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<th>SUBMITTED BY:</th>
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<td>The Honorable Lawrence E. Strickling</td>
<td>iWire365 LLC</td>
<td>Emtec Federal, Inc.</td>
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<td>Assistant Secretary for Communications and Information</td>
<td>William Hadala, PMP</td>
<td>Tony West, VP Sales</td>
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<td>National Telecommunications and Information Administration</td>
<td>President &amp; CEO</td>
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Section 1: About the Team

1.1 iWire365, LLC (iWire365)

iWire365, LLC is a Dallas, Texas, USA based Information and Communication Telecommunication Technology (ICT) services company, dedicated to developing the most advanced network solutions for complex needs. iWire365 utilizes an innovative solution-selling concept that focuses heavy on advisory and consulting services in Energy & Utilities, Public Safety, Telecom, Government and Cleantech. Utilizing next-gen M2M (Machine to Machine), advanced telecommunication, and cybersecurity devices to create a smarter, faster, multi-faceted telecommunication future, coupled with domain expertise and care for solving problems in both rural USA and Internationally.

iWire365 provides technology and telecommunication expertise to help companies take advantage of cutting edge technology to ensure long-term growth, streamlined operations and interactive user experiences. Through iWire365’s telecommunication consulting services the company is able to focus on development and/or implementation of infrastructure, security, and business continuity programs.

iWire365 provide the following services:

- Telecommunications Consulting
- Cyber Security
- Critical Infrastructure – Design & Building, Integration, Operation and Management
- Wireless Engineering
- Project Management

1.2 Emtec Federal, Inc. (Emtec)

Emtec delivers IT products, services, and solutions that demonstrably enhance an organization’s return on technology investments. We help organizations align their IT infrastructure, people, and services with their operational and customer service needs while reducing operational costs and improving their ability to measure IT’s value to the organization. IT organizations rely on our IT Transformation Services for senior level experience and time-tested frameworks for assessing and improving processes, technology, people, and metrics within an IT organization. Our overall mission is to help clients evolve IT from a cost-center to a value-partner, reduce O&M costs by helping the client manage value, and increase efficiency through optimization of people, processes, and technology using value-focused metrics.

Supporting our mission are five major service groupings as follows:

- Business Alignment
- Service Delivery and Support
- Operating Practices and Governance
- Enabling Technology
- Corporate Application Services
Section 2: FirstNet Web Services Conceptual Architecture

The FirstNet Network is a congressional mandate to build a (nationwide) secure, hardened, and resilient network infrastructure designed to provide application and web service support to first responders to fulfill the FirstNet charter.

An appropriate web services conceptual architecture is presented in order to provide a blueprint for the design and implementation of the web services infrastructure through which first responders can interact and utilize web based capabilities. The following graphic illustrates the high level conceptual FirstNet web services architecture:

![FirstNet Web Services Conceptual Architecture](image)

Figure 1. Conceptual Architecture for the FirstNet Network Web Services
The conceptual architecture pictured above will serve as the basis for implementing discoverable web services which can be accessed based on industry standards. The web services architecture will be realized utilizing the Java Enterprise Edition (JEE) and open source technology stack. In implementing the web services infrastructure in this way will enable devices across different technology platforms to access FirstNet services rendering it device agnostic. For example, a windows tablet will have the capability – through appropriate security and identity management – to access the FirstNet web services infrastructure through the Firstnet Network, even though it is built using open source technology. The same will be true of an Android device, or an Apple device, or any device which utilizes industry standard web services.

Appropriate security design and implementation will ensure a high degree of integrity with regard to attempted application misuse, malware, and other security threats. Appropriate security protocols will be built into the system with a reverse proxy and firewall, providing an effective security and data barrier which eliminates the ability of a hacker to access applications or data. Proper user based Identity Management will ensure only appropriate access is allowed.

This architectural approach will be the basis upon which the design of the FirstNet application store is created, which is presented in the next section.
Section 3: Vulcan Anomaly Detection (VAD)

Vulcan Anomaly Detection (VAD) is a breakthrough, patented technology that is able to identify non-compliant events/messages as they attempt to enter the system. Invalid events are halted, flagged and managed using existing organizational capabilities. VAD understands the context of every single event that comes into the organization’s system and how it correlates to the organization’s documented business processes. VAD is able to audit up to 10,000 workflow instances/sec, 120,000 application events/sec, and over 100m events/sec when utilizing GPU technology. VAD provides discovery and documentation of an organization’s business processes and underlying data models where these assets may be lacking. VAD complements existing business technology to leverage information assets. VAD benefits include:

- **Security.** Certainty that your business processes are protected from interference and waste. Rogue processes, including cyber intrusions, are blocked from entering your system.
- **Control.** Certainty that wasteful anomalies are identified and managed. Your organization has absolute clarity of its business processes and knowledge that they execute only as they should.
- **Data Quality.** Certainty that processes are free of common data quality issues and organizational standards adhered to.
- **Savings.** A reduction in resources that justify or clean data. The need for creating and maintaining business rules is removed.

![Figure 2. Vulcan Anomaly in the Cloud](image-url)
The chart below provides a comparison of various information management techniques and their functions and illustrates where Vulcan is positioned in information management architecture.

<table>
<thead>
<tr>
<th>Information Management</th>
<th>Methodology</th>
<th>Coverage</th>
<th>Accuracy</th>
<th>Latency</th>
<th>Costs</th>
<th>Time to Market</th>
</tr>
</thead>
<tbody>
<tr>
<td>Application Events (Live Data) (Vulcan)</td>
<td>Linking Application Events to Business Process Maps to Detect Anomalies for non-compliant events</td>
<td>Cybersecurity Privacy Quality Compliance Fraud (Anomaly Detection)</td>
<td>100%</td>
<td>Zero</td>
<td>$1/Anomaly</td>
<td>2-6 weeks</td>
</tr>
<tr>
<td>Application Data</td>
<td>Linking Application Data to Exception Rules to Determine if a Match condition has occurred</td>
<td>Anomaly Predictions</td>
<td>Historical False Positives True Negatives</td>
<td>N/A</td>
<td>$33/Anomaly</td>
<td>12-18 Months</td>
</tr>
<tr>
<td>Systems Data Management</td>
<td>Linking Systems Performance to Application Issues</td>
<td>Application Performance Management</td>
<td>Trending Bench Marking</td>
<td>N/A</td>
<td>N/A</td>
<td>9-12 Months</td>
</tr>
<tr>
<td>Network Data Management</td>
<td>Linking Network Performance to Systems Issues</td>
<td>Systems Performance Management</td>
<td>Trending Bench Marking</td>
<td>N/A</td>
<td>N/A</td>
<td>6-9 Months</td>
</tr>
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Section 4: FirstNet App Store Conceptual Architecture

A vital technology component of the FirstNet initiative will be the physical technology presence needed to manage how applications are made available to end users that access and utilize the FirstNet network and available services. This will include the management of user and developer accounts, the management of applications downloads and developer application submission uploads, security of access and application use, and the governance around those areas as well as other vital management functions.

The following graphic illustrates the proposed conceptual architecture for the FirstNet App Store.
As can be seen in the graphic, the App Store is a component of the FirstNet Service Delivery Platform, and makes use of the technology infrastructure and access which the FirstNet Network Architecture provides. The App Store is designed following the architectural premise defined by the FirstNet Web Services Conceptual Architecture, and will itself provide web services for downloading applications, as well as manage user accounts and other activity.

The app store will be architected, designed, and developed utilizing the open source/Java Enterprise Edition (JEE) technology stack, which supports a diverse list of devices as well as a robust development environment. The types of applications that will be available for download extend across technology platforms such as Microsoft, Android, and Apple. Applications available will range from downloadable apps designed to run on handheld devices, tablets, smartphones, and also standalone applications designed to run on desktops and other computing devices. The App Store will built using large-scale e-commerce, security, and governance best practices to ensure robustness, scalability, reliability and ease of integration with existing systems and the FirstNet system infrastructure.

Note: A detailed system and software architecture would be created which will require deeper dives into the various and necessary technology areas. The architecture and resulting implementation will appropriately support applicable business scenarios of app store use.

The App Store will support different types of user accounts whether it is a single individual or an organization. Appropriate security and identity management will allow both types of users to download and manage different types of applications. Additionally, developers and 3rd party vendors will be allowed to submit application to the App Store for end users to consume. Applications submitted for eventual consumption will need to pass stringent security and data integrity tests which will be built into the application submission process.

To summarize, the main technology concepts identified in the FirstNet App store are:

- Utilizes the FirstNet Web Services Architectural standards
- Service-oriented architecture
- Industry-standard JEE technology
- Failover and redundancy
- Supports integration with 3rd party payment service providers (inherently supported through the Android platform)
- PCI and PII compliance through securely encrypted user account management (through appropriate identity and account management)
- Device and technology agnostic download
- Appropriate testing and governance of app management to prevent malicious system attacks and loss of data integrity
- Support for possible E-commerce business processes
- Application Security & Governance
- Cybersecurity Protection
- Anomaly Command & Control Dashboard
- Operations Risk Management
- Privacy Protection
- Compliance
- Unauthorized Application Invocation Protection
- Service Quality & Performance Management
Section 5: Summary

iWire365 in partnership with Emtec provides the industry’s most secure and managed web services application infrastructure with agile deployment to meet Firstline’s budgeted guidelines. iWire365 has the expertise and the manpower to architect, design, build and facilitate FirstNet application infrastructure. Additionally, iWire365 has the ability to provide 1st and 2nd level 24/7 customer support and manage the provisioning and coordination of maintenance and repair processes. iWire365 & Emtec looks forward to implementing the most robust application infrastructure for FirstNet from concept to rollout.