

Full Stack Solution Architecture

Plan and Design First

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Overview architecture

A large, faint watermark logo is centered on the slide. It consists of a light blue circle containing the letters 'NTLP' in a bold, sans-serif font. The 'N' and 'T' are light blue, while the 'L' and 'P' are a slightly darker shade of blue.

History of Full Stack

1990s

The Beginning

Simple static websites with HTML/CSS

2000s

The LAMP Era

Linux, Apache, MySQL, PHP dominate web development

2010s

JavaScript Revolution

MEAN Stack: MongoDB, Express, Angular, Node.js

2015+

Modern Era

Cloud Native, Microservices, DevOps Integration

90s, static websites



Figure: Apple website in last century

Netflix

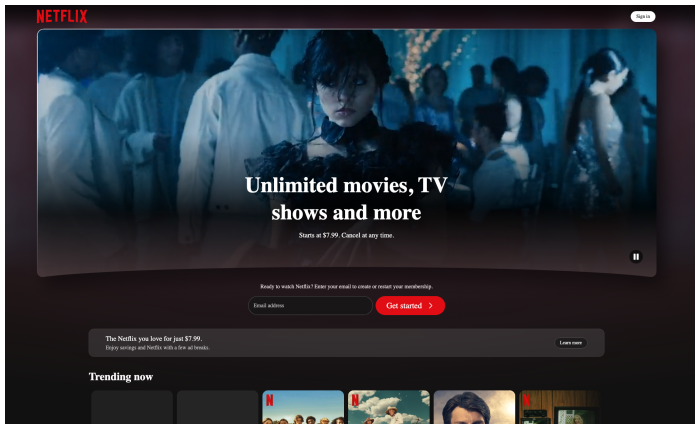


Figure: MEAN Stack

Native Serverless

The screenshot shows the Pluralsight website homepage. At the top, there's a navigation bar with links for 'Pluralsight', 'Skills', 'A Cloud Guru', 'Flow', 'Blog', and a 'Sign in' button. Below this is a secondary navigation bar with 'A CLOUD GURU', 'Why ACG?', 'Courses', 'Plans', and 'For individuals'. A search icon and 'Contact Sales' button are also present. A prominent pink banner across the top announces a 'SAVE 50%' discount, urging users to 'Beat the Black Friday rush. Celebrate early.' with a 'Save now' button. The main content area features a large dark blue section titled 'The leader in cloud learning' with the headline 'Create a culture of cloud innovation'. It describes a hands-on learning library for up to 10,000 users and includes 'View plans' and 'Watch video' buttons. To the right, there's a graphic showing two people and floating cards for AWS, Azure, Google Cloud, and Kubernetes. Below this, a row of icons represents various cloud providers and services. The bottom of the main section highlights '400+ courses and 1,800+ hands-on labs' with a 'Browse all courses' link.

Figure: native-serverless

Evolution of Tech Roles

1990s - Early 2000s

- **Webmaster:** HTML/CSS, basic server management
- **DBA:** Database administration
- **System Admin:** Server/infrastructure

Mid 2000s - Early 2010s

- **Frontend Developer:** JavaScript, AJAX, jQuery
- **Backend Developer:** PHP, Java, .NET
- **DBA:** More focused on optimization

Evolution of Tech Roles

2010s - 2015

- **Full Stack Developer:** Emergence
- **DevOps Engineer:** Automation, CI/CD
- **Data Engineer:** Big data processing

2015+ Modern Era

- **Cloud Engineer:** AWS/Azure/GCP specialist
- **ML/AI Engineer:** Data science, AI models
- **Site Reliability Engineer:** System stability

Full Stack Design We will focus on

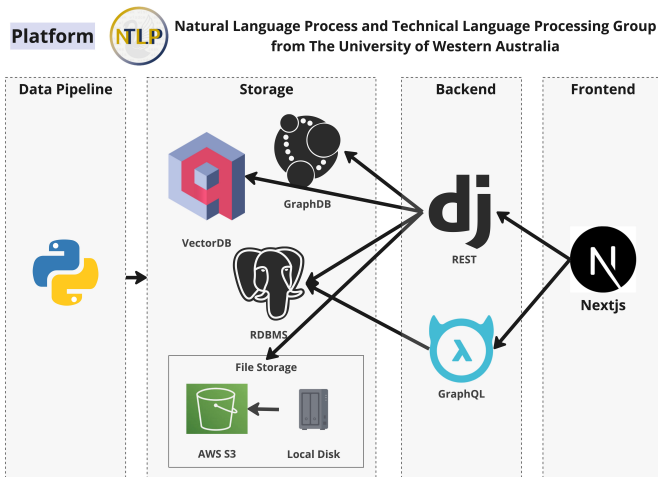


Figure: The Full Stack architecture you will build in the end

Tech Stack Justification

Data Processing Layer

Custom Python package for data pipeline automation

Database Ecosystem

- **PostgreSQL**: Industry-standard relational DB
- **Qdrant**: Vector store for RAG applications
- **GraphDB/Neo4j**: Enabling GraphRAG capabilities
- **File Storage**: Large static file processing

Tech Stack Justification

Backend Architecture

- **Django**: Mature Python web framework
- **Hasura**: Auto-generated GraphQL for CRUD

Frontend

Next.js: Production-ready React framework with SSR



Implementation Plan

Development Plan

Repository Structure

- | | | |
|---|---------------|------------------------------|
| 1 | AIWA | <i>Python Package</i> |
| 2 | AI4WAPlatfrom | <i>Backend & Storage</i> |
| 3 | AI4WAUI | <i>Frontend</i> |

Development & Deployment Strategy

- AIWA Local development → Docker package
- AI4WAPlatfrom Docker-based development & deployment
- AI4WAUI Local development → deploy to Vercel

Following previous session's foundation

Frontend Development Kits Setup

Required Tools

- | | | |
|----------|----------------|------------------------------------|
| 1 | Node.js | <i>JavaScript runtime</i> |
| 2 | NVM | <i>Node Version Manager</i> |
| 3 | Yarn | <i>Package manager (preferred)</i> |

Installation Steps

- 1** Install NVM: `curl -o- https://raw.../install.sh`
- 2** Install Node: `nvm install 18`
- 3** Install Yarn: `npm install -g yarn`

Recommended versions: Node.js 18 LTS, Yarn 1.22+¹

¹<https://medium.com/@dhakalsandeep38/>

[install-node-npm-and-yarn-with-nvm-in-ubuntu-debian-a-developers-guide-6dc1914](#)



Workshop & Demo

Homework

- Get the three repos into proper status following what we have done in the demo.



Q&A

Questions?

Feel free to ask anything