THE STATE OF APPLICATION INNOVATION IN THE U.S. INTELLIGENCE COMMUNITY

EXECUTIVE SUMMARY

From a technology perspective within the U.S. Intelligence Community (IC), data is the lifeblood of an IC mission. Applications—used by mission owners, operators, analysts, and decision makers at every level—are the manifestation of an IC mission and provide the heartbeat to a mission. Applications are a simple, intuitive, and powerful representation of the complex work that occurs every day in the IC. They are the technology underpinning of intelligence operations in today's uncertain and rapidly changing threat environment.

These threats—to national security and freedom—are bigger and evolving faster than ever before. Technology that was once a clear differentiator for the IC is easily available and increasingly provides adversaries with equal standing in asymmetrical warfare campaigns and in cyberspace. This new reality is due to lower barriers to technology entry, ease of technology consumption, and rapid commoditization of innovations that used to be advanced.

The imperative for the IC to modernize, create, and evolve mission-relevant applications faster than ever has never been more important. Applications and exceptional application experience will provide the IC with its technological center of gravity.

COMPLICATION: BARRIERS TO MISSION SUCCESS

Most often, the mantra for today's IC technology development and integration environment is "least cost, technically acceptable." The implication here is "build it cheap and meet a minimum set of standards." This is no blueprint for building and sustaining innovative mission applications while staying two steps ahead of the adversary. Imagine if combat aircraft, battle-ready tanks, and nuclear-powered ships were built with this philosophy.

Application developers tend to be under-empowered regarding innovation, and they are typically not developing within a set of repeatable, efficient, and unencumbered best practices. There are no mission standards that recognize and embrace open source software communities to fuel rapid innovation. Proprietary solutions and vendor lock-in are the norm, and innovation suppression and mediocrity become the defining characteristics of mission application development environments.

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IMPLICATION: THE RESULT OF DOING NOTHING OR MOVING TOO SLOWLY

The IC is at a technology crossroads. The result of not resolving the described complication, or moving too slowly to resolve it, has several critical implications.

Failure to adopt and maintain a modern application development environment within the IC implies inferior application capability and compromised "first-mover" advantage in intelligence operations. It impedes the IC's ability to establish and maintain a competitive intelligence advantage in data collection, processing, and analysis.

Second, inferior application innovation hinders power projection and puts the IC at a competitive disadvantage against an agile, innovative, nontraditional adversary committed to harnessing the power of technology in creative, asymmetrical ways. The battlefield has changed.

Finally, the IC's ability to attract, recruit, and retain the best and brightest technologists and application developers significantly diminishes with inferior application innovation. Application developers want to work in innovative, fast-moving, and challenging environments that value creativity, empowerment, and commitment to open source communities and collaboration.

PROPOSAL FOR MODERN APPLICATION DEVELOPMENT IN THE IC

Red Hat proposes that the IC adopt modern application development methodologies to facilitate rapid, mission-oriented IT transformation and innovate more effectively than adversaries. IC leadership must commit to five imperatives that help organizations get to mission faster. The five imperatives are as follows:

ESTABLISH AND ENACT HIGH STANDARDS

IC mission owners and agency technology leaders must demand the highest standards from their technology providers, their partners, and their people. Rigorous focus on exceptional application experience will fuel a commitment to removing obstacles and barriers to modern technology adoption and rapid innovation.

Technology providers, and especially software vendors, are critical components in the IC technology value and supply chains. Software vendors have a responsibility to provide the IC with the best software solutions. These solutions include not only packaged applications, but also operating systems, application development tools, and systems management tools. The vendors' ability to establish and maintain a mission-essential partnership with the IC depends on having these tools and applications.

As a condition of partnership, IC mission and technology leaders must demand that mission software, to the highest degree possible, is sourced from open communities of contributors in which rapid innovation is the benchmark of success. Enterprise-grade open source technology provides the application innovation platform for the IC.

Likewise, IC technology partners—system integrators, development organizations, and operations support personnel—must commit to application development and system deployment using modern application processes. This commitment implies optimizing enterprise DevOps practices so that application development and operations practices are better unified to produce shorter development cycles, increased application deployment frequency, and more stable code releases in close alignment with mission objectives. Platform thinking, in which a common Platform-as-a-Service (PaaS) is developed for all enterprise application development and operational requirements, is typically part of successful DevOps initiatives.

Finally, IC mission leaders must ensure that their operators, analysts, and developers receive tools, procedures, and policies sourced from the highest standards. This means creating an environment for rapid, repeatable innovation. Collaboration, empowerment, trust, and mission focus—especially between development and operations groups—become the benchmarks for success.

RETHINK ACQUISITION AND O&M

Applications and government IT systems follow a life-cycle and support process (O&M) that works well for weapons systems, such as expensive tanks and airplanes, but not necessarily for software, especially mission-critical applications. Current government contracting best practices usually stipulate that an organization build an application and support it for 5, 10, or even 15 years, and these applications often are supported by the staff during the life cycle. Today's reality, however, is that subject-matter experts for these applications usually transition to a new role or agency before the end of the life cycle. In this rapidly evolving technology landscape, where smartphones have a life span of less than two years, most applications become obsolete quickly.[1] This reality, coupled with threats that are hard to define and predict, suggests that a better way for application life-cycle support in the IC is required.

IC technology and mission leaders must develop, implement, and enforce a policy of standards that maps to the realities of modern application development, operation, and maintenance. Rapid and repeatable innovation becomes a key objective pursued through enhanced organizational trust, operational predictability, application reliability, and collaboration.

Most notably, IC leaders must embrace the idea of application modernity in which mission-essential applications are constantly evolving to deliver a better user experience and mission alignment. The industry term for this concept is continuous integration and continuous delivery (CI/CD).

Exceptional CI/CD processes are most often the result of enterprise open source application containerization and automation that provide the critical underpinnings of an organization's application platform. One example of an effective CI/CD process comes from Amazon, which understands that application experience is critical to customer satisfaction. Amazon routinely deploys updated code to production applications every 11.6 seconds, and it can do this across 10,000 machines.[2] IC application and mission owners must commit to measuring innovation success and mission enablement by using similar performance benchmarks.

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2 Bird, Jim. DevOps for finance. O'Reilly Media, Inc., 2015.
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RESPECT THE DEV, TRUST THE OPS

Application developers have a difficult job. They often receive an unclear set of requirements and unreasonable deadlines for development milestones, and scope creep typically prolongs the development process and impedes agile development and innovation. Moreover, developers typically face many distractions and tasks not directly relevant to innovative application development. These distractions include provisioning of the development environment (compute, storage, and network), focus on standards compliance, and ongoing interruptions that impede velocity of innovation and rapid development iteration.

Likewise, operations professionals work in a world of uncertainty and high pressure. Application availability and rapid problem identification and resolution are critical in today's high-tempo mission environment. Successful operations teams require clarity, predictability, repeatability, automation, and collaboration with development to best support the mission.

IC technology leaders and mission owners must recognize the needs and challenges of these two important groups. They must respect the challenges that developers face and the innovative potential that they possess. It is imperative that they empower developers with the right tools and then enforce best practices and policies that facilitate a culture of rapid innovation with minimal distractions. This will promote the highest software quality and application experience—on time, on target, at first pass. These same leaders must also trust that their operational teams will achieve superior results when outfitted with the right tools, processes, and service-level agreement (SLA) expectations. Rigorous commitment to this level of respect and trust makes a high-performance DevOps culture possible.

GET MODERN, STAY MODERN

IT modernization is the technology mantra of commercial and enterprise organizations that hope to compete, win, and stay in business. These organizations see technology, and especially applications, as the heartbeat of their success and long-term viability. This is a common theme across successful internet-based companies today. IT modernization implies taking the necessary steps to modernize older, mission-essential applications and adopting tools, standards, and techniques to develop portable, web-enabled, and intuitive applications that operate independently of device, time, or space.

IT modernization is not a singular outcome or a simple destination. Instead, it is a process for developing and evolving application innovation to provide sustained competitive advantage in the face of evolving, unclear, and hard-to-predict threats.

Mission owners and IC technology leaders must commit to a culture of application modernity, including processes, tools, mindset, and know-how for today and for the future. What is modern today is obsolete 12 months from now. A commitment to implementing a DevOps culture and a platform for delivering rapid innovation puts mission owners and developers back in control.

OWN YOUR OUTCOME

Successful organizations do not let technology define and limit the outcome of a mission or an application. Instead, these organizations own mission outcomes by using the right technology for rapid, sustained innovation. For years, the "mainframe mentality" suggested that a set of enterprise mission-critical applications could run only on a mainframe computing system, the original runtime platform. The belief, and sometimes reality, was that it was too expensive and technologically impossible to refactor those applications. The enterprise had to operate at the pace and limitation of the mainframe—made obsolete years ago.

Mission owners must define, control, and own their outcomes based on rapid, sustained, and repeatable innovation that results in exceptional application experience. They must build applications that users want to use and that are tightly aligned to the mission.

Developers must demand technology investments that remove impediments and interference to innovation, creativity, and trust. Their commitment is to build applications that they stand behind and that work correctly the first time.

Operations professionals demand standardization, process, and tools that result in collaboration, predictability, and repeatability. Through DevOps partnership and collaboration, they will support applications that are well defined and supported—now and 11.6 seconds from now.

CONCLUSION

Red Hat has been a mission partner to the U.S. IC for more than 20 years. Through this partnership, the IC has relied on Red Hat's supported open source software solutions to produce mission-aligned applications that deliver an exceptional user experience. Red Hat's commitment to the IC is to combine the best community-based, open software innovation and collaboration with enterprise-grade software support, security, and stability. Red Hat is committed to supporting these five imperatives to promote application modernization and rapid innovation.

ABOUT RED HAT

Red Hat is the world's leading provider of open source software solutions, using a community-powered approach to provide reliable and high-performing cloud, Linux, middleware, storage, and virtualization technologies. Red Hat also offers award-winning support, training, and consulting services. As a connective hub in a global network of enterprises, partners, and open source communities, Red Hat helps create relevant, innovative technologies that liberate resources for growth and prepare customers for the future of IT.

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