

# Tim Flannagan

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## PROFESSIONAL EXPERIENCE

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### Platform Storage Internship

Red Hat, Inc.

May 2018—Present, Westford, MA

- Participated in the development and testing of an open-sourced Ansible role, an IT automation deployment platform, hosted on Ansible Galaxy, a community for sharing roles. This automated the local storage configuration process and associated tasks for Linux users.
- Developed, tested, and deployed new software patches (bug fixes, enhancing usability, proposing improvements, updated documentation).
- Wrote custom Ansible modules to update current playbooks per specifications (Python). Performed regression tests, and updated documentation aligned with the group and Ansible community standards.
- Implemented an integration testing framework, ensuring the Ansible role, and all playbook component interaction combinations were correctly configured in the end user's system.

## EDUCATION

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### Bachelor of Science in Computer Science

University of Massachusetts Lowell • Lowell, MA • Spring 2019

## RELEVANT COURSEWORK

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- COMP.3080 - Introduction to Operating Systems
- COMP.3500 - Special Topics (Internet of Things)
- COMP.4040 - Analysis of Algorithms
- COMP.4200 - Artificial Intelligence
- COMP.4610 - Graphical User Interface I

## PROJECTS

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### NBA Virtual Assistant Using AI & Natural Language Processing:

- Created a closed-domain virtual assistant, which provides the user with relevant, up-to-date NBA information hosted on Facebook Messenger using the RASA AI framework, natural language understanding (NLU) techniques, machine learning, and Node.js.
- Defined a knowledge base that consisted of intents, a mechanism that handles potential input questions, and examples of specific entities (e.g. player, team, etc.), and fed that interface into the built-in entity extraction and intent classification NLU components.
- Implemented custom actions (Python) that performed a specific task, such as querying NBA JSON data or utilizing other API methods.
- Trained the virtual assistant to produce training models that successfully identified the intent of a user's input, while extracting entities in that input, and a dialogue policy which chose the next best action to take based on the intent with the highest confidence distribution.

### Racket-Subset Language Compiler:

- Developed a multi-pass compiler in C++ that translates a source Racket-subset program into an actionable x86-64 assembly program.
- Processed the source program into multiple abstract syntax trees, removing variable shadowing and nested expressions, before being translated to an intermediate language, which models the C-language.
- Translated the intermediate language into the x86-64 assembly by allocating variables to a finite set of CPU registers or spilling those variables to a location on the stack.
- Supported the following constructs: control flow, register allocation using variable liveness analysis and graph coloring methods, and code optimizations using the Waddel inlining algorithm.

### Two-Factor Biometric Authentication IoT Device:

- Worked with Python, Flask, MariaDB, and a Raspberry Pi3 to create a two-factor biometric authentication interface.
- Authenticated a user login using a backend username and hashed password database, and a matched fingerprint when the user scans their fingerprint with the sensor.

### Ansible Device Encryption:

- Designed an Ansible role automating the encryption and removal process for dm-crypt devices (logical volumes) in Linux.
- Used the LUKS format for device encryption, and utilized various bash commands for managing device-mapper mappings.

## SKILLS

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Languages: Python, C, C++, HTML5, CSS, JavaScript, x86-64 Assembly, MySQL

Concepts: Data Structures & Algorithms, Object Oriented Design, Organization of Programming Languages, OS Fundamentals

Tools and Platforms: Git, Ansible, Kubernetes, Linux, Bash scripting, KVM/Libvirt, Raspberry Pi, Flask, YAML