How Cloud Computing is Enabling Artificial Intelligence

Highlights from the February 15, 2022 Roundtable

In a recent roundtable discussion hosted by the Advanced Technology Academic Research Center (ATARC), and Pure Storage, technology experts from various Federal agencies discussed ways the cloud has evolved to allow for new and emerging technologies like Artificial Intelligence (AI) and the Internet of Things (IoT). Panelists provided examples of how advancements in cloud computing can drive innovation at the enterprise level. While the potential for innovation is high, agencies shared some of the challenges they face when developing and testing new technologies in current environments.

Since the emergence of cloud technology over a decade ago, the cloud now serves as a platform to test and enable more advanced technologies, such as AI, IoT, containerization, and edge computing. Agencies participating in the roundtable discussion are testing these new technologies as solutions to a wide variety of problems. While progress has been made, best practices of implementing new technology at scale are not yet available.

Current Use of Advanced Technology

Agencies are pulling and standardizing data from various sources in the cloud in order for AI to analyze and learn from the data. Other agencies work with low code platforms to pull data from disparate systems regardless of subject matter into data repositories to allow for AI analysis, better insight into data and risk levels, and accessibility of data across agencies. Prior to the cloud, agencies operated through VPN, which limited their ability to take advantage of third-party data and analytics due to time consuming security protocols. Cloud enabled data is now accessible to all agencies and analytic vendors around the world.

Roundtable participants agree that agencies are just beginning to test the possibilities of this new technology, and finding the best technological solution to a problem is both an art and a science. The ultimate goal is to continue to test technology, share outcomes, and to develop a set of best practices. Participants lament that most technology vendors cannot be relied on to provide best practice solutions despite their conviction. An application that solved a small, niche problem in one division may not be a scalable solution for another agency.

Challenges with Implementing New Technology

When thinking about possible solutions to a business problem, panelists agreed that agencies should consider whether data is best serviced in the cloud or should remain local depending on the objective. One participant shared a cautionary example of an agency putting a large data set into the cloud, running models against the data, and later receiving an incredibly high bill from its cloud service provider. In that instance, a cloud solution to run data analytics was the wrong choice due to the significant fees incurred. Panelists suggested that some solutions are best served with a cloud tie in or temporary cloud storage. In general, data sets are getting larger and are not able to move effectively, and any business solution should account for this.

Make Smart Choices

Whether data is best serviced in the cloud or should remain local - depends on the objective.

Complex custom code versus low code solutions has impact on both needed development skills and future maintenance.

Understanding the correct architecture and foundation helps determine between web-based applications and local data centers are best.

Another challenge common to all panelists is the eagerness of some developers to build custom code applications for a problem that likely has a simpler solution. Agencies are frequently left with applications developed with complex, custom code that cannot easily be maintained by less experienced developers years later. Panelists shared that they would rather have

skilled developers implement low code solutions, so less trained developers are able to maintain it later on. Conversely, low code solutions should be a justifiable solution. Just as custom code is tedious to maintain, so are 7,000 custom fields in a low code platform. Panelists agree that team fitting is an important aspect of not only successful project implementation but also future maintenance of the technology.

Similarly, some applications that could fit into a simple static based website application are being built within Salesforce, resulting in unnecessary cost and complexity for the agency. There are instances when leveraging local data centers is a better and more cost effective alternative than running data in the cloud. In other situations, web-based applications supporting other IoT applications are more practical because agencies likely do not have access to multiple data centers across the world. Understanding the correct architecture and foundation for an application is critical to successfully implementing flexible solutions.

Recommendations:

- *Start on a small scale*
- *Be willing to take risks*
- *Share successful use cases*
- *Collaborate on solutions*
- *Leverage a lab setting for market research*
- *Focus on the 'art of the possible' rather than on limitations*

Ultimately, agencies should be using the cloud to drive innovation at the enterprise level. However, implementing solutions at the enterprise level can result in large and costly mistakes if factors previously mentioned are not carefully considered. Agencies often come across contractors who push architecture solutions that are based on older enterprise technologies. These vendors are likely not knowledgeable on new technology enough to take risks, thus stalling innovation. Panelists noted that when projects go awry, the cause can usually be traced to assumptions by the vendor that the implemented solution could be scaled based on a single use case. Most vendors, particularly large corporations, are unlikely to spend time considering whether the product is the best solution for the agency. The onus is on the agency to

determine what success looks like from a technology standpoint, and should conduct due diligence on the vendors' capabilities and proposed technological solution.

Recommendations for the Future

Panelists agreed that agencies should start with a few solutions on a smaller scale to determine what works. By doing this, agencies are able to cut losses early and determine whether the technology fits with the workloads and skillsets of current and future teams. In order to take this approach, agencies must scrutinize vendor contracts and consider them from an Agile perspective. To uncover the right technological solution, agencies should be willing to take risks and sometimes fail with new technology. This can mean terminating contracts because either the vendor lacks the skill set to match the technology or the technology was not right for the project.

In addition to testing new technologies on a smaller scale, roundtable participants concur that Federal agencies should continue to share successful use cases and collaborate on solutions. ATARC is testing pilot projects in a lab setting to produce market research that can serve as playbooks for Federal agencies to base decisions and responsibly utilize taxpayer dollars.

In order to achieve innovation, panelists agree that agencies should approach solutions from the perspective of what is possible, rather than focusing on limitations. While agencies should conduct their own due diligence, there are vendors who are willing to assist agencies with achieving their mission. While some vendors approach selling solutions from a corporate revenue recovery perspective, other vendors in the industry will assist agencies in finding the best solutions and can provide valuable insight into what has actually worked and what has not.

How Pure Storage Can Help

Pure Storage helps embrace the future of cloud and data flexibility with a true, as-a-service model that's simple to manage and always evergreen. Pure offers everything-as-a-service for flexible consumption and cloud economics. Pure delivers simple setup, effortless operations, and expansive integrations.

Contact us for more information here.