ISE® WEST EXECUTIVE FORUM

Cyber, an Evolving Ecosystem

"How cyber is laying the groundwork for Smart Cities"

City of San Diego, CA

Gary Hayslip

Deputy Director, CISO

Started with computers in early 1980's as a teenager.

Served 20 years in US Navy working with computers and cyber security. (1986-2007)

Spent 6 years as a Federal Civil Servant for the US Navy as a CISO.

In 26 years I worked numerous positions: developer, network administrator, network engineer, security architect, security auditor and security forensic investigator.

Worked on and audited federal and military networks from all over the world. (architecture, security controls, policies)

Why this background is important *– Cyber security in the Federal Government is totally different than private/municipal.*

In 2013, I resigned from Federal service and accepted a position with the City of San Diego, California.

I had no idea what I was walking into or how it would fundamentally change my view on Cyber Security.

City of San Diego

by the Numbers

11,000+ employee's

14,000+ desktops & laptops

500+ tablets and mobile devices

1000+ City issues cell phones

City has over 24 networks with an estimated 35,000+ endpoints.

Sensitive data types such as PII, PCI, HIPAA, & Financial

Installed technology ranges from 1980's type hardware to state of the art cyber security analytics software.

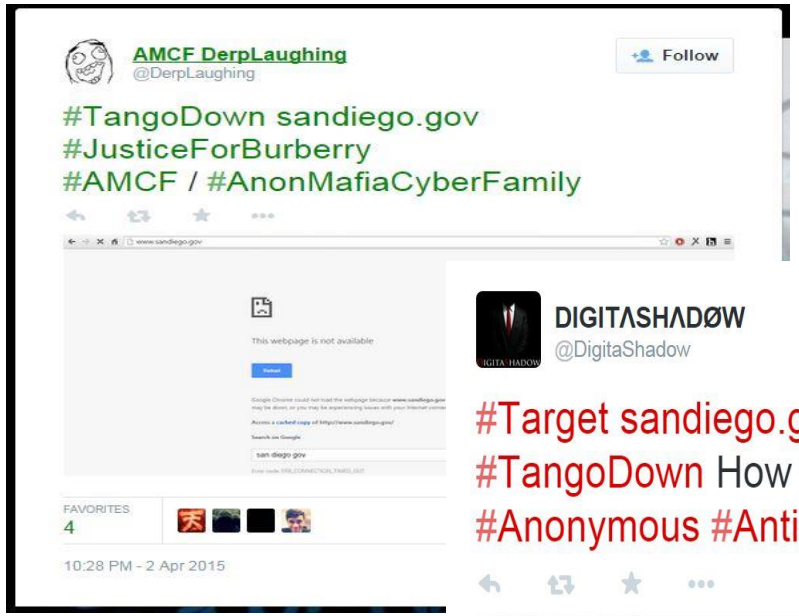
Internet-of-Things (IoT) in large scale enterprise deployments

Average 1 million attacks on its networks per day

Risk is everywhere

- *Over 40 departments with different business requirements & needs.*
- *Matching citizens expectations with reality.*
- *Risk Management = Its all about the grey.*
- *Environment is constantly changing*
- *Collaboration or die*

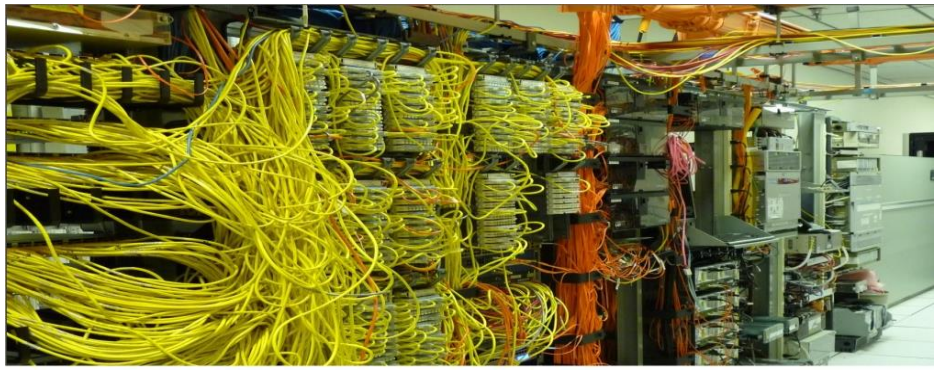
Threats – Hacktivism



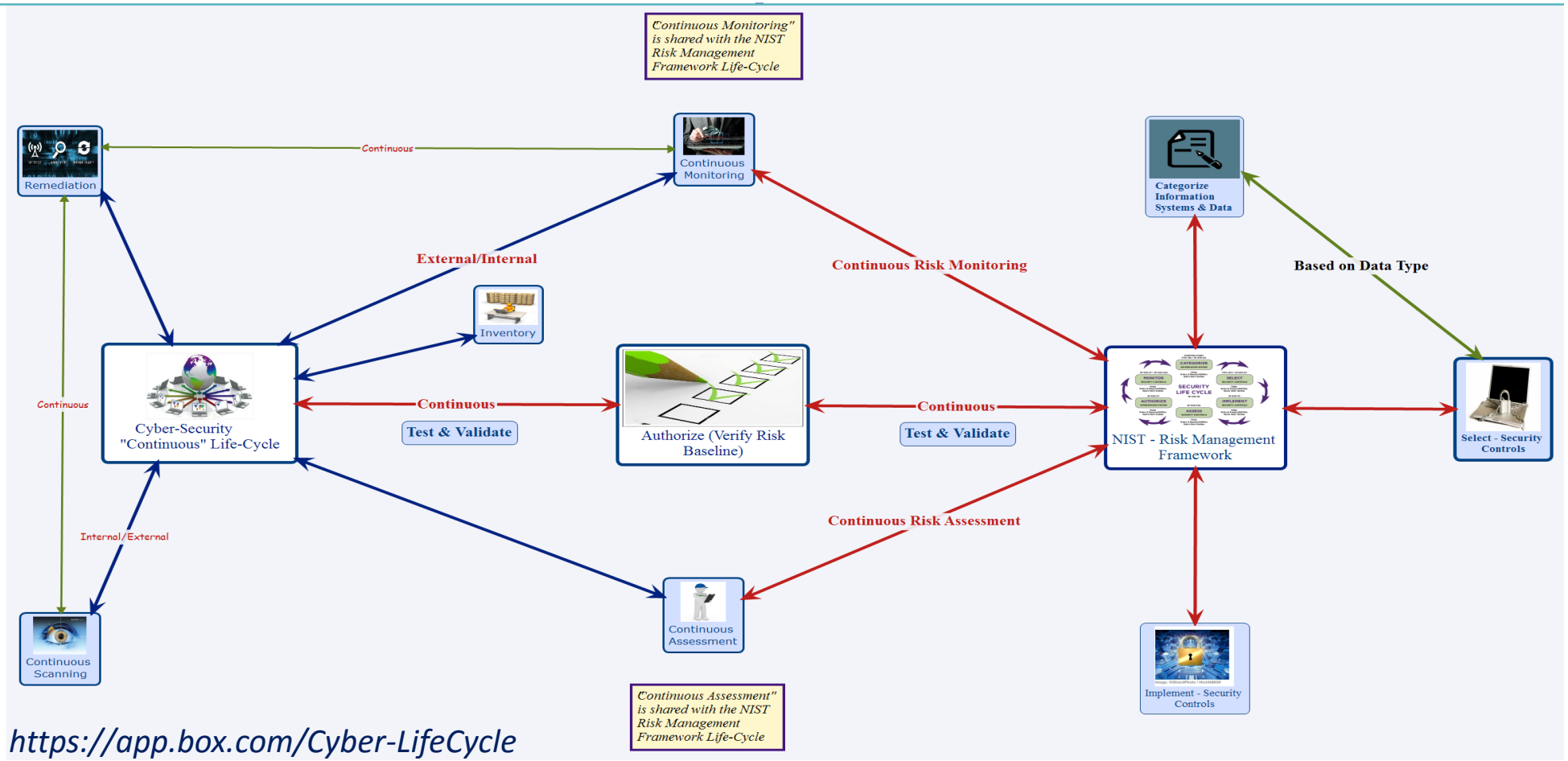
The City of San Diego has been attacked several times by Hacktivist groups over the last two years. The FBI reports attacks on municipalities has increased by 60% since 2013.

Legacy Infrastructure & Disparate Technologies

- *The City of San Diego expecting 49% growth in population between now and 2050.*
- *Growth will impact municipal services such as water, power, transportation and employment opportunities.*
- *IT infrastructure in constant use, municipal governments do not rotate technology like public traded organizations.*
- *Technology changes for municipalities have intertwined "legacy" and "new" technologies.*

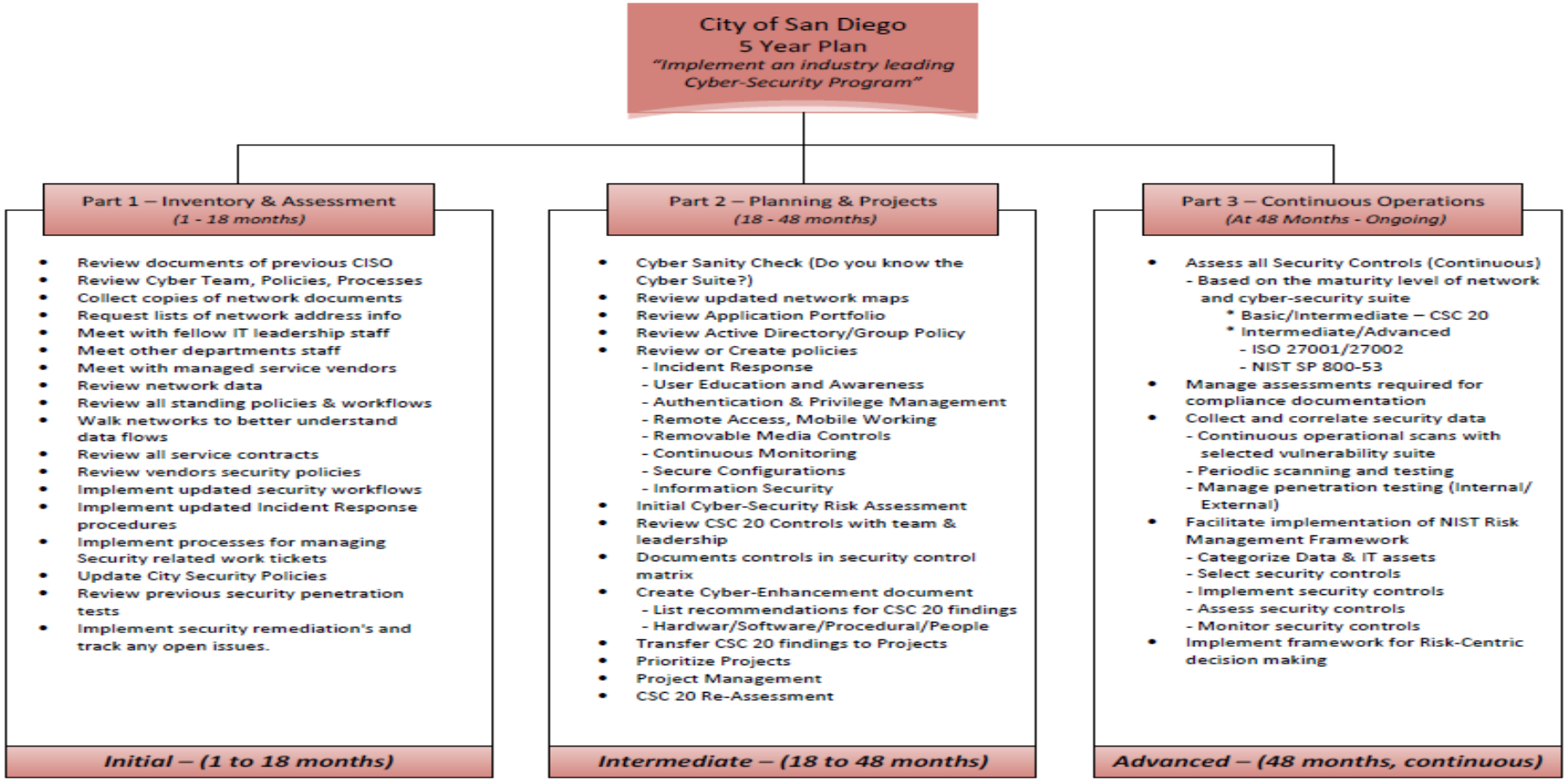


Cyber Security it's a life-



https://app.box.com/Cyber-LifeCycle

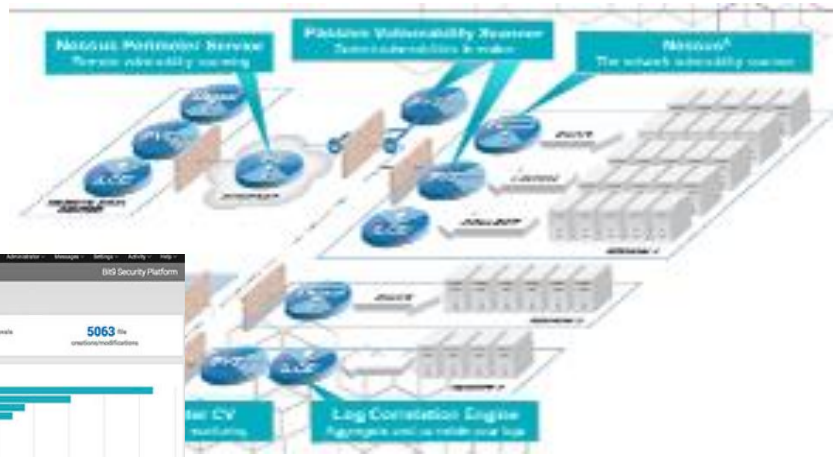
To be effective, you need a plan



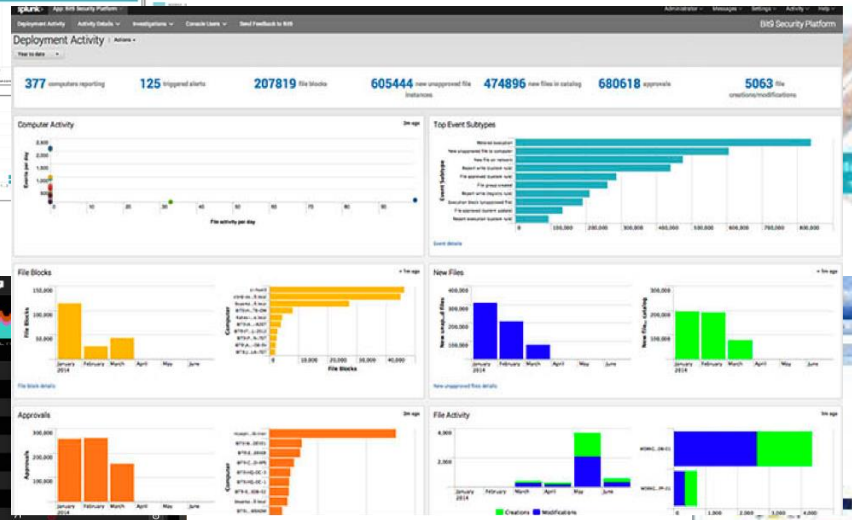
Cyber – Ongoing Projects

Daily Operations (SIEM)

Continuous Scanning, Remediation, Monitoring



Anti-Malware Platform



Network Behavior Analytics

Data Governance

Understanding our risk

Application	Valuation Components			Total Valuation
	Revenue	Asset Value	Data Liability	
Business Tax	$7,600,000	$850,000	$1,425,000	$9,875,000
Computer Aided Dispatch	$0	$4,200,000	$1,425,000	$5,625,000
Landfill	$43,000,000	$400,000	$1,425,000	$44,825,000
Permit Tracking System	$65,000,000	$85,000	$36,000,000	$101,085,000
SAP	$343,000,000	$32,250,000	$528,000	$375,778,000

PIVOTPOINT RISK ANALYTICS

SANS 20 Controls Defensive Posture

Business Tax	12.4 out of 20
Computer Aided Dispatch	12.6 out of 20
Landfill	12.5 out of 20
Permit Tracking System	12.6 out of 20
SAP	12.6 out of 20

Business Applications	SANS 20 Critical Controls																		
	SCS1	SCS2	SCS3	SCS4	SCS5	SCS6	SCS7	SCS8	SCS9	SCS10	SCS11	SCS12	SCS13	SCS14	SCS15	SCS16	SCS17	SCS18	SCS19	SCS20
Business Tax	0.4501	0.1959	0.388	0.6789	0.8724	0.7486	0.4927	0.625	0.5325	0.2	0.6875	0.8567	0.8464	0.6838	0.2125	0.9198	0.8575	1.0	0.7	0.4875
Computer Aided Dispatch	0.4501	0.3626	0.3875	0.6789	0.8724	0.7486	0.4927	0.625	0.5325	0.2	0.6875	0.8567	0.8464	0.6838	0.2125	0.9198	0.8575	1.0	0.7	0.4875
Landfill	0.4501	0.2876	0.3875	0.6789	0.8724	0.7486	0.4927	0.625	0.5325	0.2	0.6875	0.8567	0.8467	0.6838	0.2125	0.9198	0.8575	1.0	0.7	0.4875
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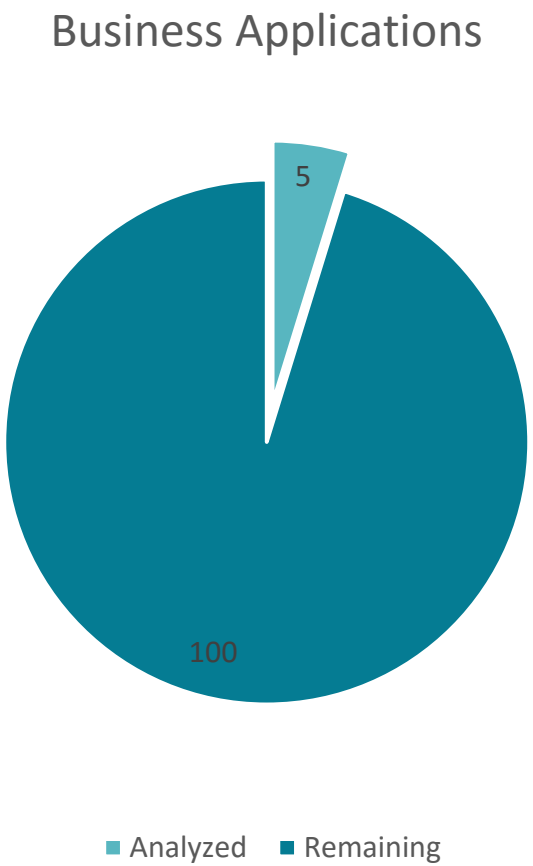
Cyber – Establishing the Risk Baseline



Produced

PIVOTPOINT RISK ANALYTICS

Summary Findings	
Total Overall Exposure	$537,188,000
Severe Potential Loss	$74,019,393
Average Potential Loss	$3,963,707

Definitions:

- *Total Overall Exposure – the overall value of the cyber assets*
- *Severe Potential Loss – the 5% Value At Risk*
- *Average Potential Loss – most likely loss over the next 12 months*

So why is this important?

Increase in population in both the city and county of San Diego.

Increase in traffic & transportation costs

Limited amount of housing for population

Increased costs in infrastructure projects

- Street repair
- Fiber and new communication conduits
- Upgrades to electrical and emergency service systems
- Increase of alternative energy technologies
- Continued conservation of water and natural resources

Financial resources & planning required for capital improvement projects that will be used for decades.

The Rise of Smart Cities

Smart Cities are high-density creators of rich data and new protocols.

Location information is a major enabler of Smart City technology benefits.

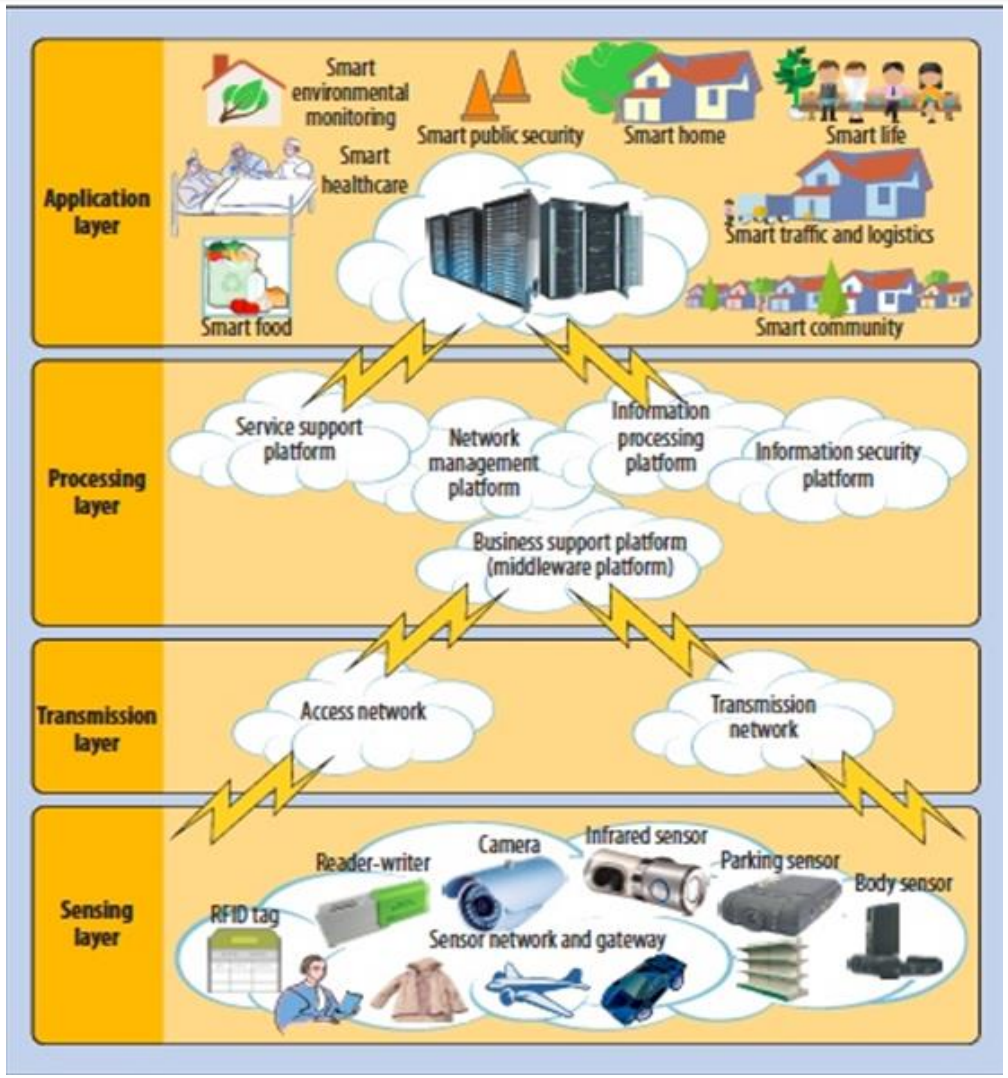
Benefits of smart technology will be judged by the services they provide to our citizens.

Reuse and repurpose is vital to urban resilience, smart data is needed to make this work efficiently.

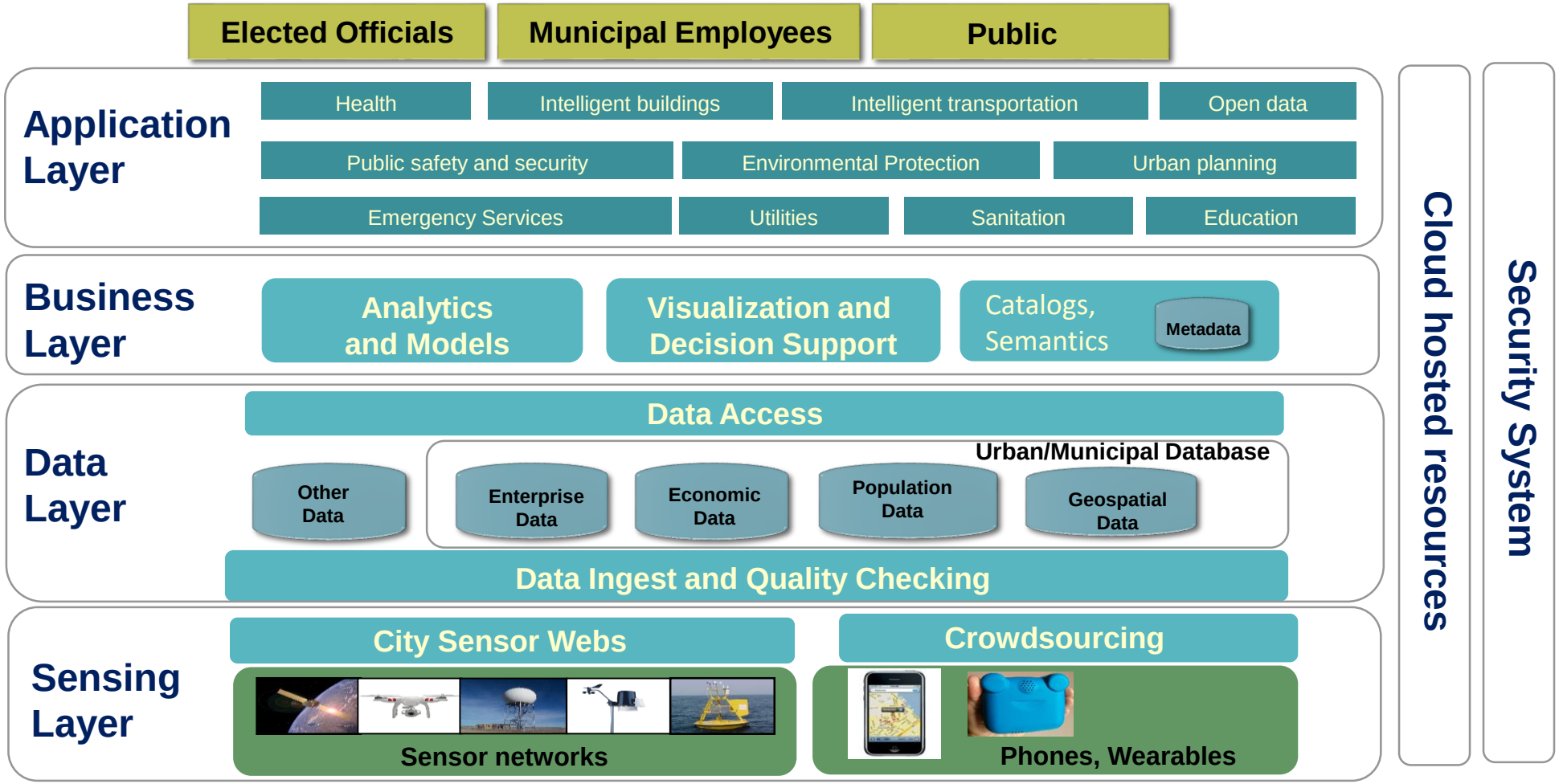
Open standards are needed for interoperability, efficiency, application innovation and cost effectiveness. (ISO 37150, 37151 & 37120)

Smart City Services

- Utilities – Smart Grid, Smart Water, Smart Waste etc.
- Intelligent Buildings
- Intelligent Transportation
- Public Safety and Security
- Environmental Protection
- Public Health
- Education
- Urban Planning
- Open Data
- Mobile Services



Smart City Infrastructure



San Diego's Smart City Initiatives

- Sempra Smart Grid
- Google Fiber
- Sensor/GPS for trash vehicles
- Street sensors – intelligent parking
- Intelligent Infrastructure
  - LED based street lights
  - Intelligent building (New library)
  - HVAC systems (43 libraries)
- Port Authority sensor network around bay
- City of San Diego Climate Action Plan – Smart City Hackathon
- Deployment of resilient emergency communications

- Sempra HQ building downtown
- City of San Diego – solar panels
- City of San Diego – EAM Project
  - New mapping of park spaces
  - Mapping of all City owned tree's

Dark side to Smart City Initiatives

Increased complexity (Legacy & Converged)

Cascading effect – simple issues cause large impact on intertwined systems.

Patch deployments – system updates become troublesome with large disparate networks.

Lack of threat models – threat on this scale is unique.

- Accurate data & threat models designed for this infrastructure profile is required.

*New Attack Surfaces***

- Traffic Control Systems
- Smart Street Lighting
- City Management Systems
- Sensors
- Smart Grid
- Public Safety Systems
- Location Based Services
- Public Transportation
- Cameras / Video
- Cloud/SaaS Solutions

**Based on research conducted by IOActive ICIT

Cyber as a Service – a new path

- Need to understand what is important to organization
  - Data, Applications, Processes
- Deploy a Cybersecurity Framework
  - Cyber Hygiene
- Work with business units to implement security controls that don't hinder
  - Continuously inventory, assess, monitor, scan and remediate
- Through innovation look for secure solutions to aide the business
  - SSO, 2FA
  - MDM
  - Cloud solution's
  - Data Governance

- Resilient, modular, flexible architecture to be the norm
  - Security by design
- Allow cities to be innovative & deploy smart city technologies securely

Questions, Rants, Discussions?

Gary Hayslip
Deputy Director, Chief Information Security Officer
ghayslip@sandiego.gov
@ghayslip
https://www.linkedin.com/in/ghayslip