Developing the Foundation for the Ground Architecture

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California Dreamin’ on Ground Architecture
What I See

- All data is aggregated in the same format
- Cost of collecting & processing data from space, air & surface sensors can be reduced significantly
- Ground infrastructure fully leveraging IT potential

If you can do it at home, we should be able to do it for DoD / IC
Access
Information available & discoverable to all authorized to possess

Content
Fully exploited, relevant, comprehensive, properly formatted information

Timeliness
Information (& data) within users’ decision loops

Focus is on the User
Access

- Provide access to large data files – up to full data content
- Provide Internet ease of discovery
- Allow users to defined product content & structure
- Push key data/information as soon as available
- Provide information receipt assessment – Feedback
- Assure availability – Redundancy, capacity
- Assure security – Automated Identity Management

Don’t Let the User Get Lost in the “Digital Junkyard”
Capture and extract ALL relevant data within sensed phenomenon – Signal Processing Improvements

Capture and extract all new modalities from all available sensors and compare with existing libraries

Process data to trustworthy information in real-time

Display information in intuitive form – visualized, geo-referenced, cross referenced, attributable

Allow for unanticipated information needs

Real-Time assessment of information utility - Feedback

Federated architecture & IT developments enable more opportunities & flexibility
Timeliness

- Capture, Stage, Process, Disseminate Data/Information in Real-Time – Streaming Processing
- Continuously Update Information
- Anticipate Data/Information Needs

Allow User to Act Faster than Adversary/Competitor
Environment for A.C.T.
Today – Trapped in the “Digital Junkyard”
Environment for A.C.T.
Need to Unlock the Architecture

IT Enables
- Processor Speed/Power: $10^8$ to $10^9$ IPS/watt
- Edge Connectivity: $10^1$ to $10^5$ Mbps
- Affordable Storage: $10^2$ to $10^{10}$ GB
- IP Addresses: $10^9$ to $10^{38}$
Environment for A.C.T. Future – Leveraging Power of IT

Advantages
• Maximizing systems utility
• Reduce need for utilities
• Flexible configurations
• Increase processing options
• Reduce processing timelines
Elastic Cloud Computing (EC2) provides 800 CPUs dynamically and simultaneously

EvoDevo “grows” millions of networks looking for the best candidate

Key Successes
- Achieved 97% Pd / 10% Pfa
- $2M+ reduced to $200/run
- 2+ week runtime reduced to 2 hours
What We Need From Our Industry

- Leverage the most advanced tools from the commercial industry
  - Develop SW/Tools to implement
- Expand our pursuit
  - Address today’s problems
  - Use the very best apps for each problem
  - Minimize cost while increasing capabilities
- Recognize/mitigate hazards/risks
  - Security – Identity Management
  - Assurance