Z-prefix for Supra Coder Designation

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Objective

The purpose of this document is to create an effective process for the United States Space Force (USSF) to develop the skills needed to empower and incentivize high performing software development culture in order to compete and win against our adversaries. This process will identify and train highly skilled software developer Guardians, also known as Supra Coders, and designate them using the Z-prefix, which is also defined in this document.

Z-prefix Definition

In the October 2021 release of the AFOCD and AFECD, the Z-prefix definition will be updated to indicate a unique definition for USSF use:

> Identify Guardians in any AFSC who perform duties managing, developing, and designing software solutions supporting both acquisition and operational communities within the United States Space Force. Supra Coders lead, manage, and operate highly functioning, integrated, and autonomous teams of product managers, designers, and/or software developers in software factories, Combat Development Teams (CDTs), and other agile software development teams across the Field Commands. Additionally, they may also serve as specific functional leads within their specialized area of operational expertise.

To remain aligned with agile software development product team roles, the Z-prefix designator may be applied to individuals who demonstrate competencies in these specific experience sets:

> SD – Software Developer: Develops and writes/codes (or modifies existing) new front-end/back-end computer/web applications, software, or specialized utility programs following software assurance best practices. Analyzes the security of new or existing computer/web applications, software, or specialized utility programs and provides actionable results. Works on the development phases of the systems development lifecycle. Designs, develops, tests, and evaluates information systems throughout the systems development lifecycle. Researches problems and breaks them into deliverable software iterations. Exhibits strong communication skills and works well in a balanced team, including a paired-programming environment. Uses Lean, Extreme Programming, Test Driven Development, User Centered Design, DevSecOps, and Agile methodologies for full-stack application development.

> SX – User Experience Designer: Makes iterative product design decisions, works on a balanced product team, and responsible for engaging with the individuals who primarily use the product. Understands user pain points and works with the product manager to create user stories for feature sets that meet the needs of the users. Creates intuitive,

innovative, and effective user experiences that military operators desire, through learning and understanding of users' needs, behaviors, and emotions to yield insights that inform product strategy and guide the design of the software and systems. Uses design sprints for user research, conducts user interviews, utilizes Lean and Agile methodologies, validates and iterates on ideas early and often with user feedback.

SM – Product Manager: Defines and prioritizes product features using Agile/Lean product development practices. Works with the product team, leadership, stakeholders, and product owner to progress the goal of delivering the right product to users. Ensures that the product is successful in terms of user value, stakeholder value, and organizational business goals. Understands the business objectives, stakeholder vision, user needs, and technical challenges associated with the software delivery process. Writes user stories, works with designers and developers to prioritize stories, and manages the day-to-day product team tempo as well as product roadmap and release notes.

The remainder of this document focuses on the SD experience set for the Supra Coder Software Developer designator.

Skills Needed for Z-prefix - SD

The following table includes the skills and competencies necessary to perform the duties outlined above for the Z-prefix designation in the Software Developer role.

- Git
  - Basic workflows
  - Reading the DAG
- Back-end (any language)
  - Restful API based CRUD
  - Request validation and processing
- Front-end React
  - CRUD
  - Shared tate
  - Form Validation
- Databases
  - Basic SQL
  - ERD
- Full Stack
  - Connecting FE/BE/DB
- CSS
  - Selectors
- Testing
  - Unit testing a pure function
  - Testing pyramid
- Containerization
  - Understand docker

- UCD
  - Why use UCD
- Agile
  - Agile vs Waterfall
  - Balanced teams
- Team mentality
  - Communication
  - Feedback
- Growth mindset
- Web architecture
  - HTTP
  - Client/Server
  - Authentication/Authorization
- OOP
  - State/Behavior
  - Inheritance
- Javascript Language Fundamentals
  - Control flow
  - Loops
- CI/CD
  - Why use a pipeline

Table 1: Z-prefix Software Developer Skills

Software Development Immersive

The training pipeline for Supra Coders is a highly selective program called the Software Development Immersive (SDI). The SDI provides an opportunity for Guardians who understand the basics of modern software development to directly interact with and contribute to projects and programs across the space domain through a three-month coding bootcamp followed by a three-month rapid development experience. These Supra Coders graduate equipped with the learning resources, network, and tools to apply their innovative skills to their current or future Z-prefix job assignments, as well as the knowledge and access rights to deploy DevSecOps-accredited code to military systems. The curriculum for the SDI is based on the skills identified in Table 1. As an alternate path to becoming a Supra Coder, Guardians with advanced software development knowledge will be identified through automated assessments, graded code reviews, and pairing interviews detailed further in the next section. In the future, new SDI curricula will be developed to prepare Guardians for the SX - User Experience Designer or SM - Product Manager roles as well.

Award Criteria for Z-prefix - SD

As mentioned above, there is an alternate path for identifying Guardians who already have the skills listed in Table 1 from previous education and experience, or obtained the skills through self-study or alternative methods (Digital University, Udacity Nanodegrees, etc). The Z-prefix assessment process for software development is broken down into four stages and will be iterated upon on a six-month cadence. The following diagram shows the process flow for award of the Z-prefix for the Software Developer experience set (SD). Z-prefix award authority lies with the Chief Technology and Innovation office.
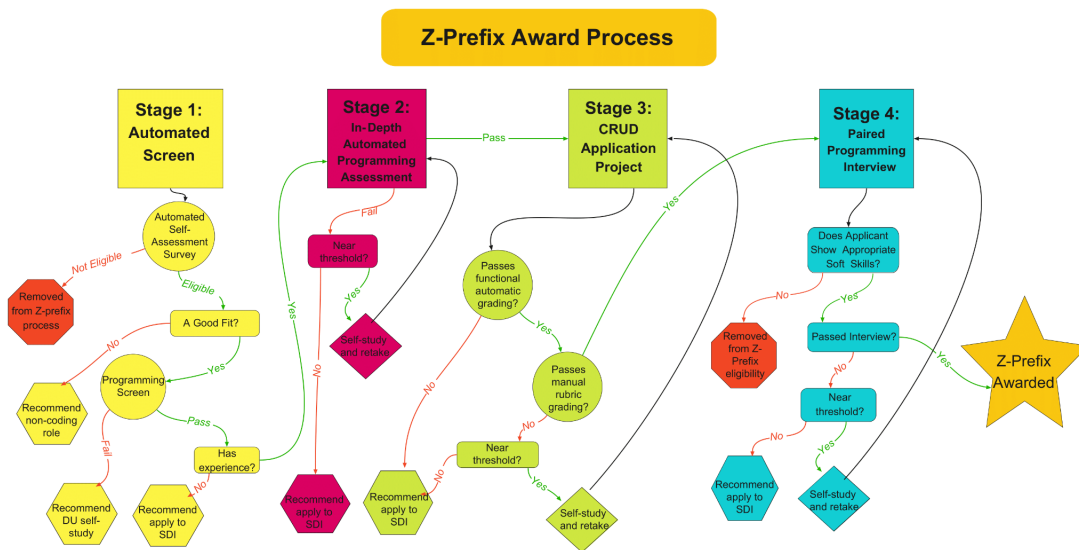

Figure 1: Z-prefix Award Process Flow

Assessment Stage One

Stage one is an automated self-assessment survey and programming screen. This assessment will be available year-round aside from brief downtime for updates on the six-month cadence. Possible paths depending on performance:

1) Move on to the next stage of the Z-prefix award process. The applicant's self-assessment states that they have prior application building experience, are eligible for the Z-prefix, and pass the programming screen. OR
2) Recommend self-study using Digital University. The applicant desires to be a software developer but does not pass the programming screen. OR
3) Recommend the Guardian apply to the SDI. This applicant has passed the programming screen but self reports not building web applications. OR
4) Recommend another Z-prefix path. The applicant's self-assessment makes them a better fit for a non-coding role (SX or SM). OR
5) Does not continue due to not being eligible.

Assessment Stage Two

Stage two is an in-depth automated assessment where each question has an assigned topic. The applicant gets two opportunities to take the assessment each six month period. This assessment will be available year round aside from brief downtime for updates each six month iteration. Possible paths depending on performance:

1) Move on to the next stage of the Z-prefix award process. The applicant scores above the required threshold. OR
2) Recommend self-study and retake. The applicant scores near the threshold and receives their assessment scores per topic area to target weaknesses. OR
3) Recommend the Guardian apply to the SDI. The applicant does not know enough about the topics for self-study to bridge the gap.

Assessment Stage Three

Stage three is a project submission to build a simple Create-Read-Update-Delete (CRUD) application. It would combine automated grading to ensure project functionality as well as manual grading for code quality based on a rubric. This stage will be open at set intervals during each six month iteration. Each interval would last a week, so applicants only have one week to complete the project. Possible paths depending on performance:

1) Move on to the next stage of the Z-prefix award process. The applicant scores above the required threshold. OR
2) Recommend self-study and retake next iteration. The applicant scores near the threshold and receives feedback. OR
3) Recommend the Guardian apply to the SDI. The applicant fails to show basic understanding of application building.

Assessment Stage Four

> Stage four is a pair programming interview scored off a rubric. It will evaluate some technical skills that are harder to automate as well as soft skills. There will be a scheduling period open for one-two weeks at the end of every six-month iteration. Possible paths depending on performance:
> 1) Z-prefix awarded. The applicant scores above the required threshold. OR
> 2) Recommend self-study and retake next six-month iteration. The applicant scores near the threshold and receives feedback. OR
> 4) Recommend the Guardian apply to the SDI. The applicant shows a significant gap in skills. OR
> 5) Removed from consideration for Z-prefix due to egregious soft skills issues.

Removal Criteria

The Z-prefix designation should be removed if the Guardian has not performed relevant duties in the last four years, or via commander and/or USSF CFM recommendation.

USSF Z-prefix Positions

Organic software development positions will exist in agile software development teams across the Field Commands, in USSF software factories, and with Delta Combat Development Teams (CDTs). Delta Commanders and other billet owners must identify billets to be coded with the Z-prefix for Supra Coders to fill as they emerge through the award process (either through the SDI or the assessment stages). Software factory product teams that are dedicated to each Delta CDT should be manned by a mix of both organic software developers and contractor support. As the USSF expands and continues to stand up CDTs within each Delta, each Delta should dedicate billets to be coded as software development positions to support this effort. These coded positions would be owned by the CDTs (ADCON) but attached to software factories such that the Supra Coders' primary duty will be on product teams. With each Delta providing Z-prefix billets attached to software factories, collaboration of efforts can be maximized as well as sharing of best-practices and breaking down stove-piped efforts. Supra Coders are high-value assets to their Deltas because of their ability to solve unit problems through the DevSecOps process.

Summary

The USSF is expanding the use of specialized training programs that provide hands-on insight into modern software development and DevSecOps, such as the SDI. As part of the CTIO vision for a digital service, the USSF is looking to expand its collective expertise in the software development realm. The intent is to build a community of software developers within the USSF, with in-depth DevSecOps experience including deploying code to production. The Z-prefix designation award pipeline will be used to build this cadre of Supra Coders.