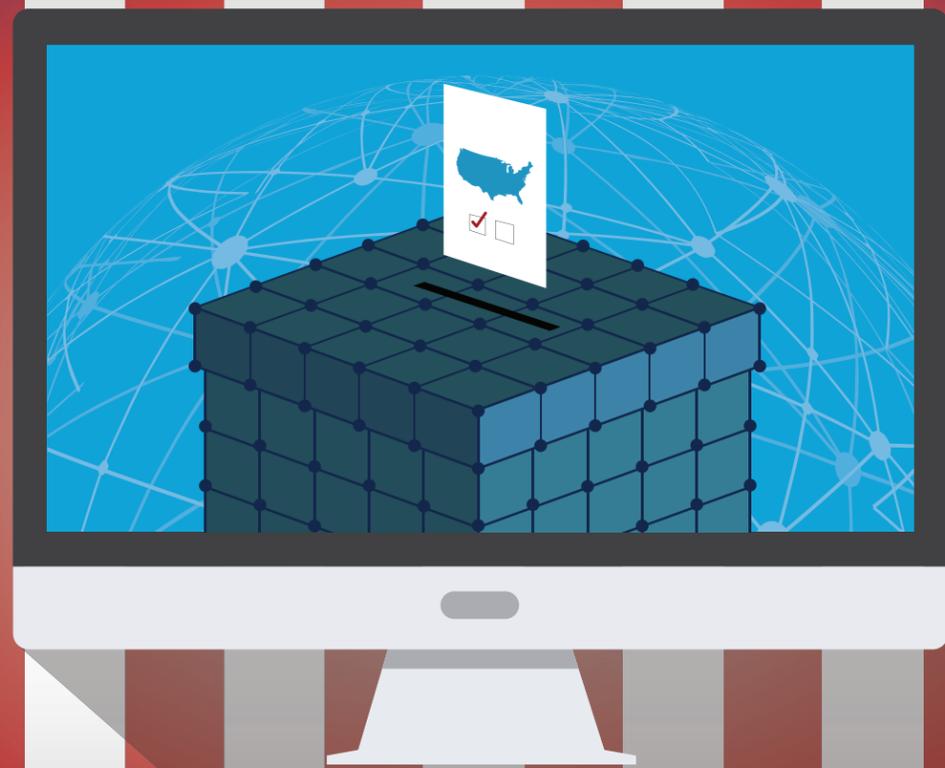


TECH ICONOCLASTS



# VOTING FOR AMERICA'S SUCCESS IN A NETWORK WORLD



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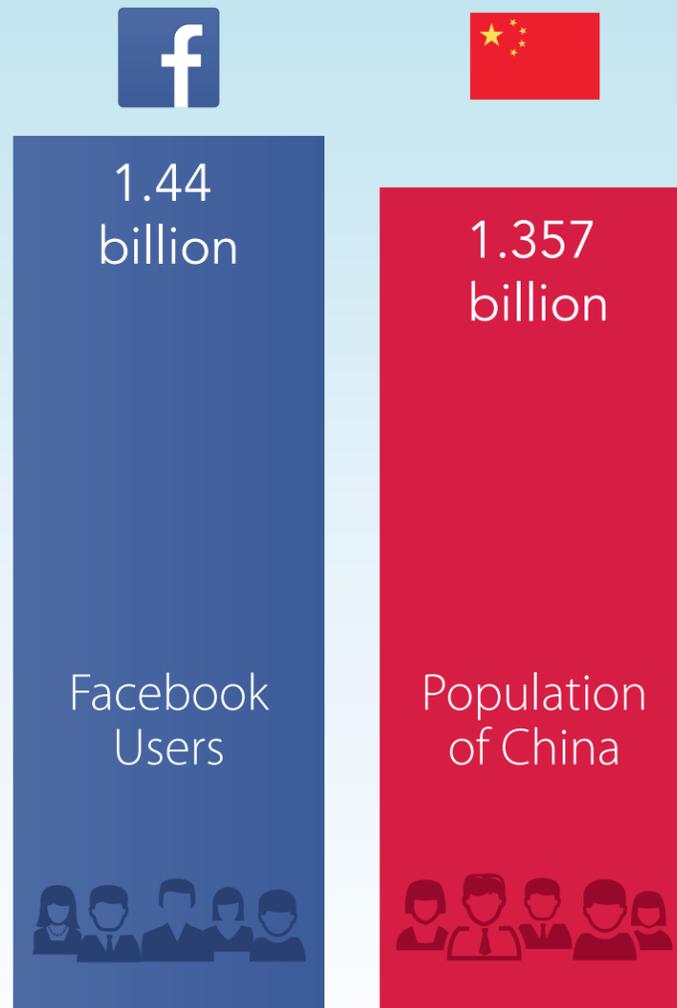
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Today, nearly half the people on earth are online.

There are **877 million** websites floating in cyberspace.



With **1.44 billion** users, the population of Facebook has outstripped that of China – and it's only one platform.



## An Open Letter

This is an open letter to the candidates for the U.S. presidency.

Today, nearly half the people on earth are online. We inhabit a networked society that respects no borders. Need information? Try one of the 877 million websites floating in cyberspace. With 1.44 billion users, the population of Facebook has outstripped that of China – and it's only one platform.

Global connectivity of Internet communications now extends to mobile devices, which have become ubiquitous. Eighty-two percent of Kenyans, 95 percent of Chinese, and 91 percent of Americans own mobile phones – and 64 percent<sup>1</sup> of Americans own smartphones. The iPhone and Android<sup>2</sup> are the great equalizers of our time, introducing a global language that breaks down barriers to understanding. But while smartphones make the world smarter, wealthier, and freer, they also make government and other traditional structures less stable.

This ubiquitous connectivity is increasing global insight and understanding, and challenging sacred cows – from American economic dominance to Europe's separate path and identity. Social and network connectivity has become the common currency of modern social, political, and economic advancement.

Yet, governments around the world are having trouble keeping pace<sup>3</sup> with tech advancements. As the world's launchpad for disruptive tech innovation, the U.S. economy must reorganize and prepare to harness the global network in a way that preserves U.S. leadership while also supporting social, political, and economic advancement around the world.

Today's thinking will not solve tomorrow's challenges. The next President ignores the changing nature of the global network at his or her own peril. Indeed, the very ability of governments to govern rests on their understanding of the networked world and their willingness to change at network speed.

### The Future Calling?

Our tech tomorrow presents utopian and dystopian shades. Is it Star Trek or 1984? Autonomous cars will unclog our cities, but put taxi drivers – even Uber – out of work.

Tech advances, income polarization, and democracy are a potent Molotov cocktail. If advantages don't reach the majority, folks will vote against tech advancement. Global networks defeat distance, but empower terrorist groups to recruit around the world. Can the Bamboo Curtain hold?

Companies no longer recognize passports or perimeters – putting power to the elbow of a global workforce to boost productivity, but undermining the foundation of critical national tax revenue platforms. Is Bitcoin good for society – heads or tails?

These and other policy questions are not inventions of a political class – they are the byproduct of a new social globalism that is fueled by technology and virtually self sustaining.

1 "Mobile Technology Fact Sheet." Pew Research Center. <http://www.pewinternet.org/fact-sheets/mobile-technology-fact-sheet/>  
 2 "U.S. Smartphone Use in 2015." By Aaron Smith. Pew Research Center. April 1, 2015. <http://www.pewinternet.org/2015/04/01/us-smartphone-use-in-2015/>  
 3 "Three Reasons Government Tech Projects Fail." Gartner. July 7, 2014. <http://www.gartner.com/newsroom/id/2790817>

## We The People?

As the U.S. readies to go to the polls in 2016, citizen expectations of government leaders and services seem to fluctuate on a day-to-day basis. Yet, the theme seems clear: Support the American people, grant them access to the tools required to succeed, and make government an enabler of that success.

Whether you see government's role as a strong hand in the economy or bare-bones caretaker, the public sector should not inhibit progress. Uncle Sam has to enable and, ideally, inspire.

But American government today feels stale – not moving and not innovating at the pace U.S. citizens expect from a global leader. An overwhelming percentage of Americans<sup>4</sup> feel as though they are not being heard or properly represented by their government. Interactions with various departments on all levels of government tend to leave American citizens with a bad taste in their mouths<sup>5</sup>. The data breach at the Office of Personnel Management – OPM – and other data disclosures profoundly threaten Americans' confidence in providing information to their government.

Some simple customer service tactics can reverse these trends: Provide more information, quicker and more consistent responses, as well as enhanced data security and privacy. All of which would help heal the communication gap between government and Americans – and all are achievable through government IT modernization.

## Continue The Conversation

The Iconoclasts are experts who grew up at the crossroads of government and tech. This report maps our recommendations for D.C. – the information age's Rome – as America turns to crown a new emperor or empress. We take aim at sacred cows – we walk past them every day inside the Beltway. We provide bold recommendations for America's tech policy priorities – recognizing that tech touches people.

We drill down to frame how U.S. government tech spending must change to empower America to realize strategic gains and big-picture goals.

We cover five topic areas in the chapters that follow. Our focus is on insight not volume – less is more:

Advancing America's competitiveness

Rebuilding trust in government and institutions

Using technology to simplify and enhance people's lives

Reinventing government technology

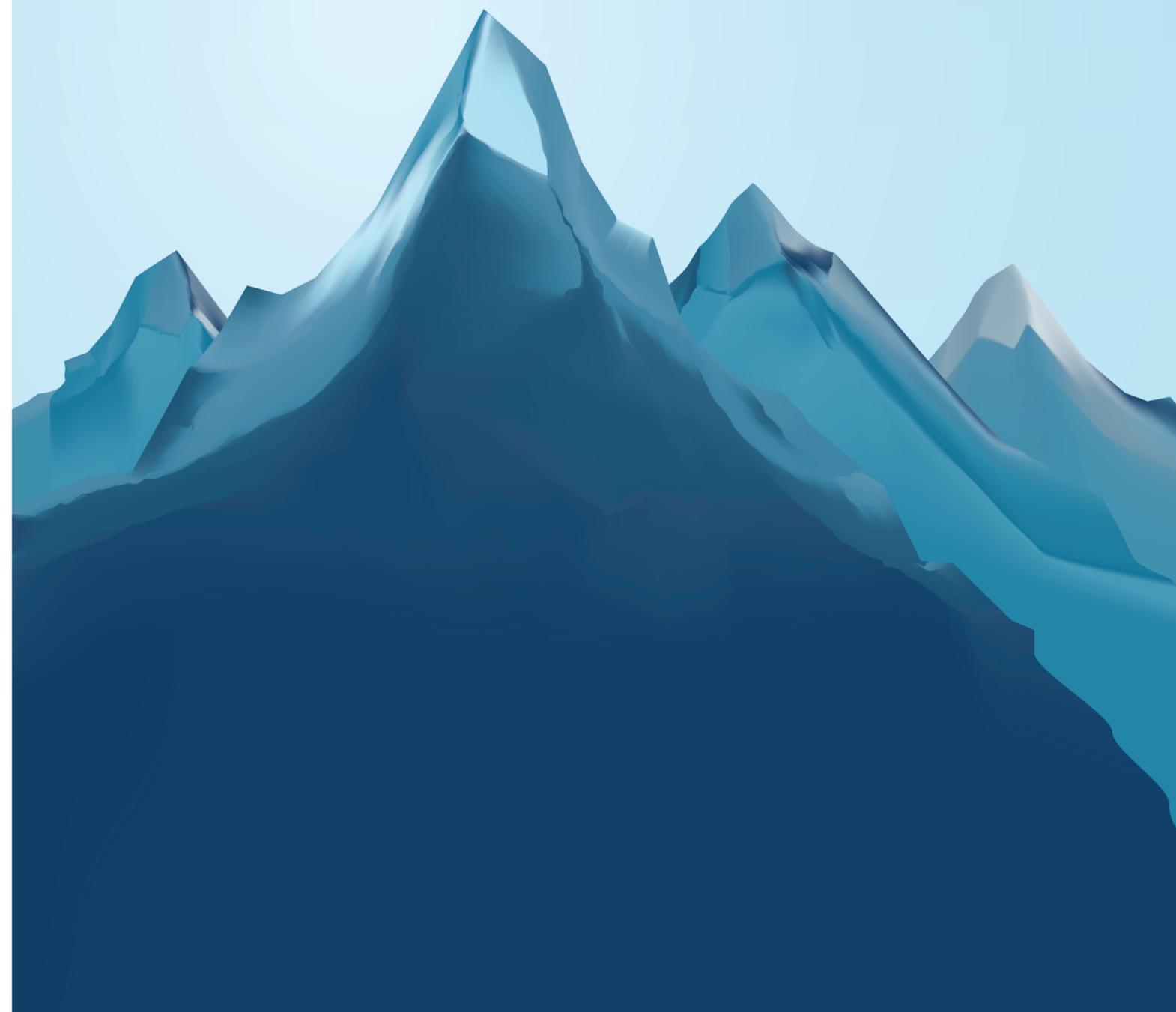
Evolving the workforce

Again, this is an open letter to the candidates for the U.S. presidency. We are committed to public service and innovation. We look forward to continuing the conversation.

<sup>4</sup> "How Americans View Government: Deconstructing Distrust." Pew Research Center. March 10, 1998. <http://www.people-press.org/1998/03/10/how-americans-view-government/>

<sup>5</sup> "Meeting Citizen Expectations in New Ways." Oracle. March 2012. <http://www.oracle.com/us/products/applications/meeting-citizen-exp-wp-1560499.pdf>

# ICONOCLASTS



Since 2011, overseas companies have won more than half of the patents granted by the U.S. Patent and Trademark Office.

## Advancing America's Competitive Edge

The U.S. no longer owns the patent on innovation – since 2011, overseas companies have won more than half of the patents granted by the U.S. Patent and Trademark Office. Today's leaders can quickly become tomorrow's laggards. Consider cause and effect. South Korea amped up its R&D investment<sup>6</sup> from less than one percent of GDP in 1980 to more than three percent today. The number of patents granted<sup>7</sup> by the Korean Intellectual Property Office increased from 1,808 in 1981 to 73,512 in 2005. The Seoul state vaulted from 25th in global manufacturing output<sup>8</sup> in 1980 to 7th in 2010.

The United States remains hamstrung by a patent system in dire need of reform. Congress has considered more than a half dozen proposals to reform the patent system during the last two years. The U.S. must find a way to put an end to patent challenges and infringement lawsuits that are thinly researched, and lacking in both facts and merit.

In a networked world, keeping a pulse is important – a chain is only as strong as its weakest link. The same goes for a nation. So how does the United States get ahead and stay ahead? How can the U.S. government best enable private-sector resources to succeed on the global stage?

Four keys to increasing America's competitive edge:

1. Focus Research and Development (R&D) investment
2. Change patent law
3. Reform immigration law
4. Embrace emerging technologies to unlock government's potential

### Focus R&D Investment: Innovation Boom

With annual public and private sector investment of \$465 billion in 2014, the U.S. outpunches the world in R&D. China plows back \$284 billion. But the gap is closing on both ends. The Federal government's contribution to R&D is declining – it fell by nine percent<sup>9</sup> in FY2013 and looks likely to shrink further. And, too much of U.S. R&D is D, rather than R – as companies focus R&D on productizing to achieve near-term returns. R investments are the roots for innovation.

There are two dimensions to Chinese R&D the U.S. should consider. First, a dollar goes a lot further in China. If you multiply the Chinese investment by the real value of money in country, the dragon's real investment<sup>10</sup> of \$257 trillion dwarfs Uncle Sam. And, the Chinese are ramping up the volume of their R&D. Current

<sup>6</sup> "Excelsior: The Korean Innovation Story." By Sungchul Chung. Fall 2007. <http://issues.org/24-1/chung/>

<sup>7</sup> Ibid.

<sup>8</sup> "Manufacturing the Future: The Next Era of Global Growth and Innovation." The McKinsey Global Institute. November 2012. <http://www.nist.gov/mep/data/upload/Manufacturing-the-Future.pdf>

<sup>9</sup> "American Innovation Lies on Weak Foundation." By Eduardo Porter. NY Times. May 19, 2015. [http://www.nytimes.com/2015/05/20/business/economy/american-innovation-rests-on-weak-foundation.html?\\_r=0](http://www.nytimes.com/2015/05/20/business/economy/american-innovation-rests-on-weak-foundation.html?_r=0)

<sup>10</sup> "China Headed to Overtake EU, U.S. in Science and Technology Spending, OECD Says." OECD. December 11, 2014. <http://www.oecd.org/newsroom/china-headed-to-overtake-eu-us-in-science-technology-spending.htm>

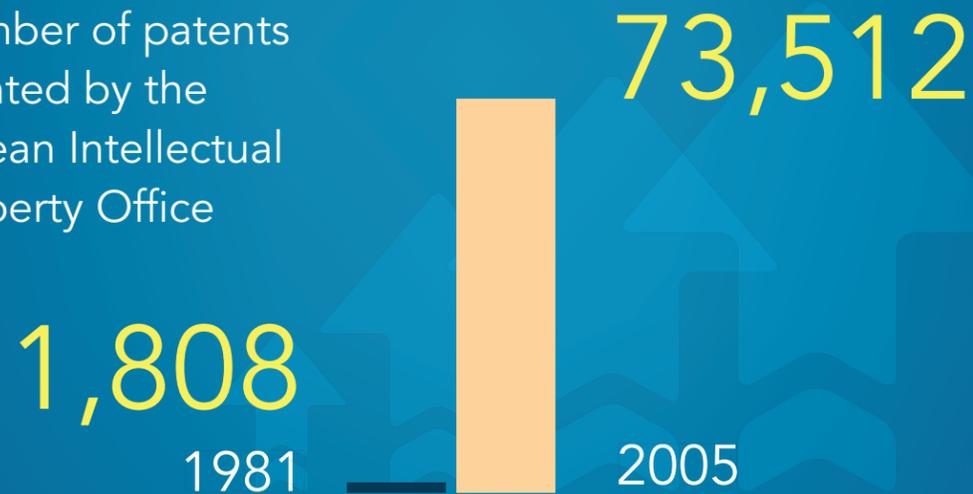


SOUTH KOREA

### R&D investment



Number of patents granted by the Korean Intellectual Property Office



Seoul state's global manufacturing output



RANKING

projections<sup>11</sup> tell us they will surpass U.S. R&D spending by 2022.

A study by the National Science Foundation<sup>12</sup> found that about 20 percent of the more than \$40 billion in Federal funds given to universities for R&D went to just 10 of the 896 university recipients of such funds. It may be time to consider shifting the status quo in how the Federal government awards research funding.

Consider some of the biggest advances of 2014. The first landing on a comet, discovery of a new particle, development of the world's fastest supercomputer, and the germination of new plant biology to feed the planet. None had U.S. DNA<sup>13</sup>.

#### RECOMMENDATIONS:

1. Increase focus in R&D targets. The U.S. spends a lot on D, but does not put forth the same spend toward R. Ensure the R&D projects that receive funding have clear goals and hold project leaders accountable. Direct funding for R toward basic and applied research
2. Move a portion of R&D funding to rural America. Innovation is not limited to Silicon Valley, the corridor around Boston, or inside the Beltway that loops around Washington, D.C. Push more R&D money from the coasts to rural areas where it is possible to take advantage of less expensive land, lower labor costs, and less onerous tax rates
3. Incentivize U.S. companies to repatriate capital held overseas contingent on specific investment guidelines – specifically, that money needs to be invested into research-based programs focused on technology innovation
4. Consider Federal R&D funding patterns to universities – how do we tie Federal grants to specific target outcomes?

### IP Law for the 21st Century: Rethink IP

Patents are designed to benefit society – providing inventors with a monopoly on their ideas, protecting investors, and spurring innovation through the publication of ideas that others can build upon. There are two competing camps of thought in this field – patents lead to more investment and innovation vs. the system is plagued by patent trolls and big-money bullies that choke innovation. The big-picture question, however, is – are patents good for society?

Between 40 and 90 percent<sup>14</sup> of patents issued are never used by their owners. And, patent trolls are becoming increasingly troublesome. In the month of January 2015, there were more patent lawsuits filed<sup>15</sup> by trolls than in the entire year of 2004. Patent trolls have threatened more than 100,000 companies<sup>16</sup> with infringement suits in the last year alone.

At the same time, China and other developing nations are stealing U.S. intellectual property – IP. Even

11 "2014 Global R&D Funding Forecast." Battelle. December 2013. [http://www.battelle.org/docs/tpp/2014\\_global\\_rd\\_funding\\_forecast.pdf](http://www.battelle.org/docs/tpp/2014_global_rd_funding_forecast.pdf)

12 "Profile for 2014 Election Cycle." National Science Foundation. <http://www.opensecrets.org/orgs/summary.php?id=D000036125>

13 "The Future Postponed." Massachusetts Institute of Technology. April 2015. [http://dc.mit.edu/sites/default/files/innovation\\_deficit/Future%20Postponed.pdf](http://dc.mit.edu/sites/default/files/innovation_deficit/Future%20Postponed.pdf)

14 "A Question of Utility." The Economist. August 8, 2015. <http://www.economist.com/node/21660559>

15 "Innovation Act Needed More Than Ever as Patent Trolls Roll On." By Daniel Nazer. Electronic Frontier Foundation. February 18, 2015. <https://www EFF.org/deepinks/2015/02/innovation-act-needed-more-ever-patent-trolls-roll>

16 "Patent Assertion and U.S. Innovation." Executive Office of the President. June 2013. [https://www.whitehouse.gov/sites/default/files/docs/patent\\_report.pdf](https://www.whitehouse.gov/sites/default/files/docs/patent_report.pdf)

cookies aren't safe – and we're talking real cookies<sup>17</sup>. Nabisco uses a special formula patented by DuPont to make the vanilla cream in Oreos just the right shade of white. A Chinese company paid two American businessmen \$20 million for the stolen formula. That company is now building a plant to produce the whitening powder. The secret to milk's favorite cookie is no longer secret.

What can government do to enable innovation and protect IP? Some argue America should throw out the patent system altogether. Others champion a "use-it-or-lose-it" approach where patents expire if not used within a specific time period. Six patent reform bills<sup>18</sup> have been proposed to Congress. We, the Iconoclasts, are on board with reform that includes expiration for unused patents.

#### RECOMMENDATIONS:

1. Reform the law. Patents that are not productized within five years should lapse

### Reform Immigration Law: New Blood

Ironically, America, the melting pot, has the recipe badly wrong on immigration. There are two pots on the verge of bubbling over. U.S. industry can't import the talent we need to win, and at the same time Uncle Sam's requiring America to deport Science, Technology, Engineering, and Mathematics – STEM – experts from our shores.

U.S. industry petitioned the U.S. Citizenship and Immigration Services – USCIS – for 233,000 H-1B visas to bring qualified experts to reside and work stateside. But the Federal government will issue just 36 percent of those visas. That means U.S. industry will be starved of 148,000 qualified and vital employees.

As H-1B visas go MIA, America ejects international students who earn advanced degrees in STEM in the U.S. – forcing them to return home on graduation. Get this: As of 2013, Iran's Cabinet has more U.S.-educated Ph.D.s than the U.S. Cabinet – six in the Iranian Cabinet<sup>19</sup> compared to one in the U.S. Cabinet<sup>20</sup>.

#### RECOMMENDATIONS:

1. Issue more H-1B visas. Apply a strict screening process for H-1B visas and double the percentage of H-1B visas for tech positions
2. Retain talent. Provide green cards to international students that graduate from U.S. universities with advanced degrees in STEM disciplines

17 "Jury Convicts Two Americans of Selling Secret Oreo-Whitening Techniques to China." By Mary Beth Quirk. Consumerist. March 6, 2014. <http://consumerist.com/2014/03/06/jury-convicts-two-americans-of-selling-secret-oreo-whitening-technique-to-china/>

18 "A Question of Utility." The Economist. August 8, 2015. <http://www.economist.com/node/21660559>

19 "Rouhani's US-Educated Cabinet." The Iran Primer. November 13, 2014. <http://iranprimer.usip.org/blog/2014/nov/13/rouhani%E2%80%99s-us-educated-cabinet>

20 "Bob Schieffer Says Iran President Hassan Rouhani Has More Cabinet Members with American Ph.D.s than Obama." By Katie Sanders. PolitiFact. December 16, 2013. <http://www.politifact.com/punditfact/statements/2013/dec/16/bob-schieffer/bob-schieffer-says-iran-president-hassan-rouhani-h/>

## Embrace Emerging Technologies to Unlock Government's Potential: Equip Government for the Networked World

What is the old saying about "glass houses" and "stones?" It's tough for the government to talk innovation and change when its tech infrastructure's a dog's breakfast. Uncle Sam spends more than \$80 billion per year on IT. We hemorrhage \$64 billion of that money maintaining duplicate, geriatric systems. GAO tells us the Federal government maintains 777 supply chain systems and 622 HR systems. Fraud goes unnoticed and unpunished. Five postal addresses in America received 4,900 tax refunds in 2010. IT security is a cyber sieve – see OPM, IRS, and more.

It's time to embrace the opportunity for wholesale government and technology modernization. The OPM breach – and the resulting Federal Cyber Sprint – shine a light on the government IT dilemma. It's impossible to secure the rusting hulks of our legacy IT application vessels. The time is now to invest aggressively in new, cloud-based, secure IT systems and applications for government.

*For recommendations see Chapter 4 – Reinventing Government Technology.*

Just **23%**  
of Americans say they trust  
the Federal government  
to do the right thing  
"most of the time."



Worse, only **31%**  
of Americans trust the  
U.S. government to  
safeguard their data.

## Rebuilding Trust in Government and Institutions

Like budget surpluses, trust is a rare commodity in government. Just 23 percent<sup>21</sup> of Americans say they trust the Federal government to do the right thing “most of the time.” Worse, only 31 percent<sup>22</sup> of Americans trust the U.S. government to safeguard their data. And why should they? Highly publicized data breaches at the Department of Veterans Affairs – VA –, the Internal Revenue Service – IRS –, and, most recently, at OPM are zapping public confidence in government’s ability to protect the data it gathers, particularly when it comes to personally identifiable information – PII.

Data not collected can’t be stolen. But NSA’s mass data collection program is gathering data at an alarming rate. The mobile phone that keeps Americans connected to work, family, and friends is also a vacuum cleaner, sucking up information for surveillance.

But the issues with public trust in government are not limited to zeros and ones. Long-smoldering questions about law enforcements’ treatment of minorities has gained new credence based on emerging mobile phone videos captured by victims and bystanders. Trust in law enforcement is at an all-time low, which disenfranchises millions and makes it increasingly difficult for upstanding law enforcement officers to do their jobs. Tomorrow’s law enforcement officers’ standard-issue equipment will include body cameras. These devices will put all sides on notice – and provide objective evidence to document right and wrong on the thin blue line.

In a networked world, mobility, social media, and the Internet of Things – IoT – promise enormous capability for improving government’s responsiveness to citizens. They also pose threats to privacy and security.

So what’s government’s role? What do citizens expect from government? How can government increase transparency on what data it collects without jeopardizing national security? Can government restore Americans’ confidence, and, if so, how?

Four keys to ensuring trust in government:

1. Safeguard data
2. Elevate standards – ensure a clear linkage between data collection and improved performance
3. Establish Federal liability insurance
4. Define law enforcement video capture and management standards – and map to clearly stated national policy.

21 “Americans’ Views on Open Government Data.” By John B. Horrigan and Lee Rainie. Pew Research Center. April 21, 2015. <http://www.pewinternet.org/2015/04/21/open-government-data/><http://www.pewinternet.org/2015/04/21/open-government-data/#fn-13275-1>

22 “Americans’ Attitudes About Privacy, Security, and Surveillance.” By Mary Madden and Lee Rainie. Pew Research Center. May 20, 2015. <http://www.pewinternet.org/2015/05/20/americans-attitudes-about-privacy-security-and-surveillance/>

## Safeguard Data: The Balance of Trust

The Federal government continues to struggle to find balance between national security and privacy. On one side are national security and public safety concerns. On the other are the personal freedoms of regular citizens.

Revelations about mass surveillance programs emphasize government’s hunger for data and the absence of an effective system of checks and balances to control that appetite. The Foreign Intelligence Surveillance Act, known as FISA, prescribes procedures for physical and electronic surveillance. Of the 34,000 surveillance applications filed by government agencies to the FISA court – the institution tasked with overseeing the law’s execution – only 12 requests were refused in the 33 years from 1979 to 2012. That’s one every two and a half years. The lesson is clear: The jury almost always swings in favor of intelligence agencies.

It’s one thing to collect the data – it’s another to lose it. The OPM breach was all the more painful because it happened after the OPM Inspector General had documented the agency’s non-compliance<sup>23</sup> with Federal security mandates. Protecting sensitive personal data must be an absolute necessity for any government agency.

For government to regain people’s trust, it needs to strengthen its customer service initiative: What do people expect? How can government more effectively serve the public? How can government ensure citizens know what information the government collects and explain why that collection is in the interest of both the citizen and the government?

But with trust comes responsibility – government has to be accountable for its compromises. It’s time to stop apologizing in the passive voice – “mistakes were made” just won’t cut it.

Likewise, for the government to regain trust it must do two things: Tell the story of the millions of public servants who do tough jobs under tough conditions and who do the right thing. And involve citizens more often in regular public policy decision-making. Both of these goals are tailor-made for the communications and social media tools that now drive our networked lives.

But before citizens will truly feel digitally empowered to participate and engage with their government, the institution of government must embrace a wholesale modernization of government IT – see Chapter one and Chapter four.

23 “EPIC Fail – How OPM Hackers Tapped the Mother Lode of Espionage Data.” By Sean Gallagher. ARS Technica. Jun 21, 2015. <http://arstechnica.com/security/2015/06/epic-fail-how-opm-hackers-tapped-the-mother-lode-of-espionage-data/>

In 2014

1,500 attacks

almost 1 billion

data records  
were compromised



OPM Breach  
1 attack

22 million

data records were compromised

#### RECOMMENDATIONS:

1. Safeguard data. Invest in cyber security solutions that identify and protect against cyber crime. Share threat data among government agencies – and between government and industry. No more talk – it's time for practical legislation that empowers market forces
2. Enforce compliance. Reward organizations that meet standards and penalize those that fail. Hold organizations and government accountable
3. Establish a tort, liability, and insurance framework – and make government responsible and accountable. This is the only way to get serious about cyber security. Even government vehicles need insurance to drive on our roads
4. Embrace best practices. Define what has worked most effectively in protecting data, and share this information between government and industry. Migrate off old, legacy systems that are structurally incapable of protecting data in any meaningful way

#### Elevate Standards: New Terms of Use

Government isn't alone in earning the ire of consumers. Americans have even less faith in the ability of private institutions than they do in government to protect their data. Only 29 percent<sup>24</sup> of Americans believe credit card companies will protect their data, and just 22 percent trust retailers with their personal information.

Today's ubiquitous privacy agreements are so long and so complex that the average user rarely reads or understands them. Consumers are overwhelmed by these agreements, which grant businesses the ability to use users' data in ways many cannot even fathom. The typical consumer would spend 25 days<sup>25</sup> a year to actually read all the privacy policy and user agreements he or she encounters when downloading apps or visiting websites.

But, what Web visitors don't read can hurt them. Data brokerage is a multibillion-dollar business. The largest data broker, Acxiom, has about 1,500<sup>26</sup> pieces of information on more than 200 million Americans. And, with mobile phones in virtually every pocket, Americans are equipping themselves with the ultimate tracking devices, providing law enforcement, intelligence agencies, and marketers – as well as friends, enemies, and all manner of app providers – the ability to know the who, what, when, where, and why of every aspect of their lives. Bottom line, if you're running apps you can't hide.

<sup>24</sup> "Americans' Attitudes About Privacy, Security, and Surveillance." By Mary Madden and Lee Rainie. Pew Research Center. May 20, 2015. <http://www.pewinternet.org/2015/05/20/americans-attitudes-about-privacy-security-and-surveillance/>

<sup>25</sup> "Reading the Privacy Policies You Encounter in a Year Would Take 76 Work Days." By Alexis C. Madigal. The Atlantic. March 1, 2012. <http://www.theatlantic.com/technology/archive/2012/03/reading-the-privacy-policies-you-encounter-in-a-year-would-take-76-work-days/253851/>

<sup>26</sup> "The Data Brokers: Selling Your Personal Information." By Steve Kroft. 60 Minutes. March 9, 2014. <http://www.cbsnews.com/news/the-data-brokers-selling-your-personal-information/>

**RECOMMENDATIONS:**

1. Develop and define national privacy standards. Simplify terms of service agreements for websites so users know what they are agreeing to and why. This could be achieved at a national level by tasking the National Institute of Standards and Technology – NIST – to lead a public-private development of a national privacy standard leveraging related work already underway as part of the National Strategy for Trusted Identities in Cyberspace
2. Increase oversight and transparency. Require websites and apps to notify users if – and what – information is shared with third parties. Develop uniform data-breach-notification requirements for customer data thefts

**Establish Federal Liability Insurance for Consumers: Preparing for the Worse Case**

In 2014, in just 1,500 attacks, almost 1 billion<sup>27</sup> data records were compromised. This pales in comparison to the OPM breach that compromised the records of 22 million Americans in a single incident. Cyber security insurance would help mitigate losses, promote use of preventative measures, and encourage adoption of best practices. But it's also costly and confusing when it comes to what's covered.

The Federal government has focused most of its attention since 2012 on helping to create the right conditions for the birth of a healthy cyber insurance market in the U.S. But those efforts have focused almost exclusively on insurance products of corporations and critical infrastructure owners and operators. To date, the Department of Homeland Security's National Protection and Programs Directorate has held four working group sessions with private sector organizations to develop ways to promote better preventative measures in return for more coverage at better rates.

And while the NIST Framework for Improving Critical Infrastructure Cyber Security will likely play an important role in establishing a foundation for the development of a mature cybersecurity insurance industry, many companies continue to take an "it-can't-happen-to-me" approach to buying insurance.

More importantly, consumers have been left out on their own without a centralized champion they can turn to when their data is placed at risk or compromised in a national network that does not recognize national, state, or county borders.

Currently, 47 states<sup>28</sup> have requirements for notifying customers and the state attorney general after the unauthorized access of PII. But the triggers for notification and various state consumer notices lack uniformity. As a result, lawyers and advisers must analyze 47 sets of requirements to deal with a data breach – a costly exercise that a nationwide standard would address.

27 "1 Billion Data Records Stolen in 2014, Says Gemalto." By Amir Mizroch. The Wall Street Journal. February 12, 2015. <http://blogs.wsj.com/digits/2015/02/12/1-billion-data-records-stolen-in-2014-says-gemalto/>

28 "Cyber Insurance in the Spotlight: Senate Mulling Federal Data Breach Protections." By Rosalie L. Donlon. PropertyCasualty360. March 20, 2015. <http://www.propertycasualty360.com/2015/03/20/cyber-insurance-in-the-spotlight-senate-mulling-fe?t=commercial&page=4&slreturn=1453321465>

**RECOMMENDATIONS:**

1. Bring public and private organizations together. Create a required public-private partnership between NIST and the insurance industry to create a consumer-focused cyber insurance framework
2. Establish national insurance standards for doing business with the Federal government. Leverage the NIST Framework to require that all businesses have cyber liability insurance to protect not only the business itself but also the customer

**Define Law Enforcement Video Capture and Management Standards – and Tie Off Against the Law**

It's time for the Federal government to define the role for body cameras in Federal, state, and local law enforcement. What needs to be captured? When can law enforcement turn off the cameras? What's admissible? How long does law enforcement have to store the videos? What's the best format for storage? Questions abound. Delay in tackling these questions is undermining already significantly damaged public trust. There is significant opportunity for NIST to convene working sessions with Federal, state, local, as well as International Association of Chiefs of Police and citizen-rights organizations to define the new law of the land.

**RECOMMENDATIONS:**

1. Define role of body cameras. Clarify the expectation and outcomes so both law enforcement officers and citizens understand what is allowed, when, and why

According to the 2015 World Happiness Report, the Swiss own earth’s biggest smile – while Americans rank 15th on the grin list.

HAPPINESS RANKING



1st

15th

But America’s ahead of Switzerland in tech adoption – we rank number one on Internet usage and just behind the Chinese on mobile phone use.

TECH ADOPTION

MOBILE PHONE USE



1st



2nd



1st

So tech may not equal happy.

# Simplify and Enhance People’s Lives

America was founded on the pursuit of happiness. Let’s say that low stress, productivity, and good health all contribute to “happy.” But what is happy in America – and are happiness and technology friends?

Before we consider how technology can turn America’s frown upside down, let’s compare Americans against the happiest folks on earth – and consider tech’s input. According to the 2015 World Happiness Report<sup>29</sup>, the Swiss own earth’s biggest smile – while Americans rank 15th on the grin list. But America’s ahead of Switzerland in tech adoption – we rank number one on Internet usage and just behind the Chinese on mobile phone use. So tech may not equal happy. If IT expands and increases the intensity of the workday, drives folks out of work, polarizes and depresses wages, and compromises trust – it drives a dystopian future.

Now, let’s consider the half-full perspective and focus on the profound opportunities to simplify and enhance Americans’ lives through technology.

Three keys to simplify and enhance American’s lives:

- 1. Reduce stress and increase safety
- 2. Enable better health outcomes
- 3. Improve government services

### Reduce Stress and Increase Safety: Meet George Jetson

Progress is about advantage. The wheel allows man to move more efficiently. The Spinning Jenny increased productivity, freeing workers to concentrate on more creative tasks. IT’s no different. And, IoT, combined with big-data analytics, is the next profound opportunity in our species’ crawl forward from the primal soup.

Today, millions of devices and appliances carry sensors – and those sensors are starting to talk with one another to roll up information that yields new insight and intelligence. Autonomous cars will slash automotive fatalities, unclog our roads, and allow humans to reallocate millions of hours spent steering to creative thinking and leisure. Self-regulating thermostats will tune into the weather forecast to harvest billions of dollars in energy savings – not to mention making burst pipes a thing of the past. When cars talk with the weather and with smart buildings, who knows what new crosstab curiosities we’ll uncover?

But, there are two sides to the IoT vision – less stress, and more stress. We’ve seen how hackers can compromise today’s smart cars<sup>30</sup>. We’ve also heard the controversy about hackers on commercial airliners<sup>31</sup> – claiming to have altered the flight path of the plane from their seats. We’ve seen the prevalence and payload of cyberattacks against our existing automated systems. What happens when we turn over our kinetic world

29 “World Happiness Report 2015.” Edited by John Helliwell, Richard Layard, and Jeffrey Sachs. <http://www.theglobeandmail.com/news/national/article24073928.ece/BINARY/World+Happiness+Report.pdf>

30 “Chrysler and Harman Hit with a Class Action Complaint After Jeep Hack.” By Andy Greenberg. Wired. August 4, 2015. <http://www.wired.com/2015/08/chrysler-harman-hit-class-action-complaint-jeep-hack/>

31 “GAO: Newer Aircraft Vulnerable to Hacking.” By Matthew Hoye and Rene Marsh. CNN. April 14, 2015. <http://www.cnn.com/2015/04/14/politics/gao-newer-aircraft-vulnerable-to-hacking/>



Nearly **25%** of people accessing government websites in the first half of 2015 did so with a mobile device.



### Improve Government Services

More government does not make Americans happier. What is it they say about policemen? You never see one when you need one. Better access to the government services we need, and for which we are really eligible, is critical to a very significant portion of the American public. And every American wants and needs the government in their time of real need – be that in an emergency or when he or she needs a passport or driver's license.

### Follow Through on E-Gov Initiative

The 1990s push to modernize and bring government services online – known as E-Gov – remains a work in progress. The Digital Divide<sup>32</sup> meant that lower income folks who most needed government could not access online services because they didn't have internet access or PCs. As such, agencies needed to build new e-distribution channels while still maintaining traditional paper- and people-based delivery mechanisms.

Although the E-Gov initiative introduced important advances for government to build on, the almighty mobile phone and its prevalence across all segments of society now provides government with the ability to drive Mobile Gov – and build upon the foundation laid by the seminal work of the original E-Gov initiative.

Mobile Gov presents the opportunity to deliver ubiquitous, responsive services. After all, nearly 25 percent<sup>33</sup> of people accessing government websites in the first half of 2015 did so with a mobile device. Government should consider new models for this mobile-service delivery – including public-private partnerships – to deliver improved services without driving up cost. This also provides an opportunity to integrate services and applications and streamline government. Let's take advantage.

Let's not forget the security angle – online services must be secure and protected. Government – and citizens – can't afford today's massive security breach profile to persist.

#### RECOMMENDATIONS:

1. Modernize government. See Chapter 4 – Reinventing Government Technology
2. Encourage market forces to deliver broadband wireless everywhere at no cost. Consider sponsorship opportunities similar to the model used by existing TV networks. No license fee – paid for by advertising
3. Improve security. Ensure all agencies are aligned with existing security mandates and thoroughly test security to keep hackers out and citizen data safe. Map to proposed cyber security tort, liability, and insurance model

<sup>32</sup> Digital Divide. Wikipedia. [https://en.wikipedia.org/wiki/Digital\\_divide](https://en.wikipedia.org/wiki/Digital_divide)

<sup>33</sup> Digital Analytics Program. <https://analytics.usa.gov/>

## Reinventing Government Technology

The U.S. Federal government put the first man on the moon. We invented the Internet and GPS. Clearly the impact of Uncle Sam's leadership has a massive multiplier effect in the U.S. and global economy. However, today, in spite of spending \$80+ billion each year on IT, Uncle Sam's tech outcomes are dismal. The recent OPM cyber security breach, which stole the records of more than 22 million Americans, is only the latest in an epidemic of compromises that position government IT as a leaky, rusted sieve.

But it's not just cyber security. Blind spots allow fraudsters to purloin trillions from the tax man, health services, and other Federal departments – and by extension law-abiding Americans like us. How can it be that five postal addresses in America received 4,900 tax refunds in 2010 and that a single address in Lithuania pocketed 699 tax refunds? As America ages, health care fraud is getting healthier – pegged at \$272 billion last year, and growing. And, speaking of health care outcomes, consider the healthcare.gov malaise.

### Double Trouble

So what to do about the failing equation? While the Federal government gets a lot of money to fund its IT requirements, too much of that money is sucked up by legacy, redundant systems. The Government Accountability Office (GAO) and the Federal Chief Information Officer (CIO) Tony Scott reported at the August 2015 MeriTalk FITARA Forum that 80 percent of the current \$80+ billion Federal IT budget is committed to operations and maintenance for legacy systems. And we have lots of them. GAO tells us that we have 777 supply chain and 622 HR systems in the Federal government.

### OPM Inspiration

Let's wind back to the OPM breach for inspiration. Reacting to this cyber catastrophe, the President unleashed the Cyber Sprint – an aggressive 30-day program to secure IT systems across the Federal government. In light of the OPM experience, logically establishing multifactor authentication for users to access Federal systems factored high on the list of Cyber Sprint priorities. Both sadly and ironically, the Cyber Sprint is mission impossible. It's impossible to apply two-factor authentication to systems built in the '60s, '70s, '80s, '90s, and 2000s.

Just as important as the legacy system challenge is the fact that the current government IT management model simply does not work. The OPM breach provides evidence of this as well. For example, in addition to a series of scathing inspector general reports, OPM's own Federal Information Security Modernization Act – FISMA – reports provided multiple, repeated warnings to senior officials that the agency's IT systems were wide open to hackers. Yet, nobody demanded action. It required the largest data breach in government history to get the attention of senior government IT leaders.

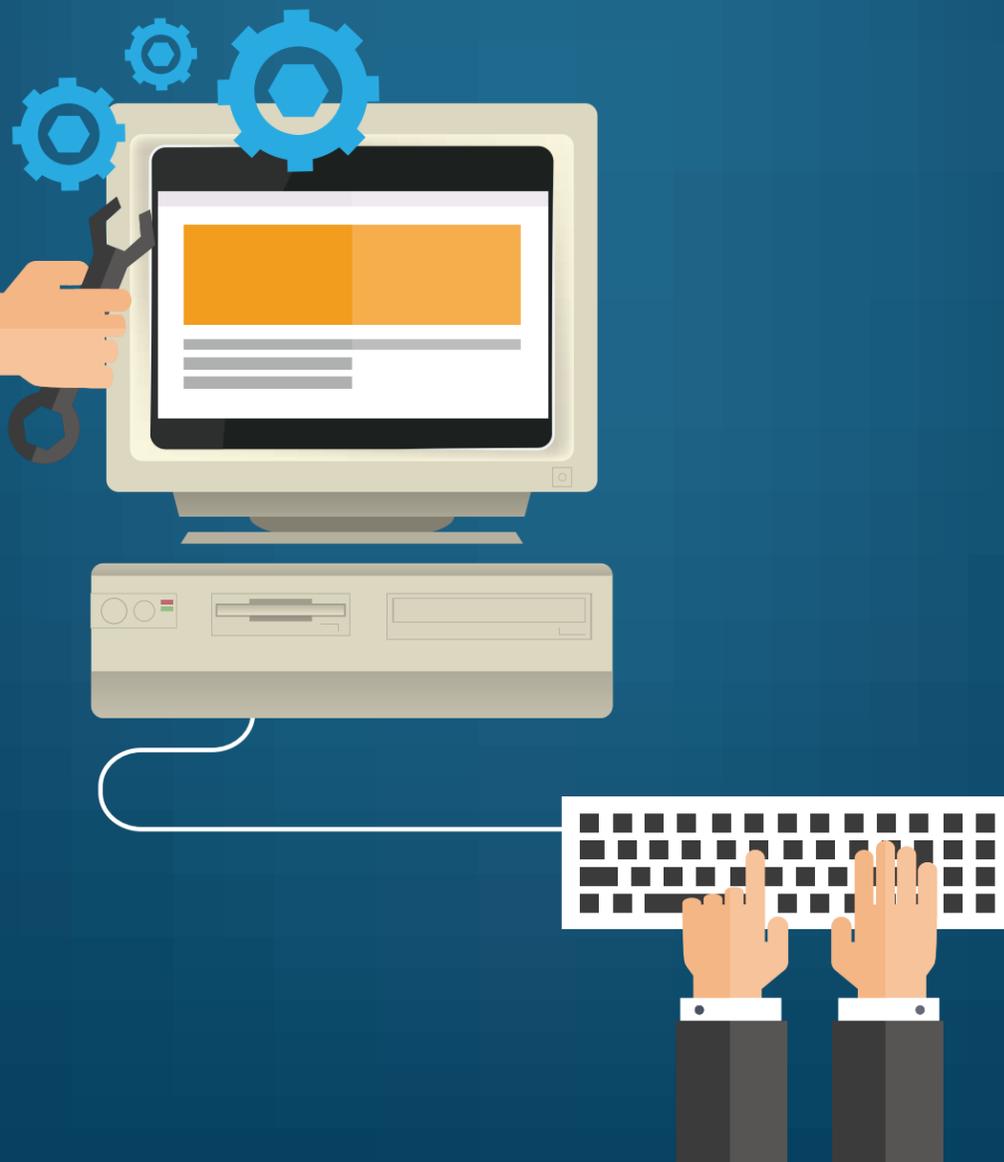
It's time to rethink government IT.



Healthcare fraud is getting healthier – pegged at **\$272 billion** last year, and growing.



**80%** of the current **\$80+ billion** Federal IT budget is committed to operations and maintenance for legacy systems.



## Unleash the Power of Government Data

The Obama administration has talked sharing and transparency since day one. The administration has rolled out numerous directives and initiatives to support openness – the Open Government Initiative, Open Government Directive, Open Government Partnership, and more. But, the government’s commitment to open data has not been codified. There is no guarantee that the next administration will build on this administration’s model.

How can we ensure that the next administration understands the value of data and its power to fuel the economy?

Four keys to reinventing government technology:

1. Invest in new infrastructure and applications
2. Engineer tomorrow's society
3. Democratize the data
4. Motivate the government workforce

## Invest in New Infrastructure and Applications: .usa 2020

Now is the time to take a bold stand – move away from advocating for incremental change in the Federal government’s IT. Programs such as Cloud First, Mobile First, Federal Data Center Consolidation, Trusted Internet Connection, and Homeland Security Presidential Directive-12, have failed to change Federal IT’s culture or improve Uncle Sam’s tech outcomes. As one Federal CIO noted, we’ve gone from buying a \$500 hammer to spending \$500 to buy a \$20 hammer.

Traditional, incremental IT reform has failed for two reasons: Insufficient budget and politics. You have to spend money to save money – there’s no return on investment without investment. Rationalizing and moving to the cloud is not free. Likewise, congressional appropriators have set up IT departments to fail – maintaining the existing broken system keeps Federal IT investments distributed across congressional districts to keep local voters happy. At the same time, our politicians express outrage when legacy systems fail. We can’t have a 21st century, integrated, and intelligent government if every agency maintains its own IT fiefdoms. America needs one integrated approach under an empowered, capable, and visionary CIO core.

The Iconoclasts propose a radical shake-up of Federal government IT – a program that bridges to state and local governments, touches every American, and puts the wind at the back of American business. Let’s call this program .usa 2020 – a completely new government IT infrastructure with a whole new set of applications that support multiple agencies’ requirements – so they don’t all have to build their own silos. The goal is to deliver a 21st century customer experience.

The plan is to roll out .usa 2020 by 2020.

**RECOMMENDATIONS:**

1. Empower a forward-thinking Federal CIO core to lead the charge – support FITARA, the new Federal CIO Empowerment and Accountability Act
2. Invest in a new government IT system by 2020. Stop wasting money to keep the existing systems on life support and build in a completely new IT infrastructure and applications that support all Federal agencies and delivers a top-notch customer experience

**Engineer Tomorrow's Society: Multiplier – Beyond the Beltway**

Will it cost a lot of money? Yes. But this investment will have a massive multiplier effect on our economy. Think of the economic boost delivered by a digital moon shot. The program would attract the best and brightest to the Federal government to engineer tomorrow's society. It would lead to the creation of a secure, agile government tech system that pivots to support new mission requirements. A government that provides citizens with the services they deserve – and catches and cracks down on cheats. This program would allow us to hold agencies accountable to real metrics. And, returning to the big picture for the U.S. economy, over and above the initial economic injection, .usa 2020 will change the calculus on U.S. economic performance. A better, more efficient government means a better and more efficient U.S. economy – an economy that flourishes, innovates, and provides new, engaging, good-paying jobs.

Government doesn't need to go it alone. Utilizing commercial services to perform some standard functions, like eligibility and even transaction processing, could not only help improve citizen services but also help boost the economy.

**RECOMMENDATIONS:**

1. Boost the economy starting at the Federal level. Create competitive contracts that challenge the private sector to “reinvent” government's existing IT architecture and systems. An innovative and efficient government will lift the economy, creating new jobs
2. Increase accountability. Establish metrics for agencies – such as minimum service levels, cost savings targets, and other performance goals – measure against those metrics, and reward/penalize as appropriate. These can build upon existing OMB agency goals and metrics

**Democratize the Data: Unleash the Power**

Accessing government data is crucial to America's ability to grow and succeed. From tracking and collecting weather patterns to developing GPS software, government holds the keys to the information that will propel massive innovation for data consumers. Despite efforts by the present Administration to make government more transparent and accessible, huge troves of Federal data remain to be discovered for technological, security, and other reasons.

Open data can lead to increased efficiency and the development of new products, generating a potential \$1.1 trillion in economic value annually. Disclosing data provides useful insights to citizens, government agencies, and the private corporations. The private-sector's ability to turn the data into products and services

provides long-term economic benefit.

Government needs to not only share more, but welcome an open source approach to the use of data. Data the government collects could be remixed with private-sector information – creating a two-way street of sharing. There's also the issue of privacy concerns. Government data breaches don't instill confidence. Agencies can't just open the floodgates and let data flow – they must be sure not to release private or proprietary information. The first step is to earn back trust and ease concerns about the misuse of data by developing standards that protect and speed the release of data.

**RECOMMENDATIONS:**

1. Set standards. Connecting different data sets delivers new value – and it's much easier to connect data with clear interoperable data standards. The government needs to help shape these standards as well as drive open APIs across government. Implement the DATA Act, which seeks to do this with financial reporting data
2. Use open source data to support policy change. New laws must protect privacy, while encouraging and directing the frequent release of updated data
3. Encourage the private sector to share its data. Pair private and public data to reveal new insights

**Motivate the Government Workforce: The Beatings Will Continue Until Morale Improves**

Let's go back inside the Federal government to close this chapter. Believe it or not, today there are no minimum credentials for Federal CIOs and Chief Information Security Officers – CISOs. In this day and age, this is nonsense. It's time to insist on technocrats at operational levels in government. It's time to establish all CIO and CISO positions as career jobs – no more appointees. We need to stop new administrations playing favorites with these critical operational positions. We should also increase the pay structure and pay bonuses for Federal IT executives who meet and exceed tangible performance metrics.

The road to Federal IT reform is littered with good intentions – and failed outcomes. Each administration launches its own initiatives – which fail to tie off against what went before. Budgets go north – and outcomes drift south. To change outcomes, America needs one vision, one set of metrics, and one world-class workforce.

The health of the Federal government's tech is a huge consideration. However, it's critical to consider the multiplier impact on the U.S. economy. .usa 2020 is a huge opportunity to change our economy's orbit – it's time for an IT moon shot.

**RECOMMENDATIONS:**

1. Establish minimum credentials for Federal CxOs. Transform these positions into careers not just short-term jobs
2. Increase pay and bonuses. Federal IT executives should be held to tangible performance metrics and rewarded when they meet or exceed them

The value proposition of signing up for a 30- or 40-year career in government is no longer enticing to emerging generations of Americans.



## Evolving the Workforce

Facebook is freezing women employees' eggs and Netflix is offering 26 weeks of paid maternity leave. It's all about expanding the size and diversity of the IT talent gene pool. Our economy's serious about conceiving a solution to our workforce crisis.

At the same time, the nature of work itself is changing. Uber is driving taxi drivers off the road – as well as redefining freelance work and full-time employment, putting the average Joe in the driver's seat. And, that's just the start.

If our disruptive, tech-fueled growth economy is good for the one percent – but not most Americans – we're all headed for a crash. Increased income polarization in a democracy drives to a dead end. If we don't work out how to get more folks on the road to success, the majority will vote against tech advance – and that's a massive pileup.

But we must also recognize that today's workforce is not the same as the workforce of 20 years ago. The way people work, the way organizations find employees and the way workers move throughout the workforce have all changed dramatically in the networked era. Even the perception of a government job – something that used to be viewed as an insurance policy against short-term economic disruptions – is no longer the same.

The value proposition of signing up for a 30- or 40-year career in government is no longer enticing to emerging generations of Americans. A 2015 MeriTalk report<sup>34</sup> states 70 percent of current STEM students and current graduate students have no interest in pursuing an IT career in the Federal government. The concept of service to country has fundamentally shifted – even in the military, where less than one percent of Americans serve and a mere 33 percent of 18- to 29-year-olds have a personal connection to a veteran. When offered a “tour of duty” option in government, 57 percent of STEM students still say no<sup>35</sup>.

Take the U.S. Digital Service (USDS) as an example. The USDS recruits the best and the brightest IT talent from all over the country for what it calls “tours of duty.” Those tours of duty can last as long as two years or as little as six months. Even the Defense Department (DoD) is hopping aboard this train. While those who wear the cloth of the country will continue to serve lengthier tours of duty, the Pentagon is actively seeking partnerships with private industry to detail private-sector-technology talent to the department for a year or two. In the past year, both DoD and the Department of Homeland Security have opted to open offices in Silicon Valley.

Technology is the worker's best friend and worst nightmare – it depends who's driving. The future of the workforce is about death and rebirth of jobs, roles, and redefinition of work. It's about better, more efficient, and continuous education. Immigration reform is a significant issue, but let's focus on the domestic workforce for our final chapter.

Three keys to evolving the workforce:

1. Invest in and prioritize new forms of education

<sup>34</sup> “Millennial Math: Informing the Next President's Tech Policy.” MeriTalk. February 11, 2016. <https://www.meritalk.com/study/millennial-math/>

<sup>35</sup> Ibid.

2. Prepare America to compete

3. Incentivize and change the culture

### Invest In and Prioritize New Forms of Education: Cool School

Let's start at the beginning. Students who attend a preschool program ultimately earn up to \$2,000<sup>36</sup> more per month than those who do not. Despite the numerous benefits of early childhood education, 4.3 million<sup>37</sup> 3- and 4-year-olds are not enrolled in school across the nation.

U.S. students can't solve the equation – U.S. millennials are tied for last<sup>38</sup> in mathematics skills among their peers in 22 developed nations. In 2012, 39 percent<sup>39</sup> of all young Americans were expected to graduate from college, compared with 60 percent in Iceland, 57 percent in New Zealand, and 53 percent in Poland.

Companies have a huge demand for graduates with STEM skills. Yet American schools are failing to produce the kind of graduates employers say they need. Forty-seven percent of employers say they can't find people with the right skills to fill their open positions. The median duration of advertising for a STEM vacancy is more than twice as long as for a non-STEM vacancy.

### Cost of College

The American dream is happiness, self sufficiency, and historically a college education – but the \$75,772 cost of a traditional college education is killing too many dreams. In 2013, seven in 10<sup>40</sup> graduating seniors at public and private non-profit colleges had student loans. Some 40 million Americans owe \$1.2 trillion on student loans<sup>41</sup>, an average of \$29,000<sup>42</sup> each. The average bachelor's degree holder takes 21 years<sup>43</sup> to pay off his or her loan. In 2014, college tuition at public schools rose 2.9 percent – that's higher than the rate of inflation, which was 1.4 percent.

We need new elective choices for higher education.

### Skip the Lecture – MOOCs?

Don't want to enroll in school but interested in taking a class here and there? Try a Massive Open Online Course – MOOC. Take the class on your mobile phone. Education literally could be in the palm of your hand.

Online higher education is oxygen to folks drowning in the traditional brick-and-mortar approach to

<sup>36</sup> "Early Childhood Education." National Education Association. <http://www.nea.org/home/18163.htm>

<sup>37</sup> "Not Enrolled in Preschool: A State-by-State Breakdown." Education Week Research Center. January 5, 2015. <http://www.edweek.org/ew/qc/2015/not-enrolled-in-preschool-a-state-by-state-breakdown.html>

<sup>38</sup> "Report: U.S. Millennials Getting Schooled in Skills." By Allie Bidwell. U.S. News & World Report. February 17, 2015. <http://www.usnews.com/news/articles/2015/02/17/millennials-more-educated-but-skill-levels-are-dropping>

<sup>39</sup> "OECD: The U.S. Has Fallen Behind Other Countries in College Completion." By Liz Weston. Business Insider. September 9, 2014. <http://www.businessinsider.com/r-us-falls-behind-in-college-competition-oecd-2014-9>

<sup>40</sup> "Student Debt and the Class of 2014." The Insitutue for College Access & Success. <http://ticas.org/posd/home>

<sup>41</sup> "Analyze This: A Close-Up Look at Student Loan Debt." Experian. <http://www.experian.com/blogs/news/experian-insights/analyze-this/>

<sup>42</sup> Ibid.

<sup>43</sup> "Student Loan Expectations: Myth vs. Reality." By Allie Bidwell. U.S. News & World Report. October 7, 2014. <http://www.usnews.com/news/blogs/data-mine/2014/10/07/student-loan-expectations-myth-vs-reality>

# 2012



## Young people expected to graduate from college



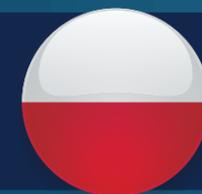
# 60%

Iceland



# 57%

New Zealand



# 53%

Poland



# 39%

USA

college education. How about graduating from Princeton, Yale, or Harvard without ever setting foot outside Mississippi or Indiana? No dorm fees and tuition at pennies on the dollar? More smart graduates would be good for all of us.

## Apprenticeships

But there's more than one running path to the happiness end zone – a good paying job and upward mobility. College education's not for everyone. We need to consider other paths. What about on-the-job training – apprenticeships. Germany has a robust apprenticeship program and, consequently, a youth unemployment<sup>44</sup> rate that is half that of the U.S.

Fortunately, some lawmakers are on board and some progress has been made. The U.S. Department of Labor, for example, announced a \$100 million<sup>45</sup> American Apprenticeship Grant competition that will expand apprenticeships into new high-tech, high-demand industries.

### RECOMMENDATIONS:

1. Engage industry. Get industry involved in developing curriculum so the skills that are needed in the workforce are taught in school
2. Forgive any student debt for those who successfully complete a two-year “tour of duty” working directly for a Federal agency STEM capacity
3. Embrace alternative forms of education. Champion online courses and apprenticeships. Expand the role of community colleges and vocational training. More education is good for all of us

## Prepare America to Compete: Frictional False Starts and Structural Shifts

As the average U.S. life expectancy inches up toward 79<sup>46</sup>, and Social Security comes up short, the retirement age in America must move north. Simply stated, Americans need to work longer. From 2002 to 2014, the average retirement age rose from 59 to 62<sup>47</sup>. As workers stay in jobs longer, they need continuous training to stay up to date and competitive in the workforce.

At the same time, many of the jobs we need today, we won't need tomorrow. This will cause supply-and-demand imbalances. Across the country, schools are still training students for jobs that may not exist in the future. We're not talking about toll booth collectors and retail clerks – but those who perform complex tasks requiring specialized training like nurses and doctors. By some estimates, technology could replace 80 percent of doctors<sup>48</sup>, and this year hospitals are beginning to use a machine<sup>49</sup> that administers drugs and replaces anesthesiologists.

44 “Germany Youth Unemployment Rate.” Trading Economics. <http://www.tradingeconomics.com/germany/youth-unemployment-rate>

45 “American Apprenticeship Grants.” U.S. Department of Labor. <http://www.dol.gov/featured/apprenticeship/grants>

46 “Life Expectancy.” Centers for Disease Control and Prevention. <http://www.cdc.gov/nchs/fastats/life-expectancy.htm>

47 “Will the Average Retirement Age Increase?” By David LaMartina. ThinkAdvisor. February 16, 2015. <http://www.thinkadvisor.com/2015/02/16/will-the-average-retirement-age-increase>

48 “Vinod Khosla: Machines Will Replace 80 Percent of Doctors.” By Liat Clark. Wired. September 4, 2014. <http://www.wired.co.uk/news/archive/2012-09/04/doctors-replaced-with-machines>

49 “New Machine Could One Day Replace Anesthesiologists.” By Todd Frankel. The Washington Post. May 11, 2015. [http://www.washingtonpost.com/business/economy/new-machine-could-one-day-replace-anesthesiologists/2015/05/11/92e8a42c-f424-11e4-b2f3-af5479e6bddd\\_story.html](http://www.washingtonpost.com/business/economy/new-machine-could-one-day-replace-anesthesiologists/2015/05/11/92e8a42c-f424-11e4-b2f3-af5479e6bddd_story.html)

In the networked world there will be a premium on creativity; robots, after all, can only do so much. But mundane, learned behavior will be automated. Government needs to get America's workforce into a place where it is more employable. This will lead to more mobility, innovation, and economic benefits.

### RECOMMENDATIONS:

1. Offer continuous training. Government needs to lead by example. Therefore, start by ensuring that training and education budgets and programs for Federal workers are strengthened and made widely available. Offer incentives to businesses that invest in continuous education and training for older workers. Older workers own IP that can be of significant value to businesses as long as they aren't left behind the technology curve
2. Look to the future. A shortage today can become a surplus tomorrow. Invest in both government and private-sector training programs that will provide the American workforce the skills it will need to make them competitive not only in today's job market but in the market of the future

## Incentivize and Change the Culture: Geeks and Superheroes

A good place to start incentivizing and changing the culture is with women and minorities.

As of Jan. 1, 2015, just 17.4 percent<sup>50</sup> of Fortune 500 CIOs are female and there are only five<sup>51</sup> African-American CEOs in the Fortune 500. When it comes to programmers, just 5.8 percent<sup>52</sup> are female. Clearly there are some important faces and voices missing from the boardroom and engineering pool.

To attract and keep diverse talent, some companies are going to extremes. Tech titans like Apple and Facebook have gone so far as to offer to freeze the eggs<sup>53</sup> of female employees. Netflix now offers unlimited maternity leave<sup>54</sup>. These perks are great for those already in the workforce. Today's students are tomorrow's workers – we need a cultural shift to motivate them with new role models focused on advancing America's competitive edge and innovation.

Another area that is critical to changing culture is education. But is going to school cool? Not according to the seven percent<sup>55</sup> of students who drop out. Unfortunately, the future for these dropouts isn't bright – it may be prison bars. Nearly 80 percent<sup>56</sup> of all prisoners are high school dropouts or earned a General Educational Development (GED) credential rather than a diploma. More than half of inmates with a GED earned it while in prison, and about 41 percent of all inmates have no high school credential at all.

50 “Good News for Women in Tech: Half of Fortune 10 CIOs are Women.” By Rachael King. The Wall Street Journal. January 14, 2015. <http://blogs.wsj.com/cio/2015/01/14/good-news-for-women-in-tech-half-of-fortune-10-cios-are-women/>

51 “Only Five Black CEOs at 500 Biggest Companies.” By Gregory Wallace. CNN Money. January 29, 2015. <http://money.cnn.com/2015/01/29/news/economy/mcdonalds-ceo-diversity/>

52 “Survey Says: 92 Percent of Software Developers are Men.” By Kevin Roose. Fusion. April 8, 2015. <http://fusion.net/story/115998/survey-says-92-percent-of-software-developers-are-men/>

53 “Apple and Facebook Pay for Female Employees to Freeze Eggs.” By Davey Alba. Wired. October 14, 2014. <http://www.wired.com/2014/10/apple-facebook-pay-female-employees-freeze-eggs/>

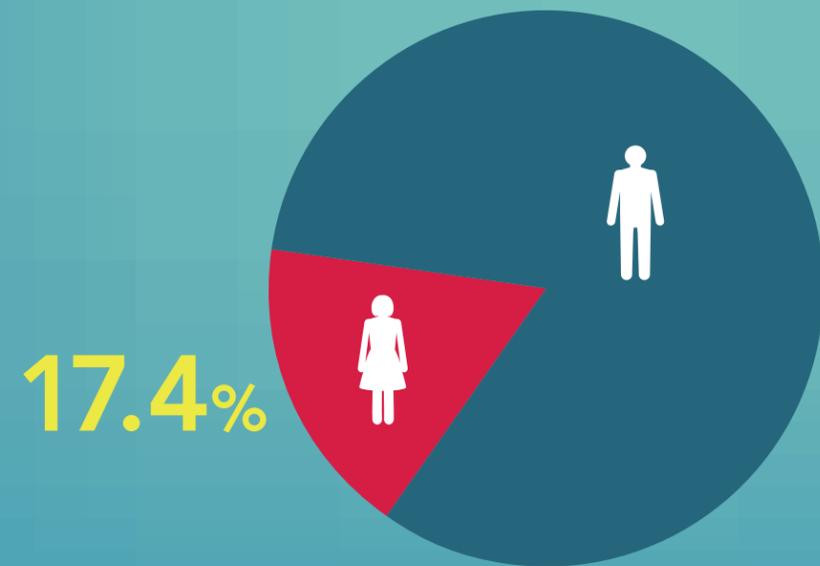
54 “Netflix Just Announced a Game-changing Parental Leave Policy.” By Kia Kokalitcheva. Fortune. August 4, 2015. <http://fortune.com/2015/08/04/netflix-maternity-paternity-leave/>

55 National Center for Education Statistics. <https://nces.ed.gov/fastfacts/display.asp?id=16>

56 “The High School Dropout Dilemma, And How Can We Help Them Stay?” By Jessie Romero. Econintersect. March 8, 2015. <http://econintersect.com/b2evolution/blog1.php/2015/03/08/the-high-school-dropout-dilemma-and-how-can-we-help-them-stay>

As of Jan. 1, 2015

## Fortune 500 CIOs



**5** Only five African-American CEOs.

## Programmers



According to the 2010 Census, there were 2.3 million prisoners<sup>57</sup> in the U.S., making America's national incarceration rate the highest in the world. In fact, there are slightly more jails and prisons in the U.S. than there are degree-granting colleges and universities<sup>58</sup>. In the South, there are more people living in prisons<sup>59</sup> than on college campuses.

All this incarceration is costly – between \$31,000 and \$60,000 each year to incarcerate one person. Wouldn't we be better off spending this on education? A one percent increase<sup>60</sup> in the high school graduation rate for males could save \$1.4 billion in criminal justice costs. High school dropouts generate less tax revenue than high school graduates and are more likely to receive government benefits on the taxpayers' dollar. Each additional high school graduate could result in public savings of more than \$200,000<sup>61</sup>.

It's time to change the culture and take a hard look at our role models. What if students looked up to the folks who developed their iPad or game system instead of Kim Kardashian and LeBron James? While LeBron is a great basketball player, his success is not typical; only about .03 percent of high school basketball players will make it to the NBA<sup>62</sup>. Better role models – who succeed on education, brains, and hard work – might keep kids in school longer and drive them toward more innovative fields.

### RECOMMENDATIONS:

1. Enlist Hollywood in the culture shift. Work with quality celebrities to change the conversation – talk about the benefits of staying in school and continuing education
2. Start early. Identify “heroes” – both male and female – in education and industry – inventors, business leaders, the people who make the technology kids use every day – to drive students' interest in education and tech-related careers from an early age

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## Appendix – Iconoclasts Members



### Roger Baker

Consultant  
Roger Baker Consulting LLC

Roger Baker is a consultant for Roger Baker Consulting LLC, advising Federal organizations and Federal service companies on government technology issues. Previously, he served as the CIO at the Department of Veterans Affairs. Roger helped define the role of the Federal CIO following the passage of the Clinger-Cohen Act.



### Alan P. Balutis

Senior Director, U.S. Public Sector  
Cisco Systems, Inc.

Alan Balutis is a Distinguished Fellow and Senior Director, U.S. Public Sector for Cisco Systems, Inc. Alan has been in the public service and industry business for over 30 years. He was a founding member of the Federal CIO Council. His 28 years in the Federal sector were spent at the Department of Commerce, where he headed its management and budget office as its first CIO.



### Rich Beutel

Principal  
Cyrrus Analytics LLC

Richard Beutel is currently the Principal of Cyrrus Analytics, one of Washington's premier boutique government market strategy and legislative advisory firms. He is the former lead acquisition and procurement policy counsel for former Chairman Darrell Issa of the House Oversight and Government Reform Committee. Rich wrote and managed the Federal IT Acquisition Reform Act – FITARA – which was signed into law as part of the FY2015 National Defense Authorization Act.



### Retired Col. Greg Gardner, Ph.D., CISSP

Chief Architect, Defense and Intelligence Solutions, NetApp  
And Senior Fellow, George Washington University's Center for Cyber/Homeland Security (CCHS)

Greg Gardner leverages his decades of government service and IT experience to provide NetApp's U.S. Public Sector team with defense and intelligence focused support. He served as the Deputy Chief Information Officer – DCIO – for the Intelligence Community – IC. Greg had a 30-year career in the U.S. Army, retiring in 2004 as a colonel. Greg served as Commissioner on the Commission on the Leadership Opportunity in U.S. Deployment of the Cloud – CLOUD<sup>2</sup> – the Big Data Commission, and the Federal Technology Convergence Commission.



### Woody Hall

Senior Vice President for Operations  
Health and Civilian Solutions Division  
General Dynamics Information Technology

Woody Hall has over 40 years of experience using information technology in both industry and government to solve complex national security problems. He served as the Chief Information Officer of the U.S. Customs Service, delivering information technology solutions and providing thought leadership on Federal IT issues.



### Scott Hastings

Partner  
Deep Water Point

A partner at Deep Water Point consulting, Scott Hastings is an executive leader with 25 years of Federal government experience. Previously, he was the Chief Information Officer for the US-VISIT program, which became one of the most successful programs at the Department of Homeland Security – DHS. Scott also served as one of the original CIOs for the DHS.



### Dr. Alissa Johnson

Chief Information Security Officer  
Stryker

Dr. Alissa Johnson, the former Deputy Chief Information Officer at the White House, is now Chief Information Security Officer at Stryker, a medical technology firm. Alissa modernized the Executive Office of the President's IT systems and played an active role in DigitalGov.



### Steve O'Keeffe

Founder  
MeriTalk

With more than 20 years' experience in the government IT community, Steve O'Keeffe has worked in both government and industry. He is the founder of MeriTalk and a fixture as an expert witness on Capitol Hill, testifying on government IT and workforce issues. Steve is a member of the USO-Metro and the Congressional Cloud Computing Caucus.



### Anil Karmel

Chief Executive Officer  
C2 Labs Inc

Anil Karmel is the co-founder and CEO of C2 Labs, a cloud security product and services company. Formerly, Anil served as the National Nuclear Security Administration's – NNSA – Deputy Chief Technology Officer. He serves as the co-chair of the National Institute of Standards and Technology – NIST – Cloud Security Working Group and sits on the board of the Congressional Cloud Computing Caucus Advisory Group.



### Gaurav Pal

Founder  
stackArmor

Gaurav Pal (G.P.) is a Senior Technology Executive with over 20 years of information systems modernization and implementation experience. He is the principal and co-founder of stackArmor, a security focused cloud solutions firm. G.P. also contributed to Federal cloud initiatives including U.S. Treasury's Public Cloud Webhosting Solutions, Department of the Interior Foundation Cloud Hosting Services, and Recovery.gov 2.0.



### David McClure, PhD

Chief Strategist  
Veris Group, LLC

As Chief Strategist of Veris Group, Dave works closely with government and industry clients to bring secure cloud technologies to market. Dave served as the Associate Administrator of the U.S. General Services Administration – GSA – Office of Citizen Services and Innovative Technologies, including the FedRAMP program. His career spans nearly three decades, including Managing VP for Gartner Inc.'s government research team and serving as the Director of IT Management for the U.S. Government Accountability Office – GAO.



### Richard Spires

Chief Executive Officer  
Learning Tree International

Richard Spires is the CEO of Learning Tree International, a leading provider for truly effective hands-on IT and management training. Richard served as the U.S. Department of Homeland Security Chief Information Officer – CIO – from 2009 till 2013. Richard also served as the Vice-Chairman of the Federal Government CIO Council and the Co-Chairman of the Committee for National Security Systems – CNSS.



### Roberta "Bobbie" Stempfley

Director Cyber Strategy Implementation  
The MITRE Corporation

Bobbie Stempfley is the Director of Cyber Strategy Implementation at The MITRE Corporation. Formerly, she served as the Department of Homeland Security Deputy Assistant Secretary for Cyber Security and Communications. Bobbie was also the Chief Information Officer for the Defense Information Systems Agency – DISA.



### Don Upson

Chief Operating Officer  
UNICOM Global

Don Upson is the Chief Operating Officer of UNICOM Global, and a Managing Partner for the Upson Technology Group. Formerly, Don served as Virginia's Secretary of Technology, the nation's first state Cabinet-level technology secretary. States and the Federal government emulated this model in the creation of a national Chief Technology Officer role.



### Dr. Simon Szykman

Chief Technology Officer, Federal Services  
Attain

Dr. Simon Szykman is the Chief Technology Officer of Attain's Federal Services division. Formerly, he served as the Chief Information Officer – CIO – for the U.S. Department of Commerce. Prior to joining Commerce, Simon served as the CIO for the National Institute of Standards and Technology and the first Director of Cyber Security R&D at the Department of Homeland Security.



### Dan Verton

Executive Editor  
MeriTalk

The Executive Editor of MeriTalk, Dan is a veteran journalist with more than 20 years of professional reporting, writing, editing, and multimedia experience in D.C. He earned a Master's Degree in Journalism and Public Affairs from American University, and his work has been recognized by some of the top journalism competitions. Dan is a former Intelligence Officer in the U.S. Marine Corps and produced security training programs for government agencies.

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