



Grant Oversight Using Data Analytics



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WELCOME!

- **Time** We will begin promptly at 2pm Eastern Time and end at 4pm Eastern Time.
- **Webinar Audio** Dial 1-877-900-8837 or 1-210-234-9867 passcode: DAW2013 to join the audio bridge in listen-only mode.
- **Questions via email only** at daw2013@nsf.gov during the webinar.
- **Captioning** Go to: www.fedrcc.us/ and enter **event confirmation # 2116549** from a separate browser page to view streaming captions.
- **Presentation slides, CPE forms** will be at: <http://www.oig.nsf.gov> after the event
- Send attendee list, evaluation forms, and CPE certifications to jhornste@nsf.gov
- **CPE Certificates** Sent within a week after receipt of certification and evaluation
- **Get Help** Send private WebEx chat to meeting host, call WebEx at 1-800-857-8777 and press 0 for technical support, Email: kotts@nsf.gov.
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*Grant Oversight
Using Data Analytics
April 16, 2013*



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**National Science Foundation
Office of Inspector General**

Georgia Institute of Technology



Agenda



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- **Introduction**
 - Allison Lerner, Inspector General, NSF
- **NSF OIG Grant Oversight**
 - Dr. Brett Baker, CPA, CISA: Assistant Inspector General for Audit
 - Laura Koren, CPA, CFF: Director of Compliance Analytics
- **Georgia Institute of Technology Grant Monitoring**
 - Phillip Hurd, CISSP, CISA: Chief Audit Executive
- **Questions** daw2013@nsf.gov



U.S. Financial Assistance Overview

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- **\$550 billion in awards**
 - 88,000 awardees and 26 Federal grant making agencies
 - Project and research, block, and formula grants
 - Outcomes are designed to promote public good
- **Challenges**
 - Limited visibility of how Federal funds are spent by awardees
 - Support for funding requests much less than for contracts
- **American Recovery and Reinvestment Act (2009)**
 - \$840 billion of assistance to stimulate the economy
 - Greater accountability and transparency over spending than ever
- **Opportunities to enhance oversight with less**
 - Automated oversight



Grants Differ From Contracts

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GRANTS

Promote services for the
Public Good

- Merit review (competitive)
- Multiple awardees
- Award budget
- No government ownership
- Grant payments
 - Summary draw-downs
 - No invoices for claims
 - Expenditures not easily visible
- Salary percentages

CONTRACTS

Specified deliverables
(Goods and Services)

- Competitive process
- One awardee
- Contract Price
- Government ownership
- Contract payments
 - Itemized payment requests
 - Invoices to support claims
 - Detailed costs
- Salary hourly rates



Framework for Grant Oversight

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- **Data analytics-driven, risk-based methodology to improve oversight**
 - Identify institutions that may not use Federal funds properly
 - Techniques to surface questionable expenditures
- **Life cycle approach to oversight**
 - Mapping of end-to-end process to identify controls
 - 100% review of key financial and program information
 - Focus attention to award and expenditure anomalies
- **Complements traditional oversight approaches**
 - Techniques to review process and transactions are similar
 - Transactions of questionable activities are targeted



End to End Process for Grant Oversight

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PRE-AWARD RISKS	ACTIVE AWARD RISKS	AWARD END RISKS
<ul style="list-style-type: none"> •Funding Over Time •Conflict of Interest •False Statements •False Certifications •Duplicate Funding •Inflated Budgets •Candidate Suspended/Debarred 	<ul style="list-style-type: none"> •Unallowable, Unallocable, Unreasonable Costs •Inadequate Documentation •General Ledger Differs from Draw Amount •Burn Rate •No /Late/Inadequate Reports •Sub-awards, Consultants, Contracts •Duplicate Payments •Excess Cash on Hand/Cost transfers •Unreported Program Income 	<ul style="list-style-type: none"> •No /Late Final Reports •Cost Transfers •Spend-out •Financial Adjustments •Unmet Cost Share



D A T A A N A L Y S I S



Data Sources

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- **Internal**
 - Proposals: budgets, panel scores
 - Agency award systems, recipient reporting
- **External**
 - Excluded Parties List System (EPLS)
 - Central Contractor Registration (CCR/SAM)
 - Public tax filings
 - Federal Audit Clearinghouse (A-133 Audits)
- **Recipient financial system records**
 - General ledger and subsidiary ledgers
 - Effort reporting
 - Property
 - Travel and purchase card
 - Subaward monitoring



Risk Assessment and Identification of Questionable Transactions

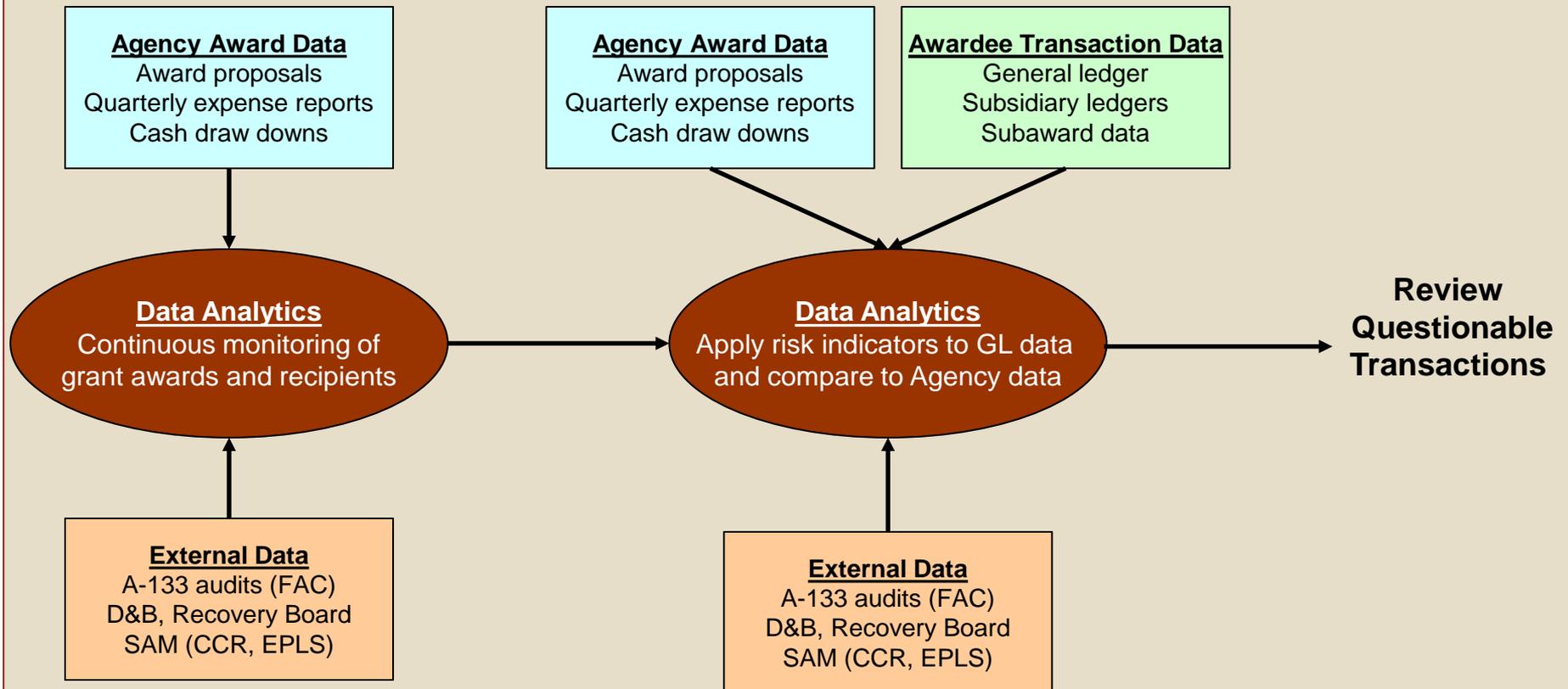
9

Phase I

Identify High Risk Institutions

Phase II

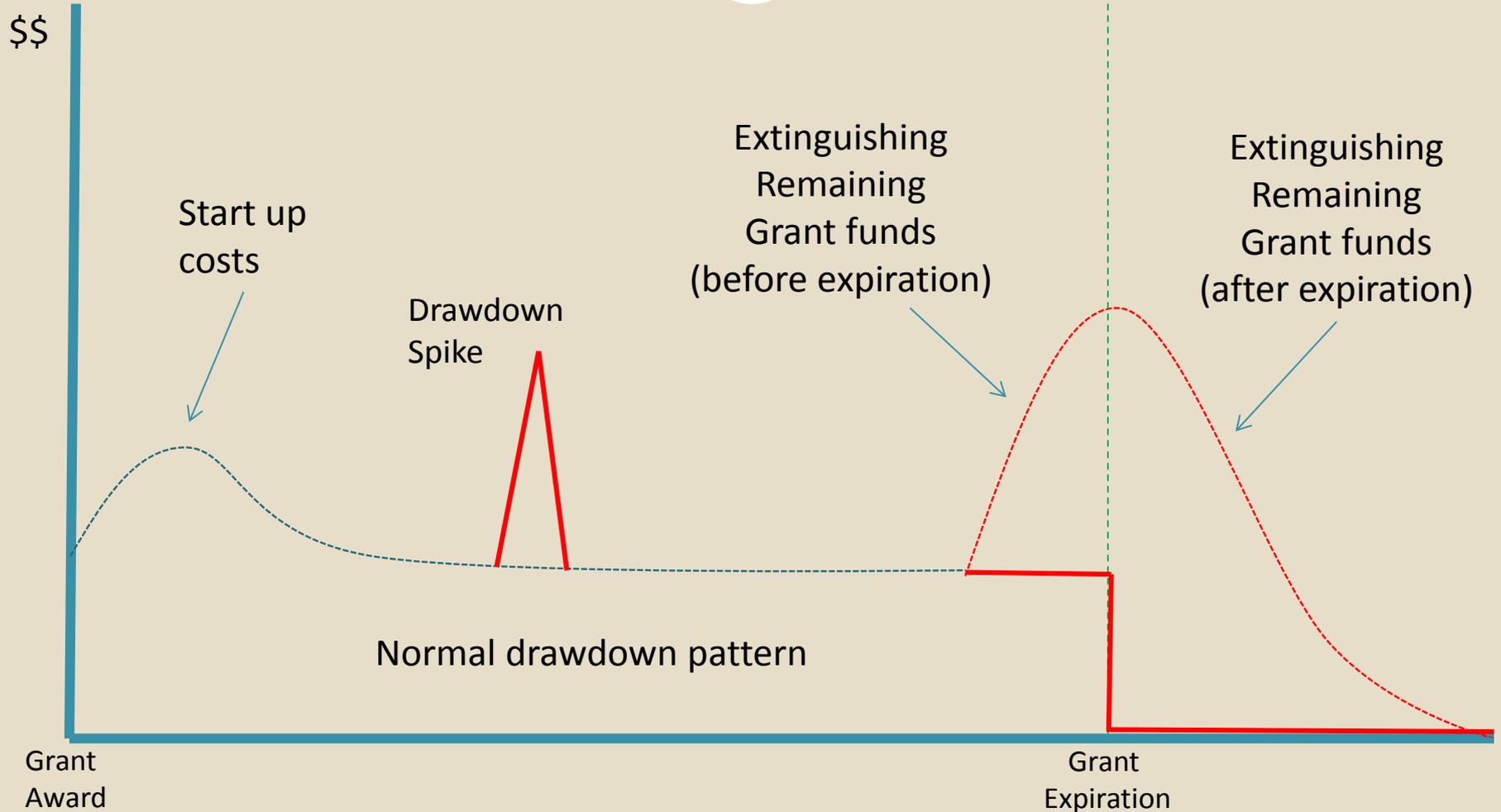
Identify Questionable Expenditures





Anomalous Drawdown Patterns

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Awardee Profile – Burn Rate

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Award	Amount (\$K)	Expended (\$K)	% Expend	Total Days	Days Active	% Total Days	Burn Rate
1	10,000	9,000	90%	1095	769	70%	+28%
2	5,000	4,000	80%	1095	524	48%	+67%
3	2,000	1,500	75%	1095	404	37%	+103%
4	1,000	995	99%	366	200	77%	+30
5	20,000	12,000	60%	1826	500	27%	+122%
6	10,000	5,000	50%	1826	1600	88%	-43%
Awardee Totals	48,000	32,495	76%	7,303	3,997	58%	+69%



Data Analytics: Myths and Realities

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MYTHS

- Data Only
- Numbers Exercise
- Process Changes Data
- Findings Unsupported
- Not Auditing

REALITIES

- Supplement to Traditional Auditing
- Yellow Book Compliant
- Rigorous Standards
- Findings Documented
- Focuses Fieldwork



Data Analytics Defined

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**Utilizing Set Rules to Perform Knowledge Discovery
On the Receipt and Use of Federal Award Funds**



Data Analytics Audit Objectives

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- Use computer assisted techniques and data analytics to
 - Target fieldwork phase of audit
 - Monitor grant spending

- Determine if costs claimed on federal awards are
 - Allowable, Allocable, and Reasonable
 - In conformity with Grant Terms and Federal Guidance



Data Sources: Federal Awardee

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General Ledger

Accounting
Transactions
Costs Claimed

Subsidiary Ledgers

Accounts Payable

Payroll

Organization Specific

Other Data

Labor Certification
and/or Effort Reports

Defined by Policies and
Procedures



Additional Awardee Data Request

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- **General Ledger and Subledgers (ex: A/P, Payroll) for all costs claimed**
- **Control/Hash totals for all files provided**
- **Data models, system architecture, data flowcharts**
- **Data dictionary containing record layout for each field**



Data Dictionary: Example

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Field Name	Field Ty	Field Len	Field Description
NSF Financially Responsible Institution	ASCII	10	10-digit institution unique identification number specifying
NSF Financially Responsible Institution	ASCII	64	Narrative institution name
NSF Award ID	ASCII	7	7-digit numeric number assigned to the award
NSF Award Title	ASCII	180	Full text title of the award being supported
NSF PI ID	ASCII	9	9-digit numeric ID for Principal Investigator
NSF PI Last Name	ASCII	24	Principal Investigator's Last Name
NSF PI First Name	ASCII	15	Principal Investigator's First Name
NSF Award Effective Date	Date	8	Effective date of award
NSF Award Expiration Date	Date	8	Award expiration date
NSF Award Financial Close Date	Date	8	Date the award was financially closed
NSF Award Final Expenditure Date	Date	8	Final expenditure date for the award
NSF Award Status Code	ASCII	2	Numeric code associated with award status description



Data Sources: National Science Foundation

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Award Database

Award Dates
Award Amounts
Award Purpose
Amendments

Award Budget

Cost Categories
Dollar Amounts
Labor and Effort
Cost Share
Changes

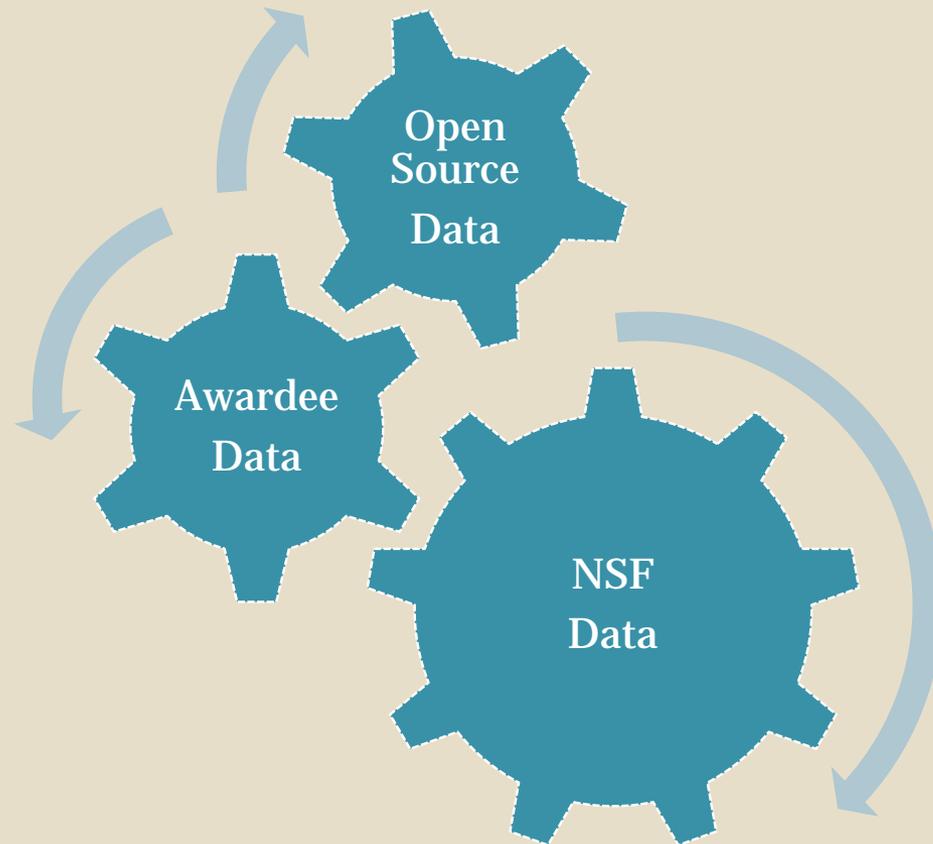
Expense Detail

Costs Claimed
Adjustments
Cash Drawdowns



Comprehensive Data Base

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Criteria

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Office of
Management and
Budget Circulars

NSF Award Terms
and Conditions,
Grant Details

**Incurred
Costs**

Awardee Policy and
Procedures

Generally Accepted
Accounting
Principles



Business Rules

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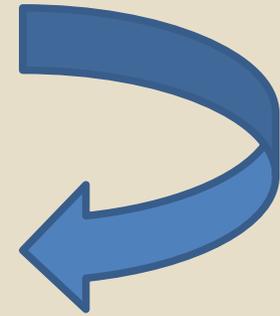
- General Rules for Receipt of Federal Funds
- Award Recipient Specific Rules
- Grant Specific Rules
- Accounting Rules



Targeting Potential Unallowable Costs

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```
OPEN A01a_xxxxxxx  
EXTRACT RECORD TO "xxxxxxx"  
OPEN_ xxxxx  
DEFINE FIELD c_U01_Key_Word_Flag COMPUTED  
AS "NSF OIG;U01 Unallowable;Key Word Flag"  
"1" IF FIND("lobby") OR FIND("campaign")  
"1" IF FIND("bad debt")  
"1" IF FIND("alcohol")
```





Example: Equipment Charges Incurred Immediately Before Grant Expiration Date

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GRANT ID	OBJECT DESCRIPTION	GRANT EXPIRATION DATE	TRANSACTION DATE	LEDGER POST DATE	FINANCIAL AMOUNT
XXXXX42	CONSTRUCTION AND ACQUISITION	09/30/2009	09/30/2009	10/06/2009	51,851.22
GRANT ID	OBJECT DESCRIPTION	GRANT EXPIRATION DATE	TRANSACTION DATE	LEDGER POST DATE	FINANCIAL AMOUNT
XXXXX27	INVENTORIAL EQUIPMENT	07/31/2010	06/04/2010	08/11/2010	31,621.56
GRANT ID	OBJECT DESCRIPTION	GRANT EXPIRATION DATE	TRANSACTION DATE	LEDGER POST DATE	FINANCIAL AMOUNT
XXXXX77	INVENTORIAL EQUIPMENT	08/31/2009	07/16/2009	09/10/2009	23,163.75
TOTAL					106,636.53



Travel Related to Award?

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NSF_OIG_Transaction	NSF_PI_ID	NSF_OIG_Award_Date	Expense Type	Transaction_Amount	NSF_OIG_Record_Co
GL Trans-030745	#####	09/25/2007	TRAVEL-IN-STATE	73518.84	1
GL Trans-099671	#####	06/11/2010	TRAVEL - FOREIGN	41474	1
GL Trans-084844	#####	11/02/2010	TRAVEL - OUT-OF-STATE	37515.73	1
GL Trans-045792	#####	02/09/2010	TRAVEL-IN-STATE	28905	3
GL Trans-117607	#####	06/11/2010	TRAVEL - FOREIGN	27262	1
GL Trans-126299	#####	08/19/2010	TRAVEL-IN-STATE	20974.5	2



Manual Audit Testing Worksheet

SAMPLE NUMBER	OBJECT NAME	TRANS LINE DESC	TRANS LINE AMT	QUESTIONED	<u>A</u>	<u>B</u>	<u>C</u>	<u>D</u>	<u>E</u>	<u>F</u>	<u>G</u>	<u>AWD ID</u>
NSF-13-01	FOREIGN TRAVEL LODGING	xxxxxxxxxx	\$ 10,516.00	\$ 10,516.00	no	no	yes	no	yes	N/A	N/A	xxxxx
NSF-13-02	FOREIGN TRAVEL M&IE	xxxxxxxxxx	\$ 7,087.50	\$ 7,087.50	no	no	yes	no	yes	N/A	N/A	xxxxx
NSF-13-03	FOREIGN TRAVEL LODGING	xxxxxxxxxx	\$ 5,784.46	\$ 22,207.38	no	no	yes	no	yes	N/A	N/A	xxxxx



Questions?

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Questions during the webinar
via email only to daw2013@nsf.gov

National Science Foundation
Office of Inspector General
Phone: 703-292-7100

University Oversight

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Phillip Hurd
Director, Department of Internal Audit
Georgia Institute of Technology



New Age & Risks

- How the information age is used to execute fraud schemes
- Using data analytics to detect fraud
 - Iterations of analytics
 - ✓ Prevention
 - ✓ Compliance

Purchasing Cards & Fraud

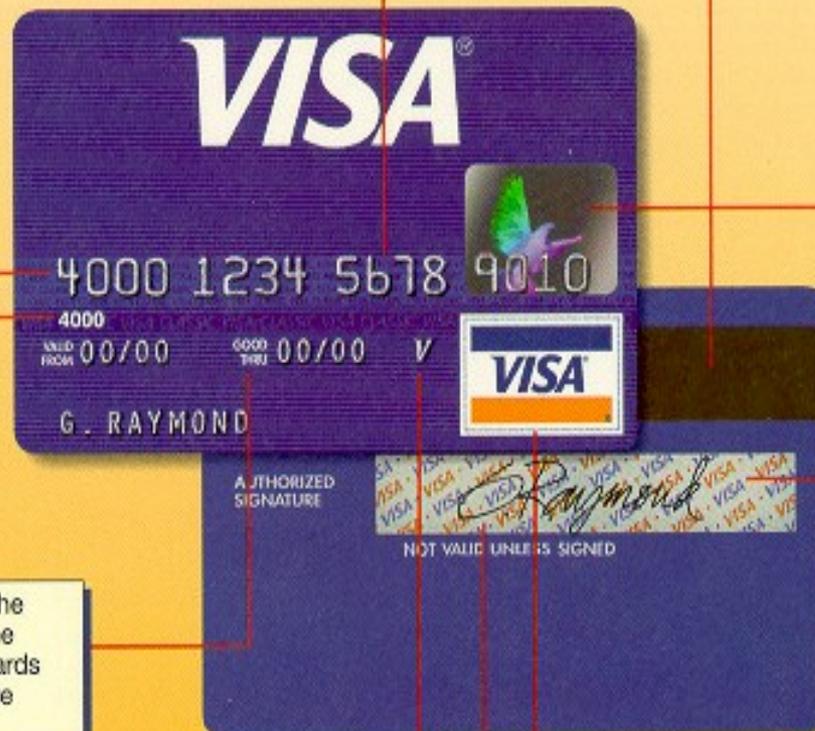
- ID Theft
- Ready Access to Institution Money
- EASY to Steal
- Hard to detect

Visa Card Security Features

The account number embossed on the card must match the account number printed on the sales draft. The last grouping of embossed digits should extend into the hologram.

All VISA account numbers begin with a 4. The characters and numbers embossed on the card should be clear and uniform in size and spacing.

A four-digit number printed on the card (above or below the account number) should match the first four digits of the account number.



A hologram showing the Visa Dove should appear to move when the card is tilted. A genuine hologram is a photographic image that appears to be three-dimensional when rotated. Most counterfeit cards contain a one-dimensional printed image on a foil sticker.

Tamper-evident signature panel with "VISA" printed at an angle in blue and gold or blue only.

The Valid Date lists the last date on which the card is valid. Some cards may have an Effective Date as well.

Tiny characters called Micro Printing form a border around the Visa logo which appears above or below the hologram. Visible by using a magnifying loupe, it is made up of the first four digits of the account number and other characters.

The "Flying V" is embossed on the same line as the valid dates.

The signature on the back of the card must match the signature on the sales draft. All Visa cards must be signed before they are valid.

Low Security by Design

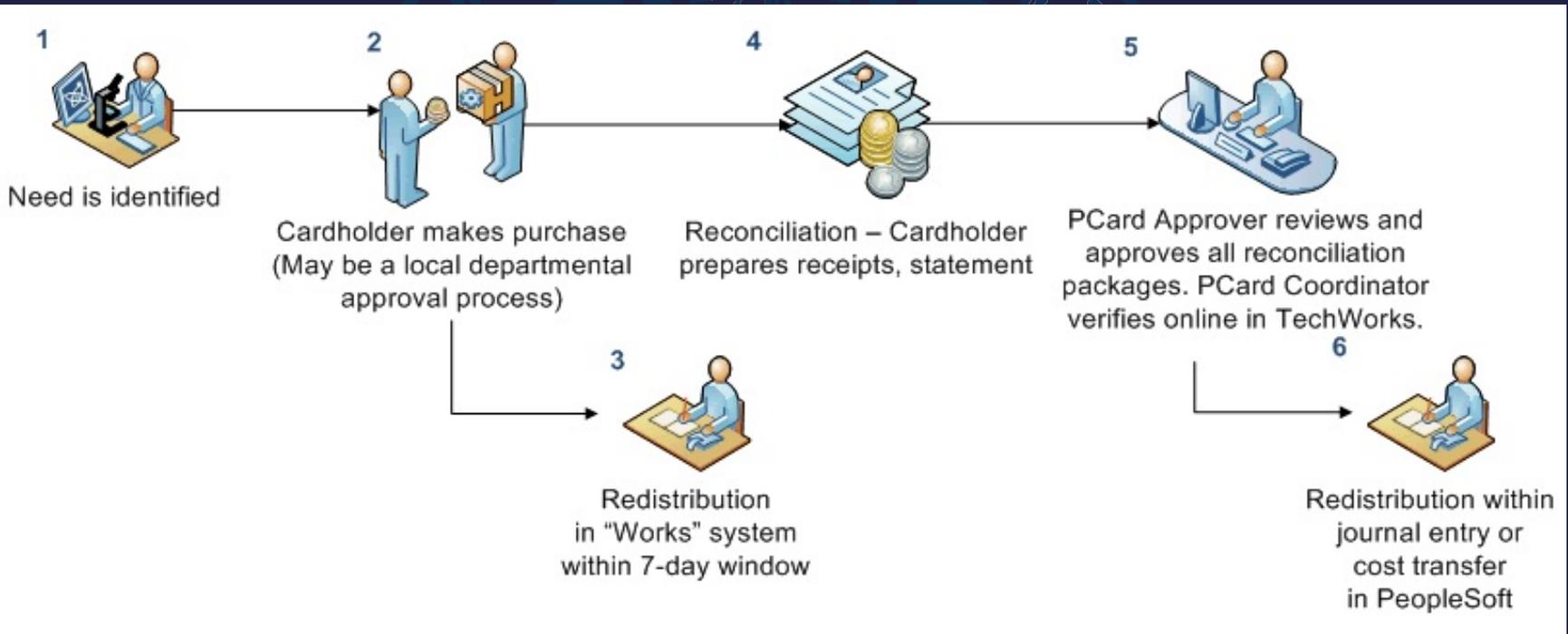
- The goal of the credit card companies, as they say, is not to eliminate fraud, but to "reduce it to manageable levels", such that the total cost of both fraud and fraud prevention is minimized.
- The low security of the credit card system presents countless opportunities for fraud. This opportunity has created a huge black market in stolen credit card numbers, which are generally used quickly before the cards are reported stolen.

The Players - Who else is in the mix?

- Banking Partner
- Merchant Provider
- Credit Card Processor
- IT/Business Staff
- Ticketing Company
- Credit Card Companies
 - Visa, Master Card, Discover Card, American Express



Georgia Tech P-Card Process



HOTLINE: 866.294.5565

Procurement Controls

- Preventive Controls
 - Card-based controls (MCC, Etc)
 - May be customized
 - Transactions not within established parameters declined at POS
- What Most Institutions Consider Procedural Controls
 - Policies and Procedures
 - Training
 - Cardholder agreement

Fun Fraud Scheme

- Preventive Controls
- Proxy Purchasing
 - Set up to sell items through Amazon or eBay using fictional name
 - Set up PayPal to receive credit card payments
 - Purchase needed items with personal funds through a legitimate vendor
 - Sell the items through the proxy
 - Purchase these items with institutional funds
 - The margin is the theft and virtually impossible to detect

Fun Fraud Scheme

1

- Move yourself into a position to purchase Items in your company

2

- Identify a legitimate need (**monitor**)

3

- Find a local store that sells the item (**electronics store - monitor \$200**)

Fun Fraud Scheme

4

- Purchase item from a local store using **your own** money

5

- Set up an online merchant presence (ebay, amazon, ect...) (eBobs monitors)

6

- Set the selling price of the monitor on eBobs monitors to \$300 +shipping

Fun Fraud Scheme

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- Use your employer's Purchase Card to buy the monitor from eBob's monitors for \$300 + shipping

8

- Bring the monitor into work and keep the shipping money and overage

9

- All paperwork is created by legitimate third parties. **Near impossible to trace without data analytics.**



Why Data Analysis?

Georgia Tech's Issues

- Large Variety of Data
 - Multiple data sources to examine
 - Not able to get consolidate view
- High Volume Data
 - Long analysis time
 - Not on pace with speed of business

Continuous Framework

Department of Internal Auditing

Data From any Source

- ERPS
- BESPOKE APPS
- SYSTEM LOGS
- TELECOM SWITCHES
- EXTERNAL DATABASES
- LEGACY SYSTEMS

CONSOLIDATED VIEW
Extract, transform, and load using established tools

CONTROL AND BUSINESS RULES
Applied using parameters and scripts

GENERATE EXCEPTIONS
Control breaches and suspicious transactions



Enterprise-wide Management of Exceptions

- Executive s
- Finance
- Audit and Compliance
- Sales and Marketing
- IT
- Board of Directors
- Business Units
- Engineering

Exception Management Deadlines
Escalation
Automatic detection of resolved issues

Business Logic
Elimination of false positives
Fine tuning of results and parameters

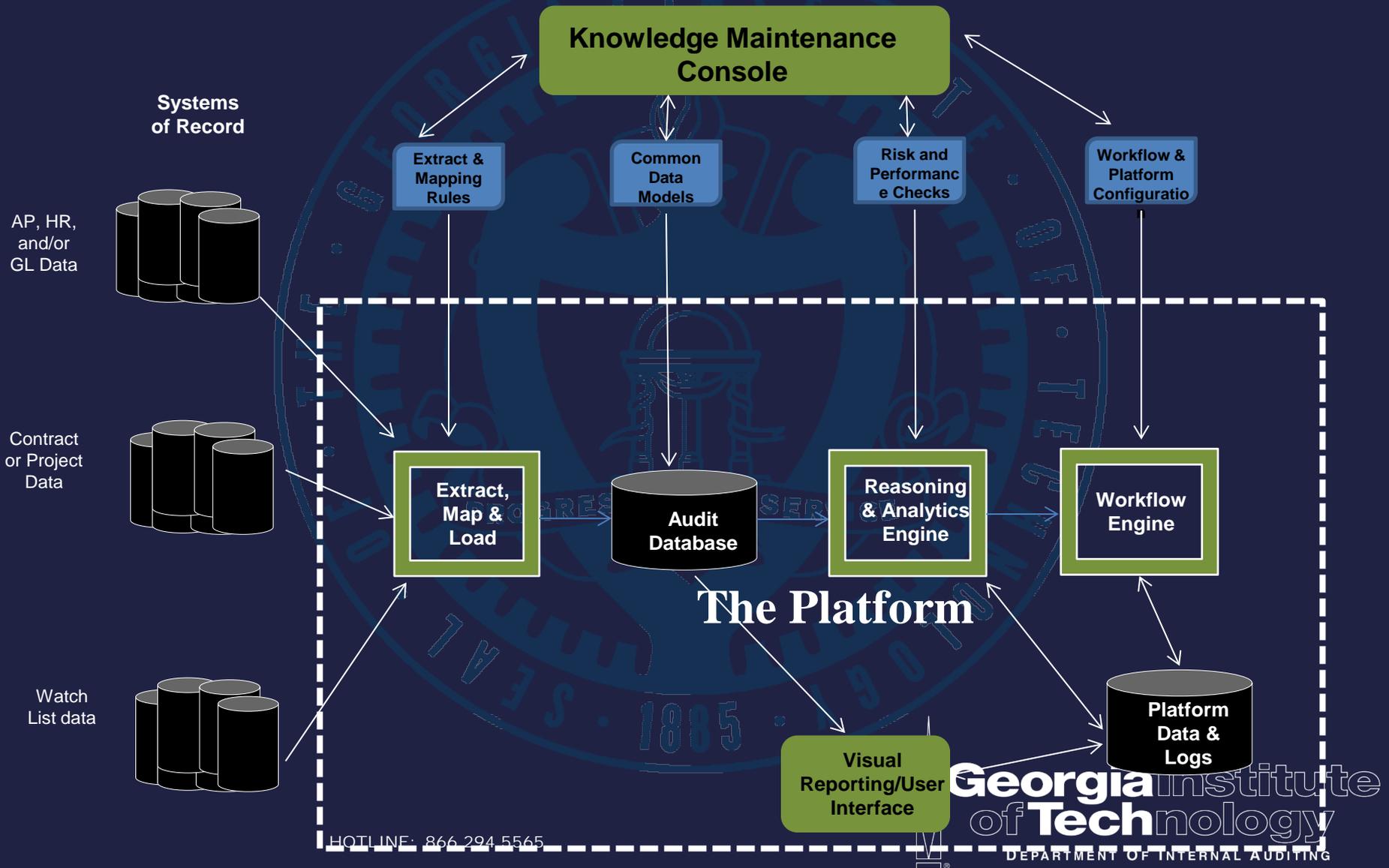
Enterprise View
Organizational view of risks and controls
Comparative analysis

Alert Systems
SMS and e-mail
For info, action, or oversight

TLINE: 86



What does a Continuous Auditing or Monitoring solution look like for GT?



CaseWare Monitor pbf-cm-app (ghackett6)

File View Security Help

Back Log Out

Dashboards

- My Issues
- Adoption
- Comparative
- Issues
- Process

Business Processes

- All
All Business Processes
- CM Test
Exception Management
- Pass 2 Demo
Exception Management

Exports

My Issues Issues ...iewing 4.3_Re...rchants **Proce...board**

Refresh 5 10 | OFF | Last Updated: 10/30/2012 10:44:56 AM

This dashboard shows items for a specific or all Business Processes.

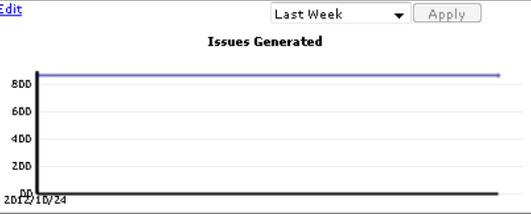
Business Processes: Pass 2 Demo

Process Details

Administrator	Ad.Gatech.Edu\jones304
Server	PBF-CM-APP
Date created	10/24/2012 6:01:00 PM
Last run date	10/24/2012 8:41:00 PM
Number of reports	12

[Edit](#) Last Week

Issues Generated



Business Process Latest Results

Report Name	Type	Count
1.1_Sales_Tax_By_State_Detail	Transactional	41
1.1_Sales_Tax_By_State_Smy-Supplier	Transactional	22
2.1_Splits_GA_Standard-All_PD	Transactional	1
4.2A_Red_Flag_Words_in_Supplier_Name	Transactional	87
4.2B_Red_Flag_Words_in_Item_Descriptor	Transactional	18

Enter filter here... << Previous [Next >>](#) [More](#)

[Edit](#)

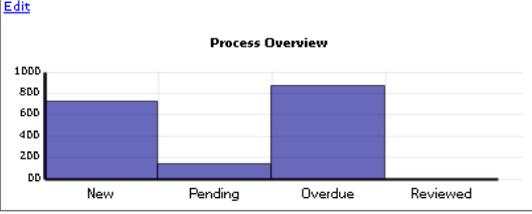
Issues Assigned for Action

Username	Full Name	Issue Count
Ad.Gatech.Edu\joringel3	Joe Oringel	868

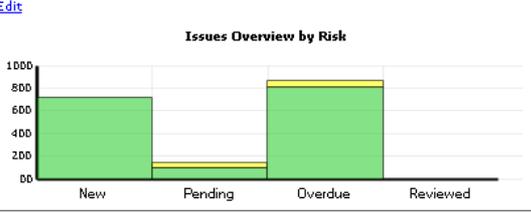
Enter filter here... << Previous [Next >>](#) [More](#)

[Edit](#)

Process Overview



Issues Overview by Risk



Ready Connected to: pbf-cm-app

Data Analysis Tool Evaluation

Factors

1. Capabilities
 - i. Data Integrity
 - ii. Data Import from any source
 - iii. Audit Specific Commands

2. Ease of Use
 - i. Equation vs. Algorithm approach



Areas for Consideration

Purchasing Cards

- Large transaction volumes

Grant Compliance

- Possible nepotism
- Non-compliance
- Unallowable Expenses
- Cross Grant Movement



Data Analysis & P-Cards

- MCC
- Data Levels –III
- Project/Grant Number
- Allow-ability Definitions
- IDEA®
- Monitor ®

HOTLINE: 866.294.5565



Georgia Institute
of Technology

DEPARTMENT OF INTERNAL AUDITING

DATA that Didn't exist 5 years ago...

Level I data includes:	Level II data includes:	Level III Data includes:
<ul style="list-style-type: none">• Date• Merchant Name• City• State• ZIP Code IS not prompted by the terminal.	<ul style="list-style-type: none">• Date• Merchant Name• Tax ID• Merchant Type Code• Merchant Category Code (MCC)• City• State• ZIP Code <p>The merchant will then need to enter:</p> <ul style="list-style-type: none">• Purchase Amount Excluding Sales Tax• Sales Tax• Local Tax Indicator• Customer Code (if using a purchasing Card)	<ul style="list-style-type: none">• Date• Merchant Name• Tax ID• Merchant Type Code• Merchant Category Code (MCC)• City• State• ZIP Code <p>The merchant will then need to enter:</p> <ul style="list-style-type: none">• Purchase Amount Excluding Sales Tax• Sales Tax• Local Tax Indicator• Customer Code (if using a purchasing Card)• Full Line Item Details

Things to note & how to detect

Notes

- Must have level three data
- Must have profile of use

Detection

- Ratio analysis of users to like items
- Test of store credentials to user information
- ID non level three vendors
- Project/Grant ID

The Journey continues...

Continuous Monitoring...

- Grants & Contracts
- Purchasing Cards
- Travel & Expense
- Financial Aid





Closing Comments



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- **More efficient use of resources**
 - 100% transaction review
 - Still use traditional audit techniques to test transactions
- **Improved risk identification**
 - Business rules based on risks
 - Focus review on higher risks
- **Recipients can use similar data analytics techniques**
 - Monitor grant spending
 - Identify anomalies early