HomeView
Tech Specifications

Uniting Streaming Services on One Site

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Hardware Requirements

1.1 Computer Hardware

Minimum Computer Specifications

CPU	Intel Pentium Gold G-6400 Dual Core
RAM	2G DDR2
Storage	64 GB
Network	Must have internet connection

Recommended Computer Specifications

CPU	Intel i5 Quad Core 3.0+ GHz
RAM	4G DDR3
Storage	128 GB
Network	Must have internet connection

General Technologies

2.1 Integrated Development Environment (IDE):

    2.1.1 What is an IDE:

- The Integrated Development Environment is a software that allows programmers to build applications in a single graphical user interface (GUI).

    2.1.2 What IDE will be used:

- Visual Studio 2019 Community Edition
  - Windows: Version 16.11.2
  - Mac: Version 8.10.8

2.2 Front-End Programming Language**:**

    2.2.1 What will be used:

- TypeScript 4.0

    2.2.2 What is TypeScript:

- A programming language built on JavaScript. TypeScript code can be converted into JavaScript which will run in a browser if it contains JavaScript.

2.3 Back-End Programming Language:

    2.3.1 What language being used:

- C#

    2.3.2 What is C#:

- C# is a modern and object-oriented programming language developed by Microsoft. C# is widely used for developing web applications and desktop applications. In most professional desktops C#, is the most popular language used. Microsoft apps that are created, usually C# is their first choice.

2.4 Operating Systems:

Windows and MacOS will be used during this development.

Operating Systems:	Build Number:
Windows 10 Home v 20H2	19042.1237
Windows 10 Pro v 20H2	19042.1237
MacOS "Big Sur" v 11.6	20G165

2.4.1 Handlement with Updates:

- Since all of our personal computers are Windows PCs, the usage of Windows operating systems will be cost and time efficient. In any case there is any new operating system update, we will verify that the update will not break our product before installing the new update.

3.1 Database Engine

- SQL Server 2019 Developer Edition

3.1.2 What is SQL Server Developer Edition:

- SQL Server Developer is produced by Microsoft for usage as a development and test database for a non-production environment. This engine lets us build the web application on top of a SQL Server and usually is the ideal choice for people who build and test applications.

3.2 Database Client

3.2.1 What will be used:

- SQL Server Management Studio

3.2.2 What is SQL Server Management Studio:

- SQL Server Management Studio (SSMS) is an integrated environment for managing SQL. We use SSMS to access, configure, manage, administer, and develop all components of a SQL Server. SSMS provides access to a SQL Server for developers and database administrators.

3.2.3 General Availability Version:

- Version Number: 18.9.2
- Build Number: 15.0.18386.0
- Release Date: July 15, 2021

3.3 Front End Framework

React	Angular	Vue
Pros: ● Easy to learn and use ● React developer tools	Pros: ● Large community for support and guidance	Pros: ● Project weighs 20KB after minutes of minification and

designed by Chrome Dev extension	● High Performance ● Backed by Google	zipping ● Simple structure helps developers to create templates and trace or catch blocks of errors
Cons: ● Uses JavaScript with HTML syntax in extension which can be confusing sometimes	Cons: ● Steep Learning Curve	Cons: ● Does not have most common plugins ● Small Community

Recommendation:
We decided to go with React as the front end framework. The developer tools are similar to a Chrome Dev extension and are easy to learn and use.

3.4 Back End Framework

3.4.1 What will be used:
● .NET Core 6.0

3.4.2 What is .NET Core:
● NET Core is a free and open-source maintained by Microsoft. The framework can run on Windows, macOS, and Linux operating systems. This back-end framework can allow us to build the web application we desire.

3.5 Browser

Google Chrome	Microsoft Edge	Mozilla Firefox
Pros: ● High Speed ● Safe and Secure ● Powerful Developer Console	Pros: ● Similar Speed to Chrome ● Microsoft add-ons to extend functionalities of Microsoft apps to	Pros: ● Has native pop-up blocker that automatically detects and blocks pop-ups ● Collects minimum

	browser	usage data for performance improvements
Cons: ● High memory and cpu usage	Cons: ● Slow Speed ● Not compatible with old hardware specifications	Cons: ● Has significant drop of users, industry insiders note that Mozilla is financially struggling. Therefore no more future updates.

Recommendation:
We decided to use Google Chrome as our web browser, even though it uses the highest memory and cpu usage it has the highest performance and security. Google Chrome also includes Chrome DevTools which will help us with representation of our web pages.

3.5.1 What is Chrome DevTools:
● DevTools is a set of web developer tools that are built directly into the Google Chrome browser. DevTools allows you to view and change/manipulate the representation of our web page or programming interface that uses a script programming language, such as JavaScript.

3.6 Web Server

3.6.1 What will be used:
● Internet Information System (IIS) v 10.0

3.6.2 What is Internet Information System:
● Internet Information Services (IIS) is a flexible, general-purpose web server from Microsoft that runs on Windows systems to serve requested HTML pages or files. The ASP.NET Core framework is a script engine that produces interactive webpages. Basically the middle man between our user interface and the data being stored.

3.7 Web Server Hosting

Amazon Web Services Elastic Cloud Computing (EC2)	Microsoft Azure	Google Cloud Services
Pros: ● Easy to navigate and setup ● Can add more storage if need be	Pros: ● Offers High availability, service level agreement of 99.95% (4.38 hours of downtime per year) ● Strong focus on data security	Pros: ● Detailed API reference guide ● Offers 99.99% data durability (survival)
Cons: ● Free tier only has 1GB of RAM	Cons: ● Requires expertise to ensure all parts work efficiently	Cons: ● SDK API less stable than Amazon

Recommendation:
We decided to go with AWS EC2 since it is easy to navigate and set up compared to the others. AWS is also a popular option when it comes to server hosting with all the positive ratings it has been given. We can also purchase more storage space if needed instead of paying monthly subscriptions.

3.8 Modeling / Diagrams

Draw.io	Lucidchart	Dia
Pros: ● Easily produces quality diagrams ● Integrates with Google Drive ● Can export to many formats	Pros: ● Mobile application exist ● Live Collaboration ● Easy to use templates	Pros: ● Desktop application ● Simple layout, easy to use

Cons: ● No desktop application only available as web application	Cons: ● Object Limit	Cons: ● No cloud storage, uses PC as only place to save files

Recommendation:
We decided to use Draw.io for all our diagrams since it was integrated with Google Drive. It has a cloud storage so we don't need to worry about storage space and there isn't a limit of how many objects we can create on our diagrams.

3.9 Version Control

Git	Mercurial SCM	Apache Subversion
Pros: ● Quick at uploading files that need to be changed ● Can differ who wrote which code segment that will make debugging communication better	Pros: ● Easier to learn ● Has GUI ● Branches are visually easier to understand	Pros: ● Cannot clone repositories ● Storage can handle large binary files
Cons: ● No GUI, executed mainly by command line	Cons: ● Rollback will only undo latest commit	Cons: ● Cannot make commits offline ● File based system making merging and branching difficult

Recommendation:
We decided on using Git since it can quickly upload files that we need to change, we can also make local commits. Plus the branching and merging system is much easier than the other options.

4.1 Transfer Protocol:

HTTP	HTTP/2	HTTPS
Pros: ● Each file is downloaded from an independent connection. Chance of interception is minimized ● Gets stored in page cache, when visited again next time it loads quickly	Pros: ● Travels faster and capable of having less errors ● Allows websites to load faster with less optimization	Pros: ● Data is always encrypted ● No data stored on public space
Cons: ● If hacker manages to intercept request they can view all information on web page	Cons: ● Multiplexing can overwhelm the server	Cons: ● Need to purchase SSL Certificate, possible free certificates, but not recommended for security issues

Recommendation:
We decided to use HTTPS. Data is always encrypted so personal information will never get stolen. If we can't find a secure free certificate, purchasing a SSL will be good for user security.

4.2 Hashing Library

Argon2	Bcrypt	Scrypt
Pros: ● Protection against attacks for modern GPUs, accessing more memory faster ● Optimized for either time or memory cost	Pros: ● Resistant to brute force attacks ● Algorithm was created since 1999 and still remains unbreachable	Pros: ● Lightweight less time consuming ● Running Scrypt on personal computer won't drain too much resources

Cons:	Cons:	Cons:
● Password hashing could cause performance issues	● Slow and requires memory	● Cannot increase memory usage without increasing run time

Recommendation:

We decided to use Argon2 since it decreases the probability of a hacker successfully guessing your password. Argon2 is also GPU resistant so it will help slow down password guessing attacks as well. Argon2 won the Password Hashing Competition and is still releasing updates as of today.

Resources

https://www.webnots.com/advantages-and-disadvantages-of-google-chrome/

https://www.profolus.com/topics/advantages-disadvantages-of-mozilla-firefox/

https://www.profolus.com/topics/microsoft-edge-advantages-and-disadvantages/

https://docs.microsoft.com/en-us/power-platform/admin/web-application-requirements

https://www.javatpoint.com/pros-and-cons-of-react

https://www.thirdrocktechkno.com/blog/pros-and-cons-of-reactjs-web-app-development/#disadvantages-of-reactjs-web-development

https://www.brainvire.com/blog/pros-and-cons-of-angular-development/#Pros_and_Cons_of_AngularJS

https://ronakataglowid.medium.com/pros-and-cons-of-the-vue-js-framework-8015dcbc05ef

https://www.quora.com/What-are-the-pros-and-cons-of-using-Amazon-EC2

https://blog.icorps.com/pros-and-cons-microsoft-azure

https://www.simform.com/blog/aws-lambda-vs-ec2/

https://medium.com/dailyjs/google-cloud-storage-pros-cons-and-how-to-use-it-with-javascript-ea9ce60a94c0

https://www.typescriptlang.org/

https://docs.microsoft.com/en-us/dotnet/csharp/tour-of-csharp/

https://stackify.com/what-is-c-used-for/

https://searchwindowsserver.techtarget.com/definition/IIS

https://www.c-sharpcorner.com/article/what-and-why-reactjs/

https://azure.microsoft.com/en-us/blog/introducing-web-hosting-plans-for-azure-web-sites/

https://www.hitechwhizz.com/2020/08/5-advantages-and-disadvantages-drawbacks-benefits-of-http.html

https://www.limelightonline.co.nz/blog/what-http2-benefit-your-website/

https://www.hitechwhizz.com/2020/08/6-advantages-and-disadvantages-drawbacks-benefits-of-https.html

https://synkre.com/how-secure-is-bcrypt/

https://openbase.com/js/argon2

https://www.veracode.com/blog/secure-development/zero-hashing-under-10-minutes-argon2-nodejs

https://www.ory.sh/kratos/docs/debug/performance-out-of-memory-password-hashing-argon2/

https://auth0.com/blog/hashing-in-action-understanding-bcrypt/

https://www.linkedin.com/pulse/hashing-algorithms-sha256-vs-scrypt-kalana-wijenayake/

https://www.c-sharpcorner.com/blogs/bcrypt-in-nodejs

https://security.stackexchange.com/questions/216529/has-scrypt-gone-through-enough-testing-to-be-considered-secure

https://ciphr.io/blog/post/what-argon2-and-how-does-it-protect-my-data