The Essence of Node

The State of Node for the Enterprise

Report, June 2015

NODESOURCE®

The Essence of Node

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

JavaScript on the Server

- there is already a large JavaScript developer community that is building some of the world's most exciting web applications.

- JavaScript consistently ranks among the most popular languages. "Developer joy" is a common theme for Node and this largely relates to JavaScript's approachability and the high levels of productivity it a affords.

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

- 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.

The Frontend Backend I

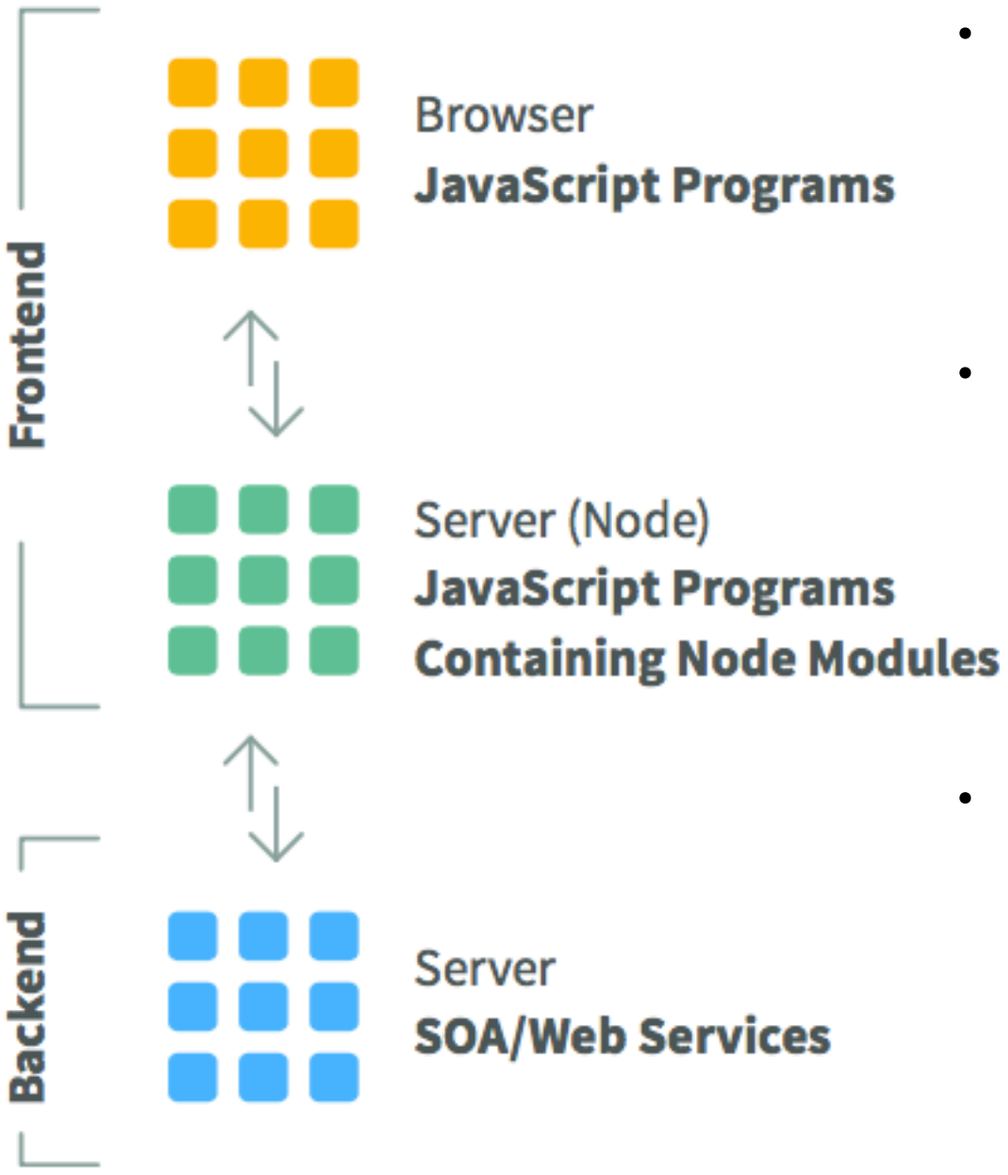
- Rich client teams who have been building exciting, dynamic JavaScript experiences have run up against problems from building large, monolithic structures that naturally result from traditional top-down programming.

- 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 II



- 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.