Developing a Cybersecurity Scorecard

U.S. Department of Agriculture

Farm Service Agency

FSA

FARM SERVICE AGENCY

Foundation

- People & Organizations Contribute to Outcomes
- Good Management Through Measurement
- Confidence Through Transparency Requires Evidence
- Performance Improves Through Recognition and Feedback
- All Levels Value Communication

NIST References

- NIST Special Publication 800-55 Revision 1: Performance Measurement Guide for Information Security
  - Elizabeth Chew, Marianne Swanson, Kevin Stine, Nadya Bartol, Anthony Brown, and Will Robinson
  - http://nvlpubs.nist.gov/nistpubs/Legacy/SP/nistspecialpublication800-55r1.pdf
- ITL Bullentin Security Metrics: Measurements to Support the Continued Development of Information Security Technology
  - Shirley Radack
  - http://csrc.nist.gov/publications/nistbul/Jan2010_securitymetrics.pdf
  - Especially pages 2-4 “Issues In Developing Security Metrics”
- NISTIR 7564: Directions in Security Metrics Research
  - Wayne Jansen
  - http://nvlpubs.nist.gov/nistpubs/Legacy/IR/nistir7564.pdf
  - Especially Section 3 “Aspects of Security Measurement”

Why a Scorecard?

People & Organizations Contribute to Outcomes

- Results-based Management (RBM) uses feedback loops to achieve strategic goals.

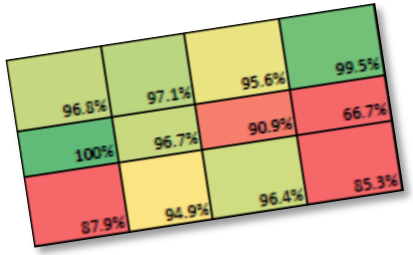
https://en.wikipedia.org/wiki/Results-based_management

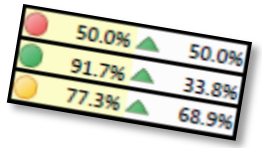
https://en.wikipedia.org/wiki/Results-based_management

Developing a Scorecard

Developing a Scorecard

- Define Success: What is the objective?
  - What does success (“good”) look like?
  - To the taxpayer, your customer, the Administration, your executive(s), you?
  - We are conditioned to respond to information presented in certain ways…

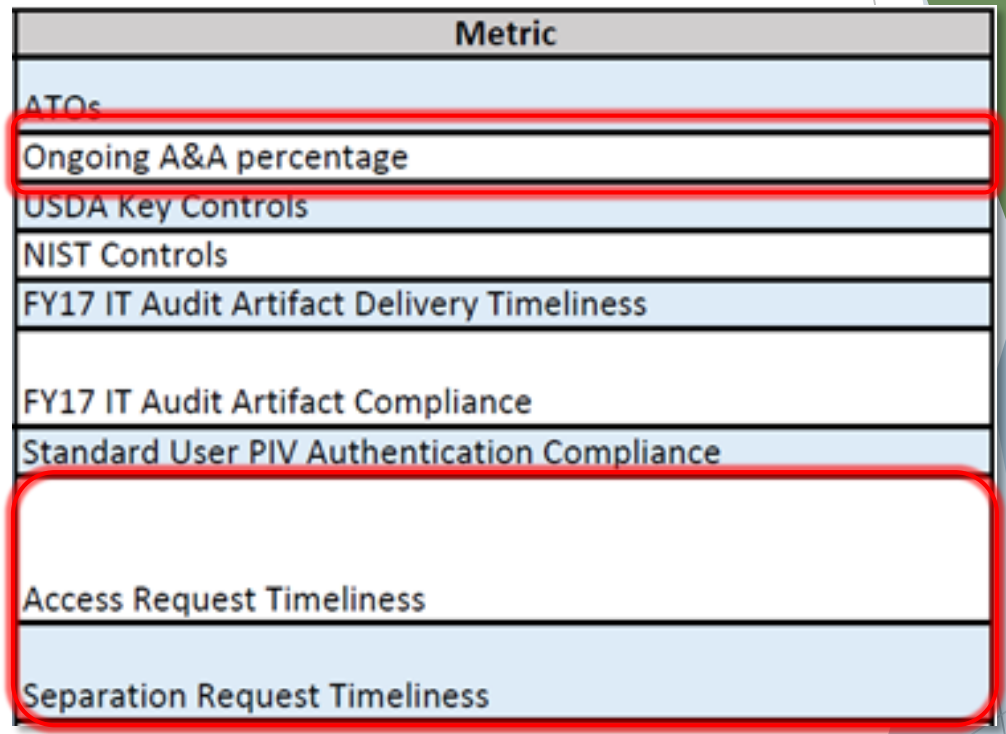




https://en.wikipedia.org/wiki/Balanced_scorecard

Developing a Scorecard

- Select targets and measures to track (progress) achievement of objectives
  - Management team is fully involved
  - Management team is the primary customer of the scorecard
  - Select leading indicators and lagging indicators

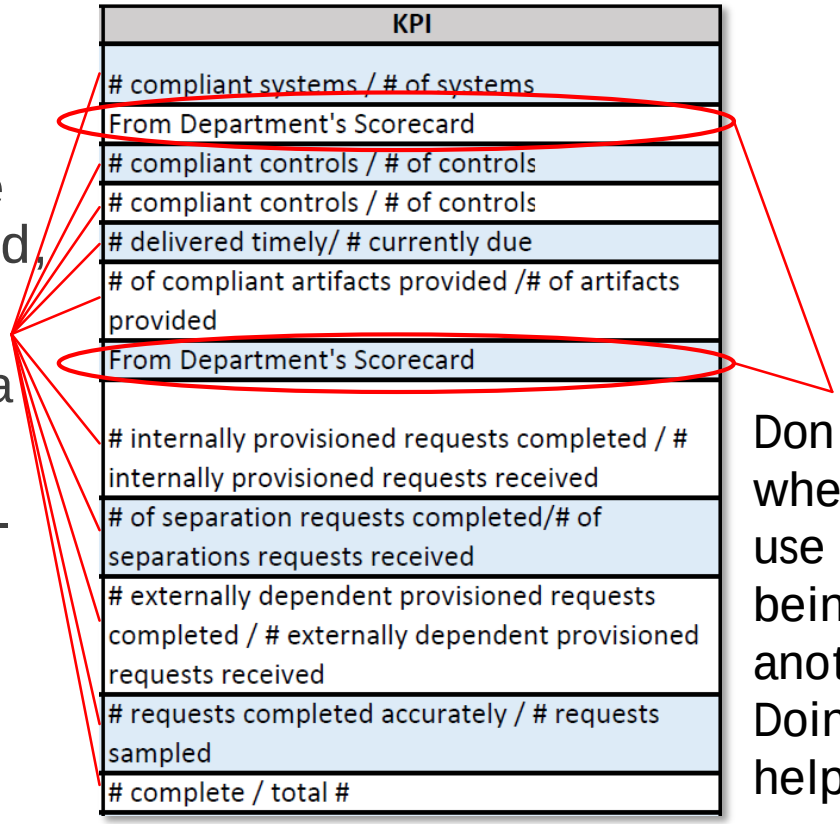


Metric
ATOs
Ongoing A&A percentage
USDA Key Controls
NIST Controls
FY17 IT Audit Artifact Delivery Timeliness
FY17 IT Audit Artifact Compliance
Standard User PIV Authentication Compliance
Access Request Timeliness
Separation Request Timeliness

https://en.wikipedia.org/wiki/Balanced_scorecard

Developing a Scorecard

- Data needs context
  - Data without context is meaningless. So what if there were 5734 events? Is that good, bad, normal?
    - Easiest way we've found is a percentage (ratio).
    - We also use some year-over-year comparisons to show trends.
  - Data with context becomes actionable information
    - Dispels F.U.D. (fear, uncertainty and doubt)
    - Enables management to take action.



Don't reinvent the wheel. It's OK to use existing KPIs being collected by another source. Doing this may help demonstrate cascading goals.

https://en.wikipedia.org/wiki/Balanced_scorecard

Developing a Scorecard

- Start small, start with one Key Performance Indicator (KPI)
- Try thinking about it this way:
  - It is important to me (and my management team) that our customers are happy.
    - My customers are happy when the right people receive the right access.
    - “My customers” are end users, supervisors, system owners, auditors, others.
    - When we deliver 100% on this metric, I am reasonably assured my customers are happy with our access provisioning service. (I should get no flaming emails or material weaknesses.)

Access Request Completion Accuracy	# requests completed accurately / # requests sampled	100%

Let’s Take A Closer Look

Domain	Metric	KPI	6/9/2017	6/2/2017	5/26/2017	5/19/2017	5/12/2017	5/5/2017	4/28/2017	4/21/2017	4/14/2017	4/7/2017	3/31/2017	3/24/2017	Notes
Hygiene	ATOs	# compliant systems / # of systems	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100.0%	100%	
	Ongoing A&A percentage	From Department's Scorecard	100%	97.1%	97.1%	85.7%	85.7%	85.7%	77.1%	77.1%	62.9%	88.6%	88.6%	88.6%	
	USDA Key Controls	# compliant controls / # of controls	99.5%	99.5%	99.5%	99.5%	99.5%	99.5%	99.5%	99.5%	99.7%	97.7%	97.7%	96.1%	
	NIST Controls	# compliant controls / # of controls	98.4%	98.4%	98.4%	98.4%	98.4%	98.4%	98.4%	98.3%	98.4%	98.0%	98.0%	97.7%	
	FY17 IT Audit Artifact Delivery Timeliness	# delivered timely/ # currently due	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	
	FY17 IT Audit Artifact Compliance	# of compliant artifacts provided /# of artifacts provided	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	
Access	Standard User PIV Authentication Compliance	From Department's Scorecard	98.9%	99%	99%	99%	99%	99%	98.6%	98.6%	98.9%	98.9%	98.7%	98.7	
	Access Request Timeliness	# internally provisioned requests completed / # internally provisioned requests received	97.6%	98%	95.1%	96.8%	96.8%	97.1%	95.6%	99.5%	99%	99.3%	96.9%	97.7%	
	Separation Request Timeliness	# of separation requests completed/# of separations requests received	90.9%	98.4%	96%	100%	100%	96.7%	90.9%	66.7%	70.6%	76.7%	91.7%	77.8%	
	Service Provider (or other Non-[IT Director E]) Request Timeliness	# externally dependent provisioned requests completed / # externally dependent provisioned requests received	91.2%	89.5%	92.5%	87.9%	87.9%	94.9%	96.4%	85.3%	84.4%	85.7%	74.6%	74.3%	
	Access Request [illegible]ccuracy	# requests completed accurately / # requests sampled	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	
Awareness	[SES Org A]	# complete / total #	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	
	[SES Org B]	# complete / total #	99.4%	99.4%	99.4%	99.4%	99.4%	99.4%	99.4%	99.4%	99.4%	99.4%	99.4%	99.4%	
	[SES Org E.1]	# complete / total #	99.9%	99.9%	99.9%	99.9%	99.9%	99.9%	99.9%	99.9%	97.2%	97.0%	97.0%	96.9%	
	[SES Org E.2]	# complete / total #	97.7%	97.6%	98.6%	99.2%	99.2%	98.5%	98.5%	98.4%	81.7%	81.3%	80.9%	80.7%	
	[SES Org F]	# complete / total #	98.7%	100%	100%	100%	100%	100%	99.6%	100%	99.6%	100%	99.6%	99.6%	
	[SES Org I]	# complete / total #	98.9%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	
	[SES Org J]	# complete / total #	96.9%	97%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	
	Externals (Contractors, Volunteers, Affiliates & Interns)	# complete / total #	93.5%	93.5%	93.1%	93.2%	93.2%	92.7%	92.5%	92.8%	92.1%	92.1%	91.8%	91.6%	
	Total Users Basic ISAT (minus committee members)	# complete / total #	98.1%	98.1%	98.7%	98.7%	98.7%	98.6%	98.6%	98.5%	98.5%	98.5%	84.6%	84.4%	
	Committee Members Alternate ISAT (Protecting PII)	# complete / total #	17.9%	15.3%	12.5%	9.6%	9.6%	5.4%	4.4%	2.3%	N/A	N/A	N/A	N/A	
	Total ISAT and PII (per USDA)	From Department's Scorecard	83.3%	82.6%	82.6%	82.6%	82.0%	82.0%	81.9%	81.9%	81.3%	0.27	0.27	0.24	
	FY17 Specialized Role-Based Training	# complete / total #	13%	12.4%	1.9%	1.9%	1.9%	1.9%	1.9%	1.9%	N/A	N/A	N/A	N/A	
Vulnerabilities	Vulnerabilities/Endpoint	From Department's Scorecard	0.87	1.31	1.31	1.31	2.05	2.05	5.86	5.86	58.72	0%	73.1%	73.1%	
	[IT Operations A] Vulnerability Remediation Tickets on Schedule	# of on schedule [IT Operations A] tickets/# of open [IT Operations A] tickets	20%	87.5%	87.5%	87.5%	87.5%	87.5%	0%	0%	0%	84.6%	16.7%	16.7%	
	[IT Operations A] Vulnerability Remediation Tickets Remed	# of [IT Operations A] tickets closed/# of [IT Operations A] tickets	84.8%	75.8%	75.8%	75.8%	75.8%	75.8%	96.2%	92.3%	88.5%	0%	81.3%	81.3%	
	[IT Operations B] Vulnerability Remediation Tickets on Schedule	# of on schedule [IT Operations B] tickets/# of open [IT Operations B] tickets	50%	100%	100%	100%	100%	90.9%	0%	0%	0%	84.4%	-67.0%	-66.1%	
	[IT Operations B] Vulnerability Remediation Tickets Remediated	# of [IT Operations B] tickets closed/# of IPSUO tickets	90.5%	83.3%	83.3%	81%	81%	73.8%	96.9%	93.8%	90.6%	-65.5%	[illegible]%	-45.5%	
Cyber Incidents	Trend of FSA incidents to USDA incidents this FY	Trend of # of incidents / # of incidents expected per ratio of FSA to USDA employees	-68.6%	-69.4%	-69.6%	-69.3%	-69.3%	-69.1%	-69.3%	-68.6%	-65.8%	-46.5%	[illegible]%	22.2%	
	Compar[IT Director E]n of FSA Incidents this FY to last FY	Incidents so far this FY / Incidents so far this time last FY	-51.9%	-52.8%	-52.7%	-51.2%	-51.2%	-51.0%	-52.1%	-50.5%	-46.9%	-23.8%	-58.4%	-53.8%	
	Trend of FSA PII incidents to USDA PII incidents this FY	Trend of # of PII incidents / # of incidents expected per ratio of FSA to USDA employees	-20.8%	-9.1%	-9.3%	-5.7%	-5.7%	-0.8%	-0.8%	5.4%	23.8%	-57.2%	96.4%	96.4%	
	Compar[IT Director E]n of FSA PII Incidents this FY to last FY	PII Incidents so far this FY / Incidents so far this time last FY	-67.9%	-67.0%	-66.0%	-65.0%	-65.0%	-63.9%	-62.7%	-61.5%	-58.7%	98.1%	100%	100%	
Exceptions	All OCIO Plan of Actions and Milestones (POA&Ms)	# of On Schedule POA&Ms / total # of POA&Ms	100%	100%	100%	94.6%	94.6%	94.6%	94.6%	97.5%	97.7%	98.1%	96.4%	96.4%	
	[IT Director A] Plan Of Actions & Milestones (POA&Ms)	# of On Schedule [IT Director A] POA&Ms / total # of [IT Director A] POA&Ms	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	
	[IT Director C] Plan Of Actions & Milestones (POA&Ms)	# of On Schedule [IT Director C] POA&Ms / total # of [IT Director C] POA&Ms	100%	100%	100%	50%	50%	50%	50%	50%	50%	50.0%	50.0%	50.0%	
	[IT Director E] Plan Of Actions & Milestones (POA&Ms)	# of On Schedule [IT Director E] POA&Ms / total # of [IT Director E] POA&Ms	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	100.0%	100.0%	100.0%	
	[IT Director F] Plan Of Actions & Milestones (POA&Ms)	# of On Schedule [IT Director F] POA&Ms / total # of [IT Director F] POA&Ms	100%	97%	97%	97%	97%	97%	97%	100%	100%	98.1%	97.8%	97.8%	
	Milestones	# of On Schedule milestones/ total # of milestones	100%	100%	100%	96%	95.7%	95.7%	95.7%	96.6%	96.8%	95.5%	95.6%	95.4%	
	Risk Based Decision (RBD)	# of unexpired / total # approved	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	

Not All KPIs Show Variations

- Access Request Timeliness
  - Our access request team processes 500+ system access requests a week. Weekly variance of +/-5% is not concerning.
- Some metrics run at 100% week after week.
  - These are scrutinized to make sure we are measuring the right things.
  - The ones that remain we've determined have value because we want to know if even small variations from 100% occur.

Benefits

Good Management Through Measurement

- Lagging KPIs help identify problems that contribute to risk
  - Improving the lagging KPIs indirectly reduces risk
- Leading KPIs help serve as an early warning on potential risks
  - Improving the leading KPIs helps resolve unrealized risks
- Information provides evidence of results

- Returning to the RBM model…

Transparency + Accountability = Confidence

- Showing good, bad, ugly ➔ Transparency
- Produces evidence through information
- Gives confidence that programs are being managed

Recognition + Feedback = Improvement

- Document Quality Assurance Surveillance Plan (QASP) results for contracts
- Document team performance results
- Document service provider performance results

Future

Future of the Scorecard

- Pivot to Cybersecurity Framework (identify, protect, detect, respond, recover)
  - Transition domains to align with CSF functions
  - Identify KPIs that support OMB cyber memo objectives
- Continue to look for KPIs that are indicators of risk
  - Security Impacts of Change Requests
  - Vulnerability Impacts
- Continue to look for leading indicators of performance
- Expand information received from service providers

Thank You

About Me

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About FSA

The Farm Service Agency (www.fsa.usda.gov) delivered over $6B in direct and guaranteed farm loans and nearly $9B in farm program payments in 2016. FSA helps to ensure the security of commodities distributed worldwide. FSA delivers its mission through a network of over 2,100 field offices supported by headquarters and regional offices throughout the United States.