Intake Systems have existed for decades. In recent years, the concepts of “no-wrong-door”, and “centralized intake (C-Intake) systems” have become mainstream with wider adoption across states. Some of the goals for these systems are:

- A single point of entry for applicants
- Streamlining the referral process
- Optimizing resource utilization
- Triage / Screen for applicant needs
- Determining appropriate service provisioning and provider placements

Implementation of such systems typically involve presenting a predetermined battery of questions and answers are mapped to predefined service referrals. Some of these systems facilitate “intelligent question and evidence gathering” that is based on a finite set of “if <answer == yes> then <ask question 2> else <ask question 4> finally<referral>”.

The principles driving the design of these systems are stable and robust but, relatively archaic; archaic in relation to how dynamic the workforce development system is.

The workforce development system, the labor market, occupations in demand, skills, tools, technologies, and the economy itself is continuously changing and evolving. The stakeholders (job-seekers, employers, government agencies, education and training providers, work-support service providers, et al) need to adapt and learn to thrive in this continuously changing dynamic. One of the key

participants in this system are job-seekers with varied characteristics (Abilities, Work Interests, skills, knowledge, education and training, experience, work-readiness barriers) and are operating based on circumstantial dimensions of needs, goals, and time. Multiple entry and exit points, interim transitions between education / training to employment and back to learning, requiring interim work supports like transportation and childcare, touch points with different human, social services / workforce agencies and partner providers through these stages of movement, are typical of the workforce system.

As an example a well planned and designed urban transit system offers multiple modes of connections:

- Walking
- Biking
- Tram
- Inter-city and sprinter trains
- Bus
- Car

Each of these or a combination of the transportation modes are availed by the citizens based on circumstantial factors (distance, time, disability, goals, needs, money, weather, etc..) The result is a plethora of customized combinations that can help unique citizen needs.

Stakeholder participation in the workforce system is analogous – dynamic, controlled chaos and difficult to be defined by a predefined finite set of business rules.

Consequently, the intake and referral infrastructure for a workforce system requires an equally adept and aligned technology platform. In the absence of a well thought out and well designed technology platform, the C-intake system cannot live up to its potential and will fall short of meeting stakeholder expectations, goals and outcomes. It therefore leads to the consideration of the new paradigm where the technology platform enables the availability of a plethora of intelligent choices for participants to hop-on and off depending on circumstances - a modern intake and referral system that facilitates a job-seeker's movement through the system based on his/her unique situation.

It is therefore time to adopt a new paradigm to designing a C-Intake System. In this new paradigm, the technology platform embraces the concepts of adaptation, learning, concept-formation, induction, self-organization and self-repair.

The key stakeholders interfacing with the C-Intake system would be:

- Job-seekers
- Program Administrators and Service (Education, Employment and Training, Work Support, WIOA partners) providers

The proposed C-intake system for Florida's Workforce Development System can be characterized below:

- Purpose
  - Learn to ask the right questions, and make the best referral
  - Improved Service provider coordination
  - Optimize human and fiscal resources
  - Accommodate Individual choice along with state's strategic priorities to optimize intake and referrals
- Environment / Domain: Intake and Referral Management for Workforce Development / WIOA partners
- Performance, Outcomes and Recommendations module: Based on what the system learns, this module provides plausible options to facilitate intake questions and rank the service referral options
- Learning module: Statistical models, hyper-parameters tuning, develop training, validating and testing learning models for the system. Incorporate evaluator feedback to design, develop and production deployment of trained systems
- Instance selection module: Extracting training and test data sets to train learning models. Requires Extracting, Transformation and Loading of varied data sets, segmenting statistically valid data to be provided to the learning module
- Blackboard / Knowledge base module: Acts as the universal repository of domain specific knowledge, information and interfaces needed by other modules of the learning system
- Evaluation module: Analyze the performance of the learning module, feature selection and engineering, and provide inputs to tweaking the hyper-parameters of the learning model, as well as help determine the appropriate sub-set of data in the instance selection module

In less esoteric terms, the core of this new paradigm is that the C-Intake will be designed to be a learning system which:

- Adopts statistical and machine learning techniques with domain specific data sets including:
  - Occupation, Labor Market and Workforce Development Data sets generated and available through the state and federal sources
  - Information collected during application intake
  - Feedback from referral partners on the quality and accuracy of referrals
  - Applicant information that changed post-initial-referral
- Continuously learns vis-a-vis the evolving workforce development system, instead of just relying on static programming of a finite set of business and assertion rules
- Goes beyond adaptive control (parameterized controls) systems design
- Adopts principles of pattern recognition that assist with classification and segmentation of applicants to be matched with corresponding services and providers
- Incorporates psychological models of learning to perform tasks and induction with the help of supervised (business domain experts) and unsupervised learning (inference from data sets and prior outcomes / performance)
- Learns the most important information / screening / triaging information to be gathered from the applicant to ensure the most optimal referral(s) and outcomes are ensured

A release plan for such a system would cross through the following phases:

1. A basic workforce registration / screening with direct mapping to services, programs and providers. Webhooks, REST Hooks

and similar technologies would be used to provide business the capabilities of:
    - A quick and easy way to job-seekers/applicants to be screened and segmented into appropriate referral buckets
    - The system will make available the client information to the subscribed service providers with minimal systems changes. The c-intake system will treat each client intake and registration as an event trigger, and make available through callbacks and / or push notification mechanisms provider specific referrals
    - The subscribers of this service will be able to consume referrals with minimal changes to their systems
2. The next iteration of the C-intake would enable the subscribed service provider to be able to provide feedback on the quality and accuracy of the referrals, as well as additional inputs on the screening and intake questions they may want to pose upfront. This iteration would be isolated to the C-Intake system, and will not require modification to service provider systems
3. The third iteration would see a 2-way interface between the C-intake and service provider systems, where-in client information that changed post-initial-referral would be communicated and updated back in the intake master client index
4. The fourth iteration would continue to build on the previous iterations, with the c-intake system exhibiting more intelligent behaviors, and provide the following value-added capabilities to business:
    - The c-intake system can make facilitate multiple / parallel referrals based on a more accurate learning of applicant needs, and the state’s priorities for the workforce system
    - Pertinent changes to client information at any of the service provider systems will now be reflected in the C-intake

system, and be appropriately shared across interested service providers

5. The fifth iteration would provide business the capabilities of evaluating their workforce development service delivery model on a variety of factors including
    - Service provider co-ordination
    - Operational metrics, fiscal and human resource utilization
    - Data consolidation – Master Data Indexes for clients, and service providers
6. The final iteration would provide business the capabilities of meeting the statutory reporting requirements, including the WIOA performance reports

The c-intake system's technology landscape, design approaches, and software development methodologies:

- Big data
- Cloud platform
- license free software like ruby on rails, python, django, pandas, sci-kit, pytorch, postgresql,
- ETL tools like Talend
- Design frameworks – MVC, Web Services (REST), Webhooks / REST Hooks and similar
- Continuous Integration and Deployment using Jenkins
- Risk Based Testing methodology
- Agile. Adaptive and hybrid SDLC methodologies

Throughout these iterations, the c-intake system will continue to be modeled as a learning system...