Continuous Monitoring:
Diagnostics & Mitigation

September 2012

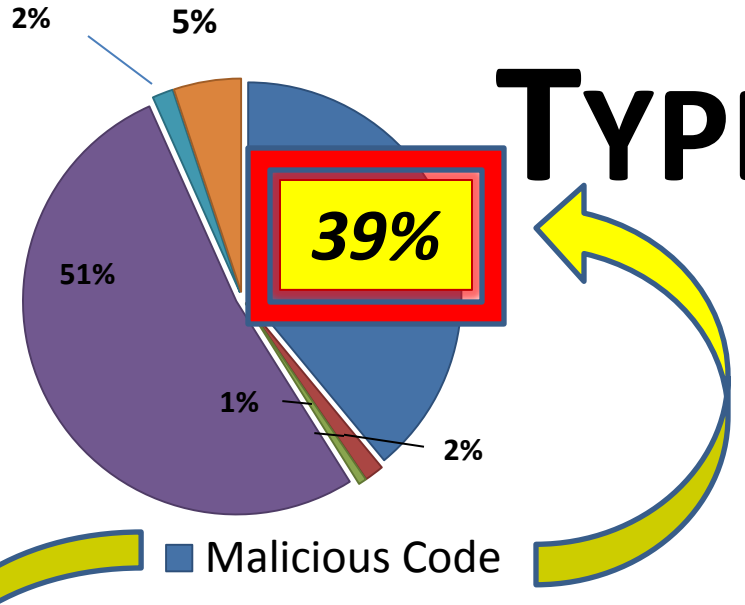
Threats Further Escalate

Tickets

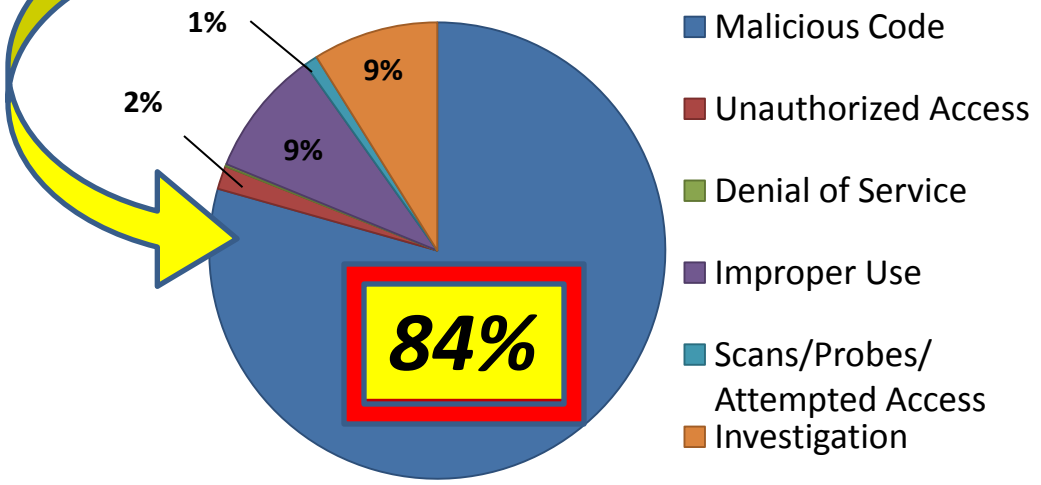
Year	Tickets
2008	2104
2009	3085
2010	7,998

Type

2008

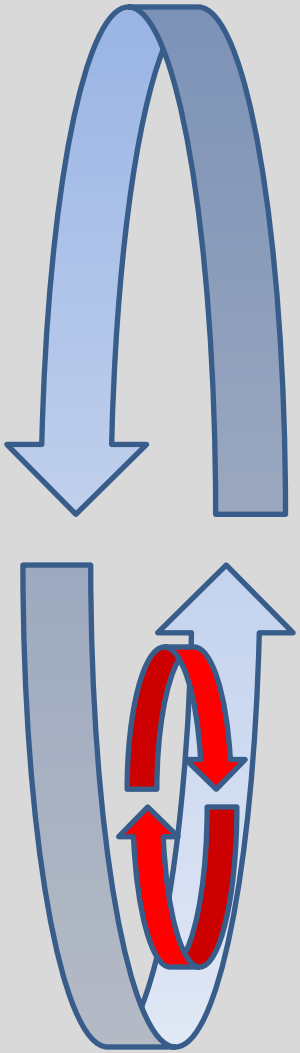


2010



Nature of Problem

80% of exploits leverage known vulnerabilities and configuration management setting weaknesses



Tactical approach

- In conflict whoever

"Observes – Orients – Decides – Acts"[1] fastest wins.

- Cyber exploits are evolving faster than they can be counteracted

1 'OODA' loops described in Boyd , The Fighter Pilot Who Changed the Art of War, by Robert Coram

“Exploit Readiness”

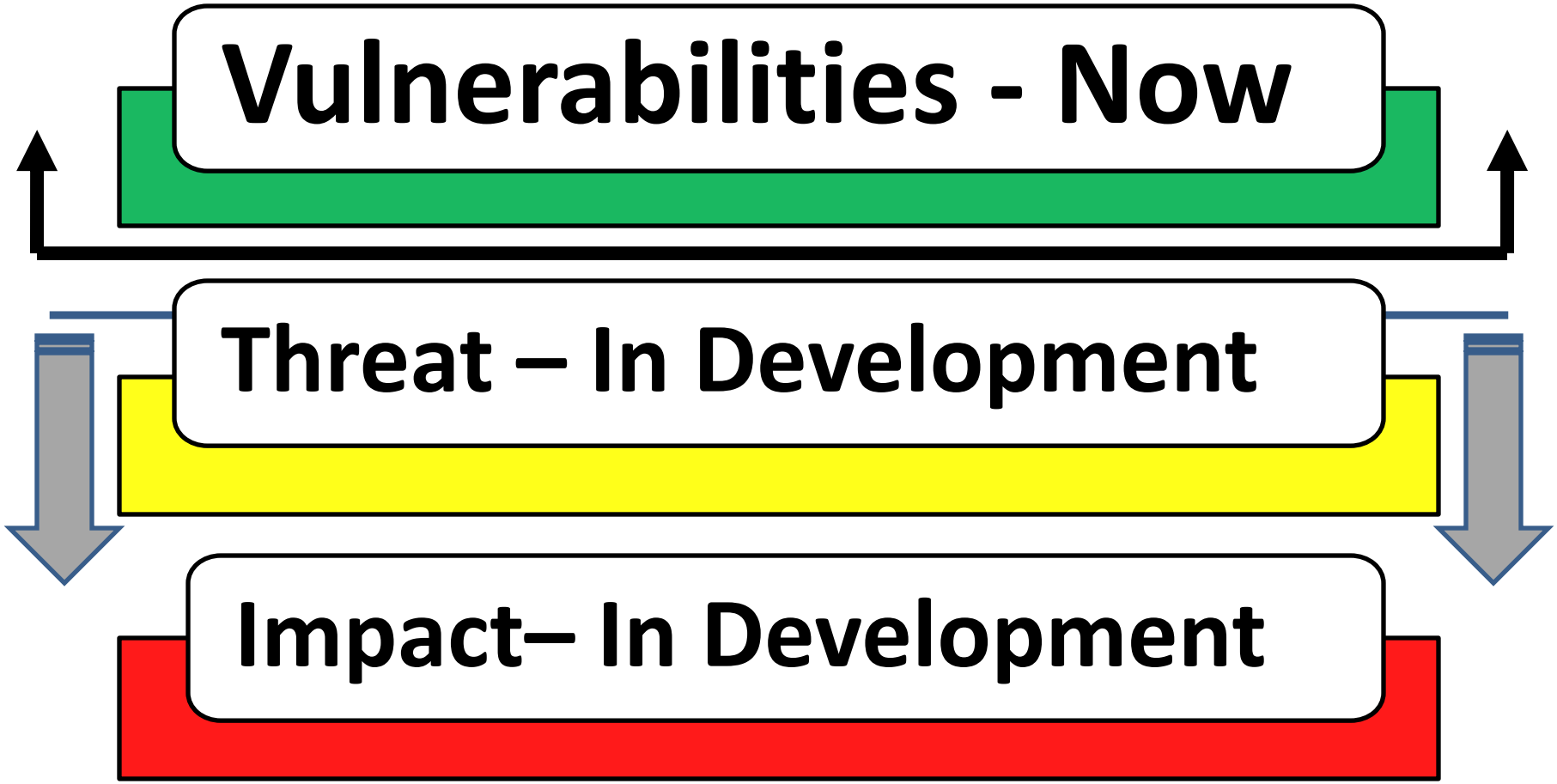
- What time is spent on
- Faster action =

  lower potential risk

Framework:

1. **Scan every 36-72 hours**
2. Focus on Attack Readiness
3. **Find & Fix Top Issues Daily**
4. Personal results graded
5. **Hold managers responsible**

RISK

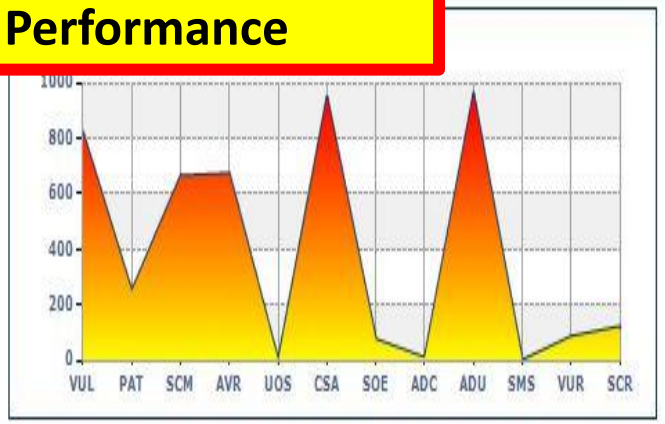

Vulnerabilities - Now
Threat – In Development
Impact– In Development

Case Study Results

- 89% reduction in risk after 12 months
  - personal computers & servers
- Mobilizing to patch worst IT security risks first
  - Mitigation across 24 time zones
  - Patch coverage 84% in 7 days; 93% in 30 days
- Outcome:
  - Timely, targeted, prioritized information
  - Actionable
  - Increased return on investment compared to an earlier implementation of FISMA

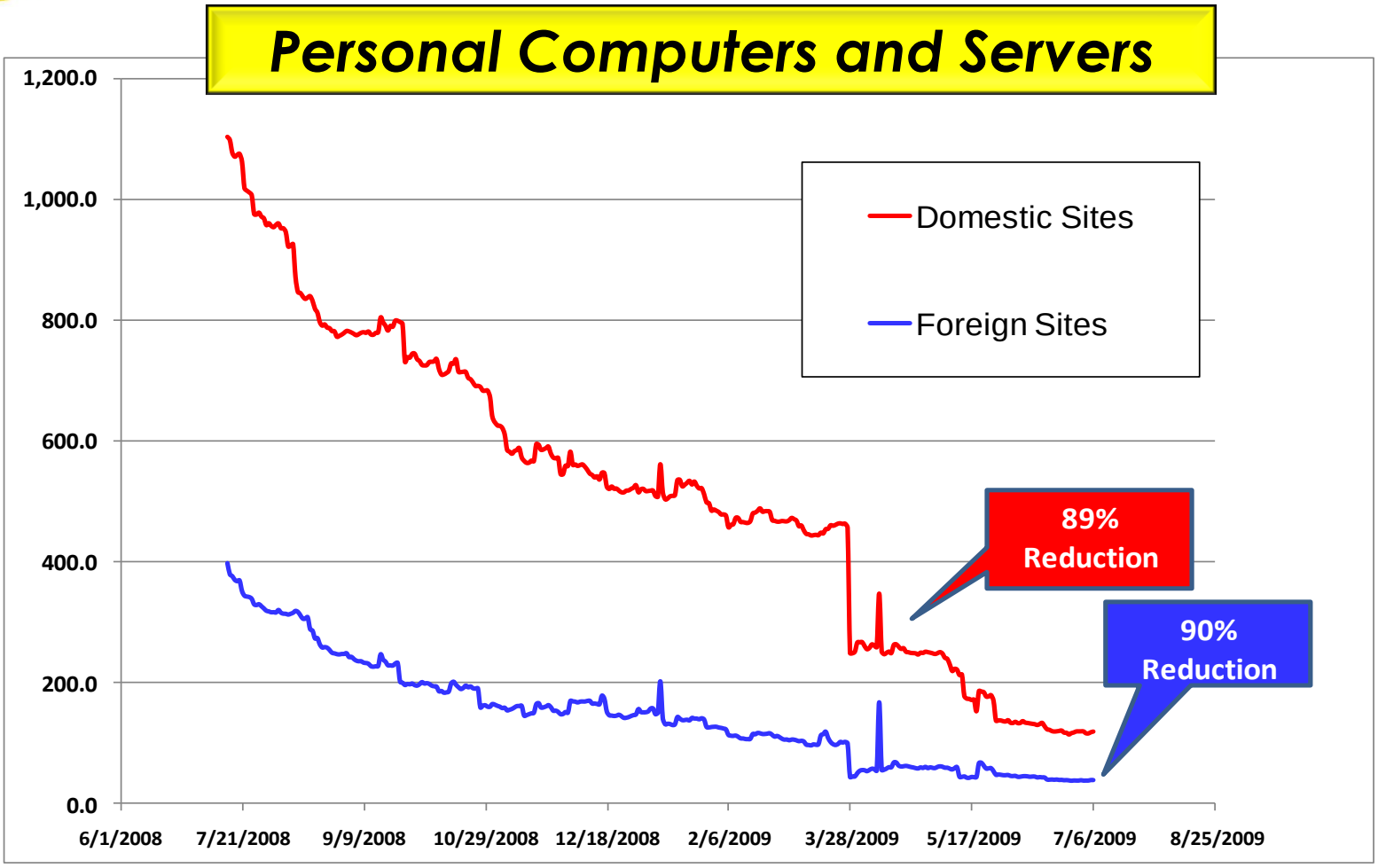
Organizations, Major Systems Contractor Performance

Risk Score Summary	
Risk Level Grade	A+
Average Risk Score	5.0 History
Site Risk Score	4,604.9
Scored Hosts	900
Rank in Enterprise	43 of 313
Rank in Region	10 of 42

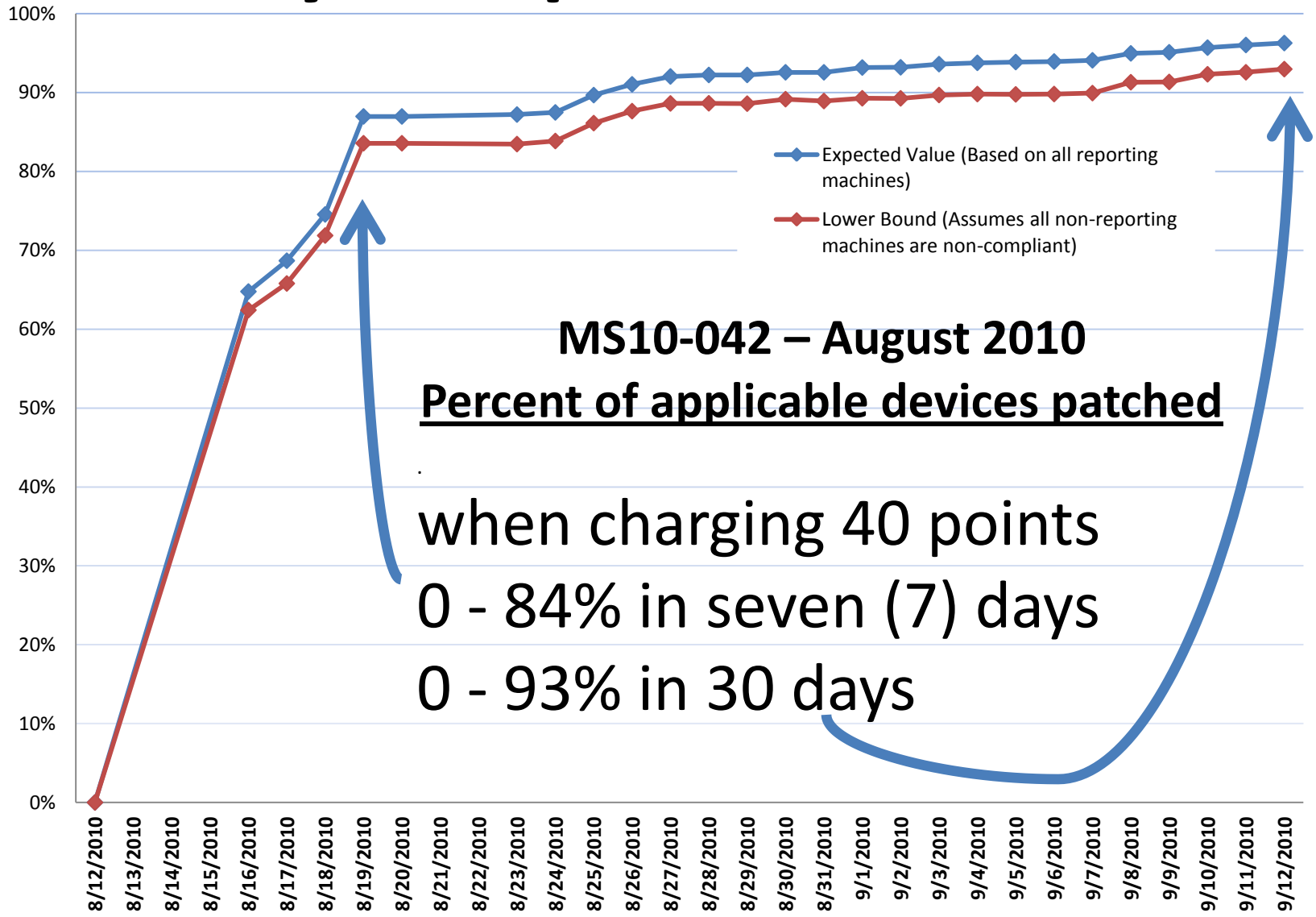


Component	Risk Score	Scored Objects	Avg/Object	% of Score	How Component is Typically Calculated
Vulnerability (VUL)	821.9	900	0.9	17.8%	From .1 for the lowest risk vulnerability to 10 for the highest risk vulnerability
Patch (PAT)	250.0	900	0.3	5.4%	From 3 for each missing "Low" patch to 10 for each missing "Critical" patch
Security Compliance (SCM)	663.1	900	0.7	14.4%	From .43 for each failed Group Membership check to .9 for each failed Application Log check
Anti-Virus (AVR)	672.0	900	0.7	14.6%	6 per day for each signature file older than 6 days
Unapproved OS (UOS)	0.0	900	0.0	0.0%	100 upon detection, then 100 per month up to a maximum of 500
CyberSecurity Awareness Training (CSA)	948.0	918	1.0	20.6%	After 15 days past the annual training expiration date, 1 per day up to a maximum of 90
SOE Compliance (SOE)	75.0	866	0.1	1.6%	5 for each missing or incorrect version of an SOE component
AD Computers (ADC)	9.0	900	0.0	0.2%	1 per day for each day the AD computer password age exceeds 35 days
AD Users (ADU)	961.0	1041	0.9	20.9%	1 per day for each account that does not require a smart-card and whose password age > 60, plus 5 additional if the password never expires
SMS Reporting (SMS)	0.0	900	0.0	0.0%	100 + 10 per day for each host not reporting completely to SMS
Vulnerability Reporting (VUR)	85.0	900	0.1	1.8%	After a host has no scans for 15 consecutive days, 5 + 1 per 7 additional days
Totals:	4,604.9	--	5.0	--	

Results First 12 Months



Efficiency is Repeatable & Sustained



Lessons Learned

- When **continuous monitoring** augments snapshots required by FISMA:
  - Mobilizing to lower risk is feasible & fast (11 mo)
  - Changes in 24 time zones with no direct contact
  - Cost: 15 FTE above technical management base
- This approach leverages the wider workforce
- Security culture gains are grounded in fairness, commitment and personal accountability for improvement

Next Steps:

– ".gov" strategy –

Federal Continuous Monitoring Directions

Federal CIO and CISO Cyber Goals

- Protect information assets of the US gov't
  - Availability, integrity and confidentiality
- Lower operational risk and exploitation of
  - national security systems
  - .gov networks, major systems & cloud services
- Increase situational awareness of cyber status
- Improve ROI of federal cyber investments
- Fulfill FISMA mandates

Continuous Diagnosis and Mitigation (CDM)

"Full Operational Capability" (FOC) / Desired State:

- Minimum Time to FOC for CDM: 3 years;
- CDM Covers 80-100% of 800-53 controls;
- Smaller attack surface/"risk" for .gov systems;
- Weaknesses are found and fixed much faster;
- Replaces much 800-53 assessment work ($440M)
  - And most of the POA&M process ($1.05 B)
- Risk scores reflect: threat, vulnerability and impact
  - Used to make clear, informed risk-acceptance decisions
- Economies reduce total cost yet improve security.

Selection of First Year Priorities

- Implement CMWG focus areas for controls
  - NSA and CMWG collaboration put in pilots
  - Complete baseline survey of highest D/A risks
- Award task orders for sensors and services tailored to agency needs and risk profile
- Connect initial controls to dashboard
  - HW/SW asset management/white listing; vulnerability; configuration settings; anti-malware

Use of DHS Appropriated Funds

- Strategic Sourcing to buy
  - Sensors (where missing)
  - A Federal Dashboard
  - Services to operate the sensors and dashboard in the D/As
- Labor to mentor and train D/As to use the dashboard to reduce risk efficiently
- Processes to support CMWG (continuous C&A)

Stakeholder Consultation

- DHS and CMWG will consult on program direction and reflect stakeholder concerns of:
  - CIO Council/ISIMC, ISPAB
  - NSS, EOP, NIST, NSA
  - D/As and components
  - Industry
  - FFRDCs
  - Others

Procurement Con OPS

Cloud

Continuous Monitoring (CM) Contract Element	Beneficiary for FY13 Networks & COTS CM Software ($202M)	Tools /Services as options for internal use	Use diagnostic standards but may or may not purchase
1. **Dashboard**	**DHS pays** for all government Department and Agencies Security reporting to Cyber Scope	**Can Purchase** off of federal contract: •.mil, Defense Industrial Base; • others who use federal $; • plus State, local gov't	Cloud Service providers for direct support of government dedicated cloud clients with cost embedded. CSP 's could buy dashboard.
2. **Continuous Monitoring Tool Bundles (Multiple Award)**	**DHS Pays** for initial .gov Agencies & Departments who choose diagnostic capabilities	**Can Purchase** off of federal contract: •.mil, Defense Industrial Base; • others who use federal $; • plus State, local gov't	Cloud Service Providers offer direct support of government dedicated cloud clients with cyber testing cost embedded. CSP 's could buy tools.
3. **Continuous Monitoring as a Service (CMaaS)**	**DHS pays** for initial .gov Agencies & Department who may choose a diagnostic service provider	**Department & Agencies (or others) pay** for custom systems CM **using internal C&A report money** (diagnostics and feeds to Cyber Scope)	Department & Agency custom systems using internal funds. CSP 's could buy CMaaS for use as 3rd party Assessors.
4. **Continuous monitoring data integration**	**DHS pays** to prepare .gov diagnostic reports & CyberScope feeds	**Department & Agencies (or others) pay** Using DHS published standards using internal funds	Using DHS published standards using internal funds

$440 M/yr