Full-Stack Engineer

Nick Spreen

“My goal is to build great products and solve problems. My most familiar technologies are Vue.js, Swift, Docker, Django, and Kubernetes on AWS and GCP.

Starting with Desktop apps in Qt, I made the jump to the web through server technologies like Django.

Nowadays, I build apps in Swift for iOS and Vue.js for the web. If your project uses different technologies, chances are I've seen it somewhere before. And if not, I'm super eager to learn more about it! The software stack is only a tool to make ends meet and I've always strived to understand technology in a broader sense by gaining experience in diverse fields.

My clients describe me as thorough and efficient, and I'm always looking for new challenges. I'm looking forward to working with you!”

Professional Projects

Founder & CEO – All In One Messenger

Hockey Labs, Q3 2022 – Q2 2023

For many of us, Instagram has become the first way to connect with people that you don’t know that well yet. Instagram messages however are a subpar user experience, and the DMs add to an already extensive list of messaging apps we use every day. iMessage, WhatsApp, Line, WeChat, LinkedIn and Twitter DMs. We all use at least a couple of those.

Together with his Cofounder Ben, Nick built one messenger to unite all chats and conversations to bring friends from all apps into one great & consistent experience. One interface to talk to all of your friends, regardless what networks you have in common.

The focus for this project was to build a messenger app that’s as functional as iMessage & WhatsApp, while building a UX & UI that feels modern and fun to use.

Keywords: Matrix, SwiftUI, Python, Flask, Ansible, Synapse, Postgres, SQLite

WatchOS & Android Wear Developer – RefConnect Realtime Watch App

Riedel, Q1 2022 – Q3 2022

Riedel Communications, founded in 1987, designs, manufactures and distributes innovative real-time networks for video, audio and communications. Its products are used for broadcast, pro-audio, event, sports, theater and security applications worldwide. The company is known for pioneering digital audio matrix systems, as well as SDI and IP-based media networks. Riedel is headquartered in Wuppertal, Germany and employs over 700 people in 20 locations throughout Europe, Australia, Asia and the Americas.

As a part of an R&D project, Nick together with his colleague Frederik built a realtime architecture to relay messages from in-stadium architecture to a central cloud-hosted server to then send messages to a smartwatch thats worn by the referee during the game. The project had strict limits on round-trip message delays that Nick and his partner were able to meet. A goal was shown on the watch in less than 1s after it's been detected by the goal-line technology.

In a second iteration of the project, Nick converted the watch application to be run on a Samsung watch with Wear OS.

Keywords: watchOS, Wear OS, Django, Daphne, WebSockets, Kotlin, Swift

Web Backend Development – Micro Services Cloud Architecture Overhaul

Linearity, Q1 2022 – Q2 2023

Linearity GmbH is the developer of Vectornator an advanced vector design app that unlocks the power of vector graphics for everyone. With its powerful tools, deep integrations and intuitive user interface it enables you to create high quality illustrations, logos, marketing materials, app interfaces and pretty much anything you can imagine.

The Vectornator app and all of Linearities services frequently call web-based micro services for parts of their functionality. Nick took over from an inexperienced backend development team to fix & maintain the existing flawed Kubernetes infrastructure. Over time he replaced all of the services with more easily scalable, maintainable, and cheaper AWS Lambda services. As a result, all of Linearity's cloud hosting costs were cut by 95% with zero downtime and no interruption to the user experience.

Today, all of Linearity's web services are invoked more than 500,000 times a day by tens of thousands of daily users. Additionally, AWS Cloudfront and Cloudflare have been used to rebuild the website architecture to support multiple web hosting solutions under one main domain and offering a seamless web experience.

Keywords: Cloudflare, Cloudfront, Webflow, Ghost.io, Storyblok, Nest.js, Express, AWS Lambda, Terraform, DynamoDB, S3, Redis

Founder & CTO – Social Video Conversations

Pineapple, Q1 2022 – Q3 2022

After working on the Bubble App in 2021, Nick was a perfect candidate to expand on that background by partnering up with Pineapple's CEO Jared to build the Pineapple app. Similarly to the ambitions of Bubble, the goal is to make people feel more personal & accountable by shifting existing conversations to the video medium.

Pineapple is a platform for five strangers to start discussing important and deeply personal topics from all areas of life. Nick supported Jared in building an app while iterating on the core feature set as the vision for what Pineapple was going to be crystallized.

Nick expanded on an existing Prisma & Nexus backend service while restructuring the frontend project to follow SwiftUI best practices.

Keywords: SwiftUI, Prisma, GraphQL, Nexus, Postgres, DigitalOcean, Mux.com

Founder & CTO – Bubble Video Commenting

Bubble Studios, Q1 2021 – Q3 2021

While the world of content creation and consumption has developed drastically over the last few years, the comments-section has been largely untouched. Bubble envisions a world where everyone's given a voice through short, round face-videos on any content. Comment a website, a TikTok video, or a picture you took on your last vacation and share it with the world.

In just a couple of months, Nick built a feature-complete v1.0 of a consumer social iOS application. As the leading full-stack engineer, Nick built a Kubernetes micro-service architecture to process, render, and deliver video files globally.

Through the use of many GCP technologies, latencies and performance were improved >15× by employing Google's CDN services into the ingress configurations. The iOS application renders multi-layered videos in real time with Apple's AVMutableComposition framework.

Keywords: GCP, Kubernetes, Celery, Google CDN, FFMpeg, Django, Swift, AVKit, nginx, Redis, PostgreSQL

iOS Development Lead – EU Digital COVID Certificate Wallet & Verifier

EU Commission & T-Systems, Q2 2021 – Q2 2021

During the COVID-19 pandemic, the EU decided to standardize digital vaccination certificates in the form of a mobile phone app. The goal of this project was to standardize development of all EU member countries by defining one standard, one protocol, and provide a working stack in form of 'template' repositories for all involved platforms.

In early 2021, Nick kicked off the open-source development of this application as the lead iOS developer. An open-source approach and ECC-encryption were key to the success of the multi-platform project. For all user-facing data, QR Codes were used and stored base45-encoded COSE data to make the graphical representation of vaccine certificates as compact as possible.

The three iOS repositories Nick created for the project can be found at https://github.com/eu-digital-green-certificates/dgca-wallet-app-ios

Keywords: Elliptic Curve Cryptography, CBOR Data, COSE Signatures, Swift, COVID-19, Certificate Pinning, QR Code Scanner

Founder & CTO – School Night

School Night, Inc., Q4 2019 – Q1 2021

School Night is a social platform that creates a fun way for friends to talk to each other. Eliminating barriers of phone calls, and connecting people in the moment, it bridges the gap between synchronous and asynchronous communication. Together with his cofounder, Nick built the company and its product over the course of a year, successfully raising $1M+ for initial funding. School Night's product is based around a scaling WebRTC server deployment on AWS. For the front-end side, a signaling client with iOS WebRTC support was built in-house.

Nick lead School Night as product-engineer and CTO. Being part of daily operations as well as designing a robust software architecture to help the company iterate and build great software fast. As part of a two-person founder team, Nick shared the responsibilities for School Night's investment, marketing strategies, product vision, employment, and recruiting.

Keywords: WebRTC, Kubernetes, Swift, Django, Docker, Redis, Postgres, iOS, Python, AWS

Mobile front-end developer – 6tudio mobile partner app

6tudio, Q2 2020 – Q3 2020

6tudio makes animated short films ready for new distribution channels. Focusing on shorter films for publishing on social media platforms, it enforces a strong & close connection between virtual characters and their viewership.

Since all of 6tudio's animated characters are paired with a celebrity partner, they are heavily involved in all steps of the animation process. They provide assets and source material for the animations and review every produced medium. With the mobile partner app, 6tudio is able to streamline the asset ingress and review & approval processes with closer and more personal connection to all celebrity partners.

Nick helped 6tudio make the jump into the mobile world. Advising the company on all things Apple, and helping them throughout the App Store approval process. Nick lead the engineering efforts on a Swift-based iOS application with responsive and reactive media-playing elements. Nick designed and engineered 6tudio's first outreach into the mobile world, building a robust and scalable software architecture for future projects.

Keywords: APNS, Postgres JSON, Apple App Store Review, iOS, Auth0, Swift, AVKit, Carthage, AWS S3

Data science engineer – Activity mining

Kutalla, Q4 2018 – Q4 2019

Kutalla is a TUM alumni start-up founded in 2018. Its mission statement is to detect, identify and eliminate inefficient processes from all layers of an organization. Most companies don't have a good grasp on the time they spend and waste on inefficient tooling and manual & labour-intensive tasks in their organization. Kutalla takes state-of-the-art data science to aggregate and analyse activity data from entire companies to make qualitative statements about the processes happening in an organization.

Nick engineered the platform which enables Kutalla to process and aggregate all customer data in a GDPR and DSGVO compliant manner. Once the pilot was complete and data started coming in, Nick lead the data science engineering to find patterns and tool chains in company & department behaviour to identify and eliminate labour-intensive tasks.

Nick designed a large-scale data aggregation architecture in SQL, as well as front-end and back-end software to gather data into Kutalla's format.

Keywords: Vue.js, D3.js, Postgres, Django, C++, C#, .Net Core

Full-stack engineer – New iOS app & REST server

Eventmatch, Q2 2019 – Q3 2019

Eventmatch is a TUM start-up founded in 2017 aimed at bringing people together in the real world. In 2019, the app got a major overhaul and started with a fresh codebase on both iOS and Android.

Nick lead the iOS and server-side engineering for the new version. Responsibilities included requirement analysis, architecture, full-stack development, and dev ops for a redesigned cloud deployment on GCP.

Keywords: Swift, iOS, Django, REST, SQL, Stripe, Google Cloud Platform

Front-end developer – Embedded kiosk touch interface

HARTING KGaA, Q3 2016

In its new 2016 research project, HARTING expanded the vending machine line up with a smart touchscreen interface. In this project, the kiosk shows a dynamic interface that's optimized for the user interfacing with it. For example, a face detection API is used for rudimentary filtering, showing children only the items to purchase which they're allowed to buy. The project was based on a Raspberry Pi integrated touchscreen system.

As lead developer for this project, Nick designed an architecture to facilitate the needs of this dynamic interface. Nick ensured an easily accessible UI which allows the user to select items to be dropped on the cash register's conveyor belt. The UI is optimized and filtered according to facial features returned by Microsoft's Face API.

Keywords: QML, QtQuick, C++, JS, MQTT, Linux, Raspberry Pi

Front-end developer – Dynamic QML interfaces

HARTING KGaA, Q3 2015

HARTING is a hidden champion, providing the entire world with industrial connectors for electronical wires and more. As a future-focused enterprise, HARTING puts a lot of resources in its R&D departments. In 2015, a new undertaking was started, to standardize the software component of all showcases for fairs and more. This new structure allows a dynamic assortment of new technology showcases to be controlled and configured from a single Android device.

Nick's role was to build the generic architecture to facilitate dynamic and changing UIs for all sorts of technologies. This framework is future-proof, and allows new technologies to be added with simple XML files. These files are dynamically loaded to create an ever-changing UI on an Android tablet. Nick lead this project, contributing his experience in C++ and JS development.

Keywords: QML, QtQuick, C++, JS, MQTT, Android

Passion Projects

Advent of Code

AOC is a yearly coding challenge that's eight years running in winter of 2022. Every day of the advent season in the month of December, one new coding puzzle is released. Nick has been solving all of the 200 puzzles earning 400 stars in total. In 2022 he started streaming the solutions on twitch and uploading the attempts on YouTube. Nick wrote his own CLI in Python to assist with downloading the puzzles in markdown and submit them straight from the terminal.

Open source at https://github.com/yspreen/adventofcode

Keywords: Python, Numpy

ºC ºF Temperature Widget

Moving to the US in 2022, Nick has been experimenting with different ways to get fluent in the Fahrenheit temperature unit. In 2023 he built a small widget to put on the iOS home- or lock screen which shows the current temperature in both units at the same time. It's free to download and offers some modern designs to choose from.

App Store at https://apps.apple.com/us/app/fahrenheit-celsius-widget/id6447822042

Keywords: *Swift, SwiftUI, WeatherKit*

Leetcode

In 2023 Nick picked up Leetcode challenges as a new source of coding challenges. Starting with the challenges with the lowest acceptance rate, it's a good way to keep up practice when it comes to algorithms and data structures.

Profile at http://leetcode.com/yspreen/

Keywords: *Python*

Späti Guide

When living in Berlin, Nick was looking for a small side project to get real-world experience with two technologies he wanted to add to his tool belt. He built Späti Guide in a couple of weekends to get familiar with Flutter and the AWS CDK. Later he also used it as a practice project to translate the infrastructure to Terraform.

Spätis are late night convenience stores in Berlin that are frequently sought out to buy alcoholic beverages. Späti Guide has a realtime compass that points you to the closest store in Berlin that's currently open and near you. The beer bottle spins when you move the phone and guides you to the right store.

App Store at https://apps.apple.com/us/app/späti-guide/id1587126815

Keywords: *Flutter, AWS Lambda, AWS CDK, Terraform, DynamoDB, Express, Typescript*

Paint95.xyz

Nick rebuilt the iconic interface and functionality of Windows 95 Paint in the browser. While it was still operating, everyone could use the website to reuse the nostalgic graphics program and then turn the created artwork into an NFT. With only one click and 100% for free. The resulting pictures were stored decentrally on the IPFS.

Keywords: *Ether.js, OpenSea, NFT, JS Canvas, Typescript, IPFS*

Bio-No.de – Containers and HPC for Biological Data Science

Bio-Node is a platform that makes the power and versatility of HPC cloud computing accessible to biological researchers. Nick built a self-scaling Kubernetes-based system on GCP in his Master's thesis at Rutgers. The system allows users to submit containerized tasks through a web-interface and makes use of a highly distributed computing cluster to execute these tasks.

Open source at https://github.com/bromberglab/bio-node

Keywords: *Kubernetes, Vue, Django, GCP, Dev Ops*

GSpy – Modular PyQt5 Plugin Desktop Framework

In a six-month deep dive, Nick focused on replacing existing software tools at the aerospace chair of TU Braunschweig with a single plugin framework written in PyQt5. The modular framework allows the application to be easily extensible, offering a plugin interface for new components for both UI and business logic. The application is integrated in a scientific environment to allow recording of all actions and measured data throughout the pipeline. Nick built the cross platform application on both Windows and Linux and contributed numerous initial modules to the plugin framework.

Keywords: *Python, Qt, PyQt 5, Cross Platform*

Covid-Info.page – Crowdsourced Rules Database for COVID

When the global lockdowns continued in January of 2021, Nick decided to build a platform to keep people informed about the local restrictions in the area. The platform is built on user-submitted data only. Being more of a tool for rule curation and submission, rather than having few people maintain all the current information. Nick's main goal for the project was to build a platform with the restriction of zero runtime costs, that's only using client-side technologies, and still allows for content submissions.

Keywords: *Vue.js, Github Actions, Bootstrap 4, Progressive Web App (PWA)*

Four in a Rowwdc – Apple WWDC Scholarship Grantee

For the WWDC 2019, Nick created a small game using Apple's SpriteKit. The four in a row implementation allows the user to play a friend, or fight a suprisingly clever AI. With this submission, Apple sponsored Nick's attendance in the developer conference in San Jose, CA.

Keywords: *Swift, Xcode Playground, Spritekit*

knok – iOS Chat App

knok is a text messenger that connects people in the moment. As such, it only allows you to message friends that are currently using their phone. Turning off the screen and placing it in your pocket automatically turns knok in silent mode and you can no longer receive texts. Nick made use of some esoteric combinations of iOS APIs to detect active usage of an iOS device to enable this magical texting experience.

Keywords: *iOS, Swift, Websockets*

Dub – iOS Camera App

In 2019, Apple announced a new developer API to access camera feeds of both the front- and back-facing camera at the same time. In a team of two, Nick and his UX design partner built a simple app which took picture-in-picture photos and videos in high quality. The app made use of the Snapkit APIs for easy sharing, as well as the Apple Metal shaders for efficient processing of the video streams.

Keywords: *iOS, Swift, Snapchat API, Metal*

Aucuro – Harvesting Robot

Using (and hacking the use of) Franka Emika's REST API, Nick controlled a 6-axis robot-arm to aid in the harvest of cucumbers. The robot is equipped with a webcam, and will detect and harvest fresh pickled cucumbers. Implementation on Cython made use of OpenCV functionality to detect and locate cucumbers precisely.

Keywords: *Cython, OpenCV, Robotics, REST API, Computer Vision*

Checkoutinator – Asset tracking

Participating in the TUM Techchallenge, Nick reverse-engineered the OPCUA protocol of a HARTING UHF reader to automate the checkout process of tools in a Makerspace. Every tool is equipped with an RFID tag to automate tracking and theft detection. Everything was implemented on a Raspberry Pi in Python.

Keywords: *RFID, UHF, Raspberry Pi, Python, OPCUA*

Double or Nothing – Chrome extension

For the 2018 Microsoft Creative Hack, Nick built a Chrome extension to gamify the Amazon purchase experience. An added button allows you to add some fun to your online shopping. Instead of hitting the One-click-purchase button, the user can select the Double-or-Nothing button. For the price of one item, they will now either receive two – or none at all! Payment is handled through the PayPal API.

Keywords: *Chrome Extension, JS*, PayPal API

Spotify Podcast Listener – Chrome extension

Nick saw an opportunity in enhancing the listening experience for a Spotify podcast. The podcast contains breaks in which the user is encouraged to play some music. Nick built a chrome extension that enhances the Spotify web player to allow timestamping of songs to be injected into the playback of the podcast. The library for these timestamps is user-extensible.

Keywords: *Chrome Extension, JS, Spotify API*