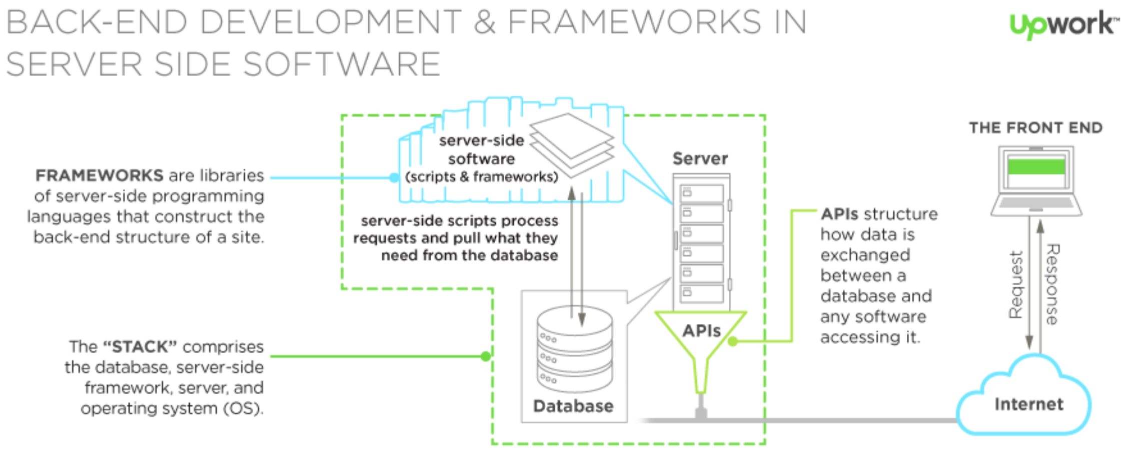
Back-end

LinqOp is a sum of layers—structure, design and content, and functionality. The technology and programming that “power” LinqOp—what the end user doesn’t see but what makes the site run—is called the **back-end**. Consisting of the server, the database, and the server-side applications, it’s the behind-the-scenes functionality—the brain of LinqOp. This is the ecosystem of the database manager and the **back-end** developer.

Here’s a look at the role of **back-end** programmers: their responsibilities, the environment they work in, the technologies they use, and related **back-end** skills.

BACK-END DEVELOPMENT BASICS


BACK-END DEVELOPMENT & FRAMEWORKS IN SERVER SIDE SOFTWARE
Upwork
FRAMEWORKS are libraries of server-side programming languages that construct the back-end structure of a site.
server-side software (scripts & frameworks)
server-side scripts process requests and pull what they need from the database
Server
THE FRONT END
APIs structure how data is exchanged between a database and any software accessing it.
APIs
Request
Response
The “STACK” comprises the database, server-side framework, server, and operating system (OS).
Database
Internet

- **Back-end** code adds utility to everything the **front-end** developer creates.
- The **back-end** is a combination of a database and a software written in a server-side language, which are run on web servers, cloud-based servers, or a hybrid combination of both. A network’s server set-up can vary, with the server-side workload divided up between various machines (e.g., a server dedicated to housing the database).
- This server-side application directly interacts with the database via an application programming interface (**API**), which pulls, saves, or changes data.
- The data are returned and converted into **front-end** code a user interacts with: filling out a form, creating a profile, shopping online, etc.
- In general, the functions on LinqOp is made possible by **back-end** code, which exists on, and is powered by, a server.

THE **BACK-END** DEVELOPERS' TOOLBOX

Back-end developers create and maintain the entire **back-end** function. The **back-end** developers take finished **front-end** codes and give it working functionality—for instance, making values in a drop-down menu possible by building the infrastructure that pulls values from the database.

Other responsibilities of the **back-end** can include

- Database creation, integration, and management—e.g., MySQL, MariaDB, SQLite, PostgreSQL, and MongoDB. SQLite is lightweight and fast, making it a very popular alternative to a larger MySQL driver.
- Using **back-end** frameworks to build server-side software, like Express.js
- Web Server technologies—e.g., J2EE, Apache, Nginx (popular for static content, like images, HTML or CSS files), and Internet Information Services (**IIS**)
- Cloud computing integration—e.g., public cloud providers like Microsoft Azure, Amazon Web Services, or private cloud environments
- Server-side programming languages—like Python, Perl, PHP, Ruby, and JavaScript, when implemented with the server-side development environment, Node.js
- Operating systems: Linux- and Unix-like operating systems, MacOS X, Windows Server
- Content management system (**CMS**) development, deployment, and maintenance
- **API** integration
- Security settings and hack prevents
- Reporting—generating analytics and statistics like system reports of server load, number of visitors, geography of visitors, etc.
- Backup and restore technologies for the files and DB of LinqOp.

SERVER-SIDE PROGRAMMING LANGUAGES AND FRAMEWORKS

Back-end developers use an array of programming languages and frameworks when building server-side software. They may choose a framework to suit their working style or a site's specific requirements. They may also work with a language within a software stack. Popular **back-end** technology includes

Java: A subset of the C language, Java comes with a huge ecosystem of add-on software components. At its core, Java is a variation of C++ with an easier learning curve; what's more, it's platform-independent thanks to the Java Virtual Machine. "Compile once, run anywhere" is its motto—and it's excellent for enterprise-level applications, high-traffic sites, and Android apps.

C#: An enhanced, second-generation version of the C language, one of the earliest **back-end** programming languages. C# is a general-purpose, object-oriented version specifically developed by Microsoft for the .NET Framework.

Python: With fewer lines of code, the Python language is fast, making it ideal for getting things to market quickly. The emphasis is on readability and simplicity, so it's great for beginners. The oldest of the scripting languages, it is powerful and works well in object-oriented designs. Python-powered sites: YouTube, Google

PHP: The most popular server-side language on the web, PHP is designed to pull and edit information in the database. It’s most commonly bundled with databases written in the SQL language. PHP is unique in that it was built for the web, not adapted for it, and remains the most widely used language on the web. PHP has a number of modern frameworks as well.

Node.js: This breakthrough development environment, part of the JavaScript-powered MEAN stack, allows the **front-end** JavaScript language to be used in server-side applications with the Express.js framework.

BACK-END SOFTWARE STACKS

What is a software stack? “Stacks” are just bundles of software for different aspects of a site’s **back-end**, combined for their compatibility and functionality to streamline development and deployment. The components include an operating system, a web server, a database, and server-side scripting language. There’s no limitation to the components in a stack—they’re interchangeable based on needs and customization. As the focus is being place on the MEAN stack for the development of LinqOp, the **back-end** developers will need to have cross-component expertise.

TWO COMMON STACKS:

LAMP: Linux/Apache/MySQL/PHP – consists of free, open-source software components that work well for dynamic websites and applications. It’s the most traditional stack model, with a few variations for different operating systems, servers, and database options. In the LAMP stack, PHP is interchangeable with the languages Python and Perl.

LAMP benefits: flexible, customizable, easy to develop, easy to deploy, secure, and comes with a huge support community since it’s open source.

MEAN: MongoDB/Express.js/AngularJS/Node.js – is an all-JavaScript-powered replacement for the traditional LAMP stack. It’s excellent for businesses looking to be agile and scalable, offering flexibility with the MongoDB document-based database and lots of features for building single- and multipage web applications. By using JavaScript across the front and **back-end**s, developers working on the client side can easily understand the server-side code, which leads to greater productivity for the team.

MEAN benefits: single language used, supports the MVC pattern, uses JSON for data transfer, offers access to Node.js’s JavaScript module library and the Express.js framework, is open source.

Redacted article from CAREY WODEHOUSE - is a freelance content marketer and writer based in Richmond

Carey Wodehouse - https://www.upwork.com/hiring/author/careywodehouse/

Article - https://www.upwork.com/hiring/development/back-end-web-developer/