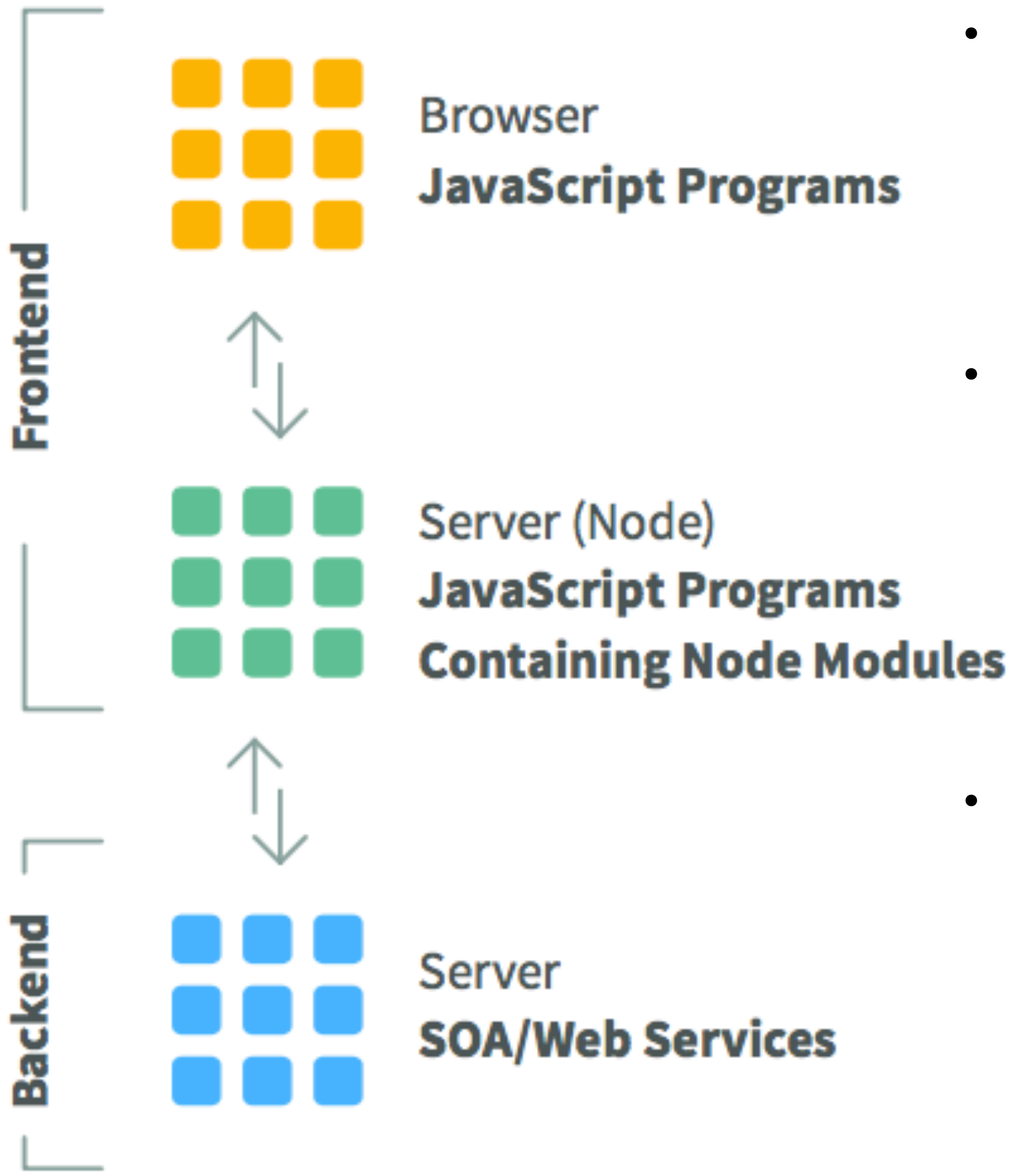
- Rich client teams who have been building exciting, dynamic JavaScript experiences have run up against problems from building large, monolithic structures that naturally result from traditional top-down programming.

- The result is poor performance and scalability and frustration for end users.

- Front end-developers must also rapidly iterate on the customer experience to keep users engaged.

- This has lead to the growth if the ‘Frontend Backend’ pattern, with node as a clear choice.

The Frontend Backend



- The application frontend needs a lightweight, dynamic back-end to deliver the scale and response times needed.
- The Frontend Backend is architectural tier added to a system to specifically serve frontend resources (templates, html, css , etc.) in front of a legacy system or API service tier.
- A frontend backend empowers frontend teams to quickly evolve the user experience to respond to rapidly changing conditions on the ground – such as news items, social happenings, and sporting or cultural events – all while being able to think and operate in the familiar JavaScript mindset.