Government Acquisitions

ACCELERATED AI
IGNITE THE REVOLUTION. OWN THE TRANSFORMATION.

AI for the Mission

PREM JADHWANI
CHIEF TECHNOLOGY OFFICER
PREM.JADHWANI@GOV-ACQ.COM
PHONE: 703-554-3827

NOVEMBER 13, 2018

AGENDA

- **AI – Current State and Future**
- **Choosing the Right AI Workloads**
- **AI Use Cases for Public Sector**
- **AI Maturity Model**
- **AI 7 Layer Technology Stack**
- **AI Roadmap to Success**
- **What is GAI doing to enable AI ?**

AI / ML – Why Should We Care?

IoT
Robotics
Artificial Intelligence
Blockchain
Quantum Computing
Platforms
Social Media
Internet
PC

1980   1990   2000   2010   2020   2025

Exponential Growth of Technology
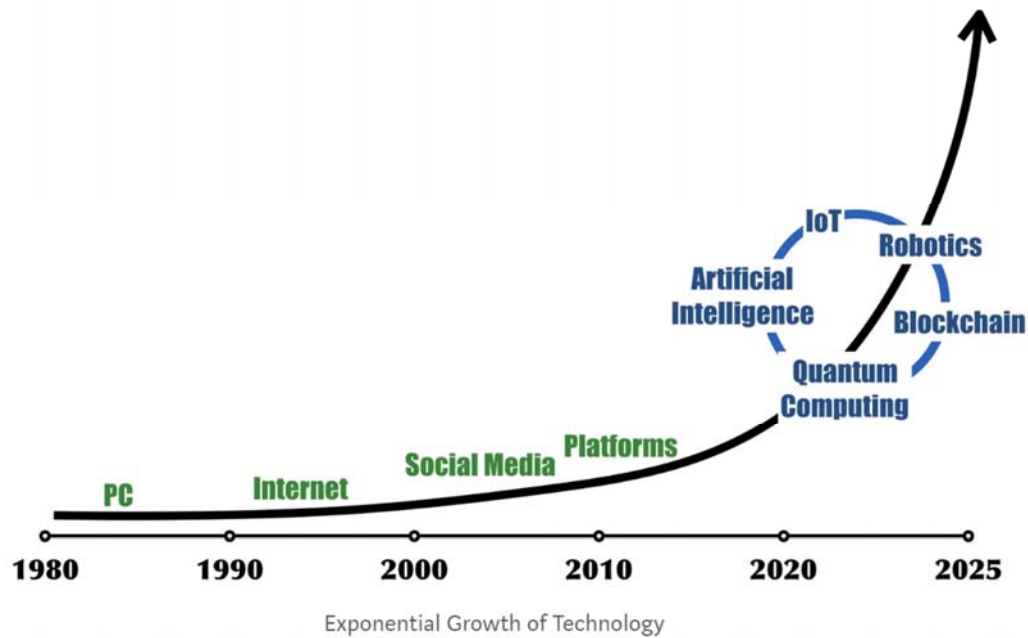
3

Artificial Intelligence Future

Artificial Intelligence

Machine ability to understand, learn, and act on information and events, designed to augment, provide assistance to, or perform tasks independently from humans

Artificial Narrow Intelligence (ANI)

- **AI Stages:** Execute specific focused tasks, without ability to self-expand functionality
- **Timing: Today**
- **Implications:** Outperform humans in specific repetitive functions, such as driving, medical diagnosis, and financial advice
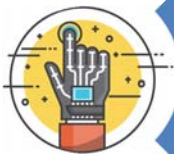
Artificial General Intelligence (AGI)

- **AI Stages:** Perform broad tasks, reason, and improve capabilities comparable to humans
- **Timing: About 2040?**
- **Implications:** Compete with humans, such as earning university degrees and convincing humans it is human

Artificial Super Intelligence (ASI)

- **AI Stages:** Demonstrate intelligence beyond human capabilities
- **Timing: Soon after AGI**
- **Implications:** Outperform humans, helping to achieve societal objectives or threatening human race
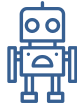
4

What Workloads are Suitable for AI ?

AI helps Reduce Administrative Burden, Resolve resource allocation problems, Automate the Workforce, Improve Worker Productivity, Solve Complex Mission Challenges

Mundane Repetitive Human Tasks & Routine Processes (Workforce Automation through RPA)

Large Diverse Data Sets in a Data Lake (Need to find Patterns & Correlations using Object Tracking)

Complex & Massive Cyber Log Data (Predictive Threat Detection & Mitigation)

Large Scale IOT Data from Autonomous Sensors (Image Classification for Smart Surveillance & Biometrics)

AI Use-Cases for the Public Sector

ACCELERATES MISSION CRITICAL APPLICATIONS

- VIDEO ANALYTICS
- WORKFORCE AUTOMATION
- BIOMETRICS APPLICATIONS
- ROBOTICS & AUTONOMOUS SYSTEMS
- CHATBOTS & DEVOPS
- FACIAL RECOGNITION
- HADOOP WORKLOADS

POSITIVELY SUPPORTS CUSTOMER MISSION

- Predictive Fraud Detection & Mitigation
- Cyber Threat Detection, Remediation & Prevention
- Geo-Spatial Intelligence Using Drones
- Predictive Insider Threat Detection & Mitigation
- Autonomous Sensors and Large Scale Object Detection
- GPU Accelerated VDI and HPC Applications
- Smart Video Analytics & Pattern Recognition
- Platform Sustainment & Preventive Maintenance
- GPU Accelerated Satellite Imagery Fusion

ACCELERATED AI

IGNITE THE REVOLUTION. OWN THE TRANSFORMATION.

Key Functions Replaced By Bots Using Robotic Process Automation (RPA)

Opening email and attachments	Logging into web/ enterprise applications	Reading and writing to databases
Copying and pasting	Filling in forms	Moving files and folders
	Collecting social media statistics	Extracting structured data from documents
	Connecting to system APIs	Scraping data from the web
	Following if/then decisions/rules	Making calculations
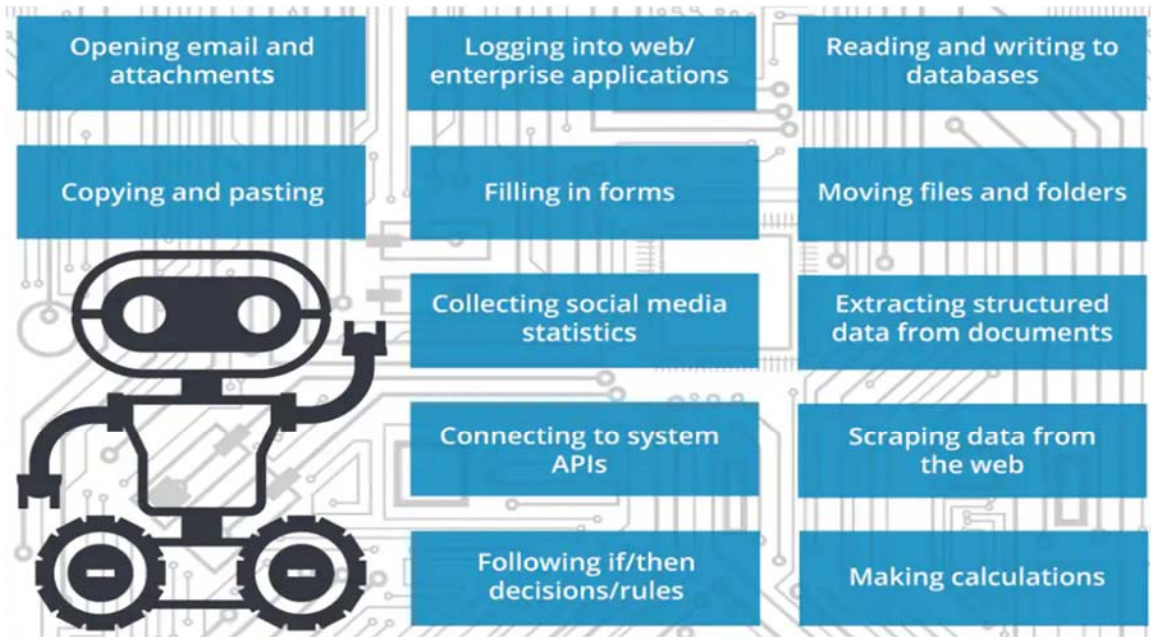
AI Maturity Model – Path to AI Optimized Agency

Emerging

Advanced Analytics

AI

Self-Learning and Completing Automated Enterprise
Computerized Human Thought Simulation Actions Towards Autonomic Agency

Simulation-Driven Analysis and Decision-Making
Mature Data Lake

Foresight
What Will Happen, When, and Why

Cognitive Analytics

Prescriptive Analytics

Predictive Analytics

Analytics Curve

Diagnostic Analytics

Insight
What Happened and Why

Hindsight
What Happened

Descriptive Analytics

Operational Analytics

Today

ARTIFICIAL INTELLIGENCE PROCESS FLOW

Input Data

"Learning" Machine Learning System

Output Data

1496204563
90624359073
85952310946
7535801244

| Feed Learner Various Data (e.g., structured and unstructured) | Align Appropriate Type of Learning System (e.g., supervised and unsupervised) | Present Results (e.g., exploratory, predictive and classification) |

Government Acquisitions

---

7 Layers of AI Technology Stack
(Important Enablers Designed for Ultimate AI Visualization)

SECURITY

PRIVACY

GOVERNANCE

ETHICS

FAIRNESS

7 Rapid Data Visualization & Decision Making
Rich Data Visualization & Mission Enablement by Data Scientists, Data Analysts, AI Center of Excellence (COE).

6 Containerized GPU Accelerated AI Applications
GPU Databases, Satellite Imagery Fusion, Robotic Process Automation, Intelligent Image Recognition, Responsibility Determination Bots, User Behavior Analytics for Insider Threat Detection

5 Deep Learning User Software
Apache Arrow, Apache Spark, NVIDIA RAPIDS, NVIDIA DIGITS, Supervised and unsupervised Learning Software

4 Deep Learning Frameworks
TensorFlow, Caffe, Pytorch, MXnet, H2O, CNTK, SciKit, Theano, Apache SINGA, CUDA Cores

3 Data Ingestion & Preparation
High Speed Data Ingestion, Cleansing, Classification, Normalization, Tagging & Labelling, Indexing and Correlation, Data Modeling & Training

2 AI Enabled Smart Endpoints
Sensors, Drones, Smart Devices, Cameras, LIDAR, IOT Devices, Autonomous Endpoints

1 AI Ready High Performance Infrastructure
Hybrid Cloud, High Performance Compute, Hyper Converged Infrastructure, Optimized Storage, GPU Accelerated HPC Purpose Built Appliances,, FPGA & ASICs, High Speed Communication Networks, Geo Distributed Data Lakes, Virtualization & Containers, SDN, Blockchain, Object Storage, Next Gen Security Platforms.

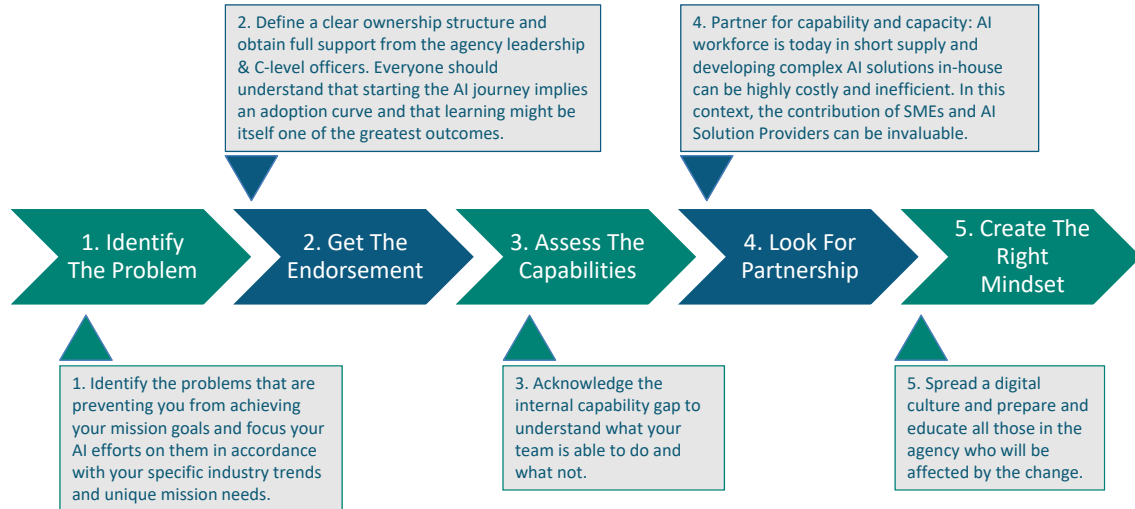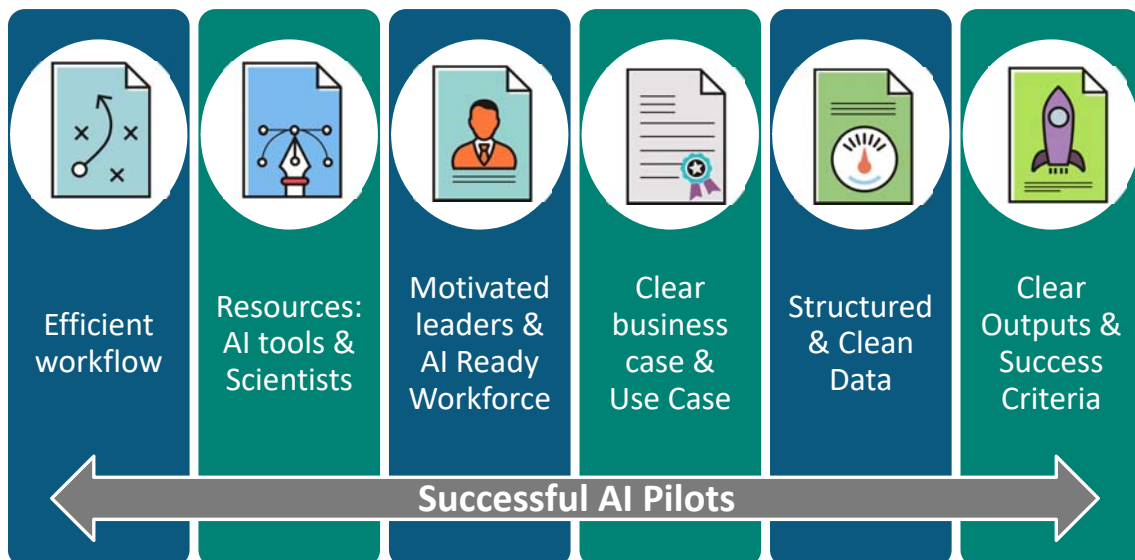**Government Acquisitions**

Roadmap to Success for AI Enabled Agency

How to succeed in your next AI project

Agencies that want to leverage AI in an effective way should consider the following:
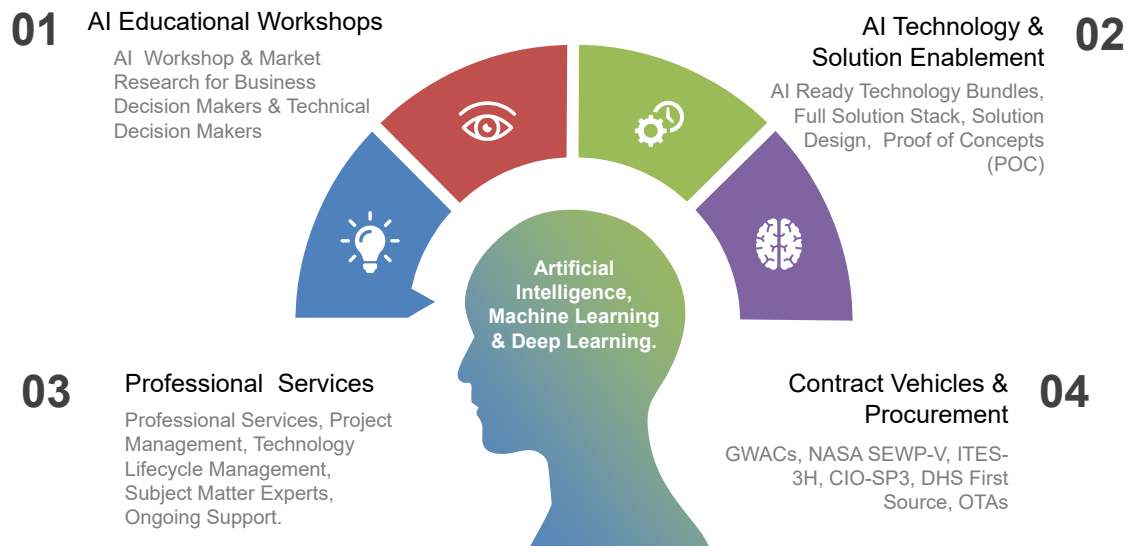
2. Define a clear ownership structure and obtain full support from the agency leadership & C-level officers. Everyone should understand that starting the AI journey implies an adoption curve and that learning might be itself one of the greatest outcomes.

4. Partner for capability and capacity: AI workforce is today in short supply and developing complex AI solutions in-house can be highly costly and inefficient. In this context, the contribution of SMEs and AI Solution Providers can be invaluable.

1. Identify The Problem	2. Get The Endorsement	3. Assess The Capabilities	4. Look For Partnership	5. Create The Right Mindset

1. Identify the problems that are preventing you from achieving your mission goals and focus your AI efforts on them in accordance with your specific industry trends and unique mission needs.

3. Acknowledge the internal capability gap to understand what your team is able to do and what not.

5. Spread a digital culture and prepare and educate all those in the agency who will be affected by the change.

AI / ML – Keys to Effective Pilots

Efficient workflow	Resources: AI tools & Scientists	Motivated leaders & AI Ready Workforce	Clear business case & Use Case	Structured & Clean Data	Clear Outputs & Success Criteria

Successful AI Pilots

GAI HyperCAP 2.0 Reference Architecture
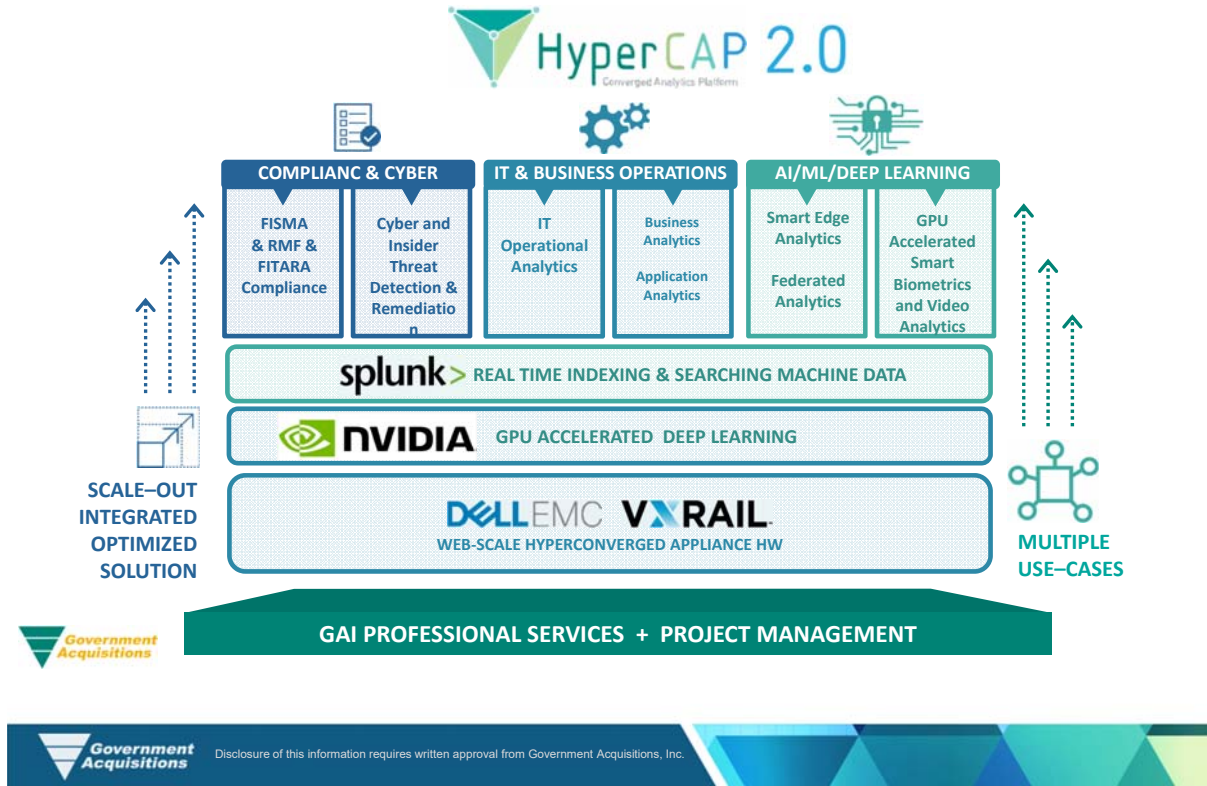
What is GAI Doing to Enable AI ?

Prem Jadhwani
Chief Technology Officer
Government Acquisitions Inc.
Prem.Jadhwani@gov-acq.com
703-554-3827

"Dedication is our DNA….
Mission is our mindset!"