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Optimizing Customer Experience through Big Data Analytics And Use of Data Analytics in Audits

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Demystifying Customer Experience

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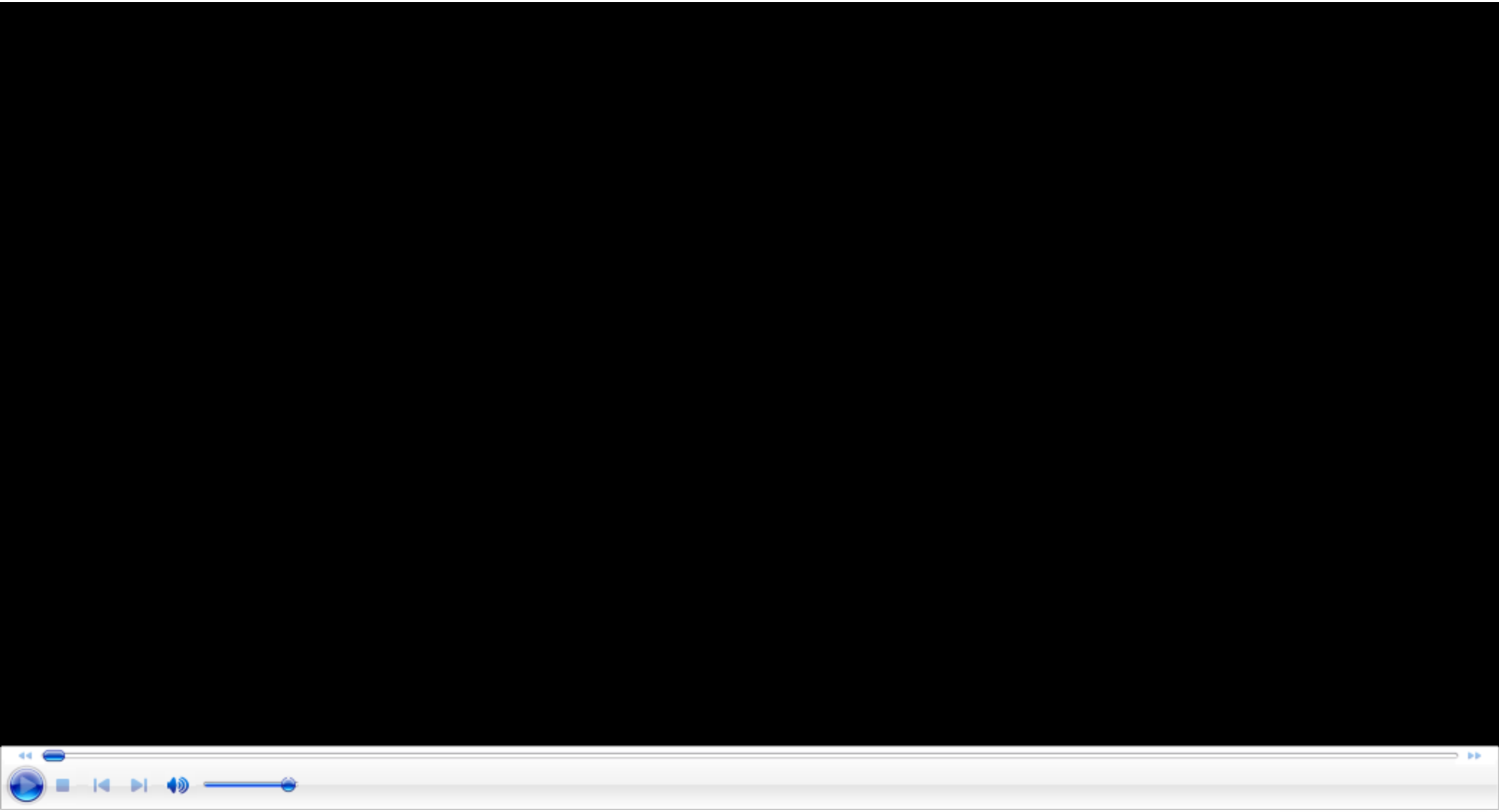
What do Customers Expect



Evolving Customer Expectations

Customers don't expect us to meet their expectations… but to exceed them

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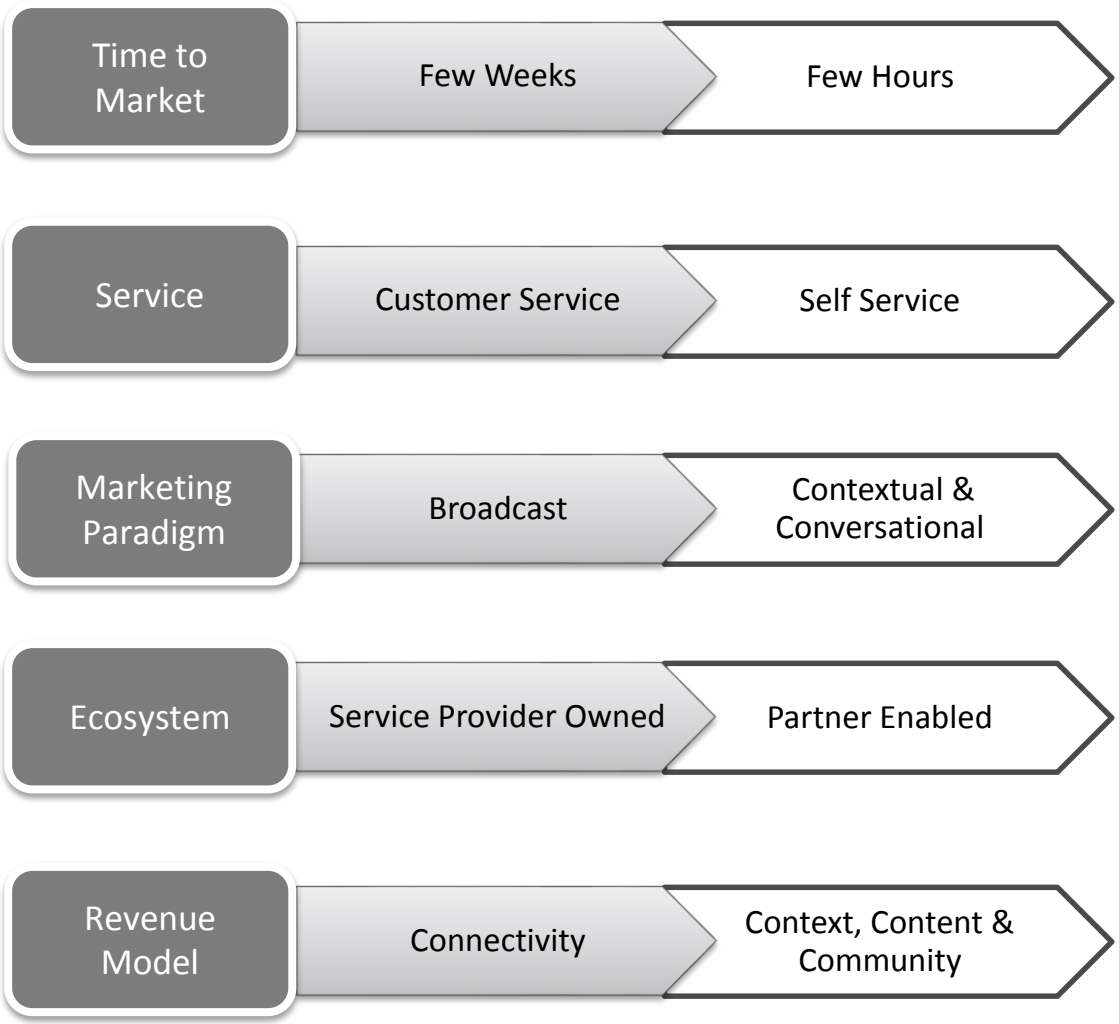
The Shifting Business Paradigm



Are you changing fast enough…

The Customer Experience Analytics Goals

A set of applications and methods

that turn visibility of each and every customer's experience over time and across all moments of interaction, into tangible business advantage

Brand Equity and Differentiation

Uplift Service Quality and Adoption

Increase Revenue and Profitability

Lean Operations

The Customer Experience Gap

We Deliver
Superior Customer Experience

80%

Service Providers

We get only

8%

Customers

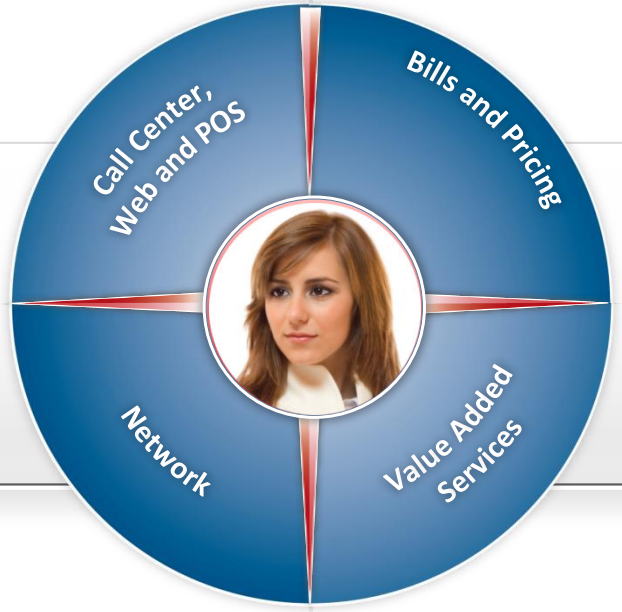
Service Providers are from Mars, Customers from Venus

The Service Provider Perspective

Average Handling Time,
Mean Time to Repair,
Average Revenue Per User,
Call Handling Efficiency

The Customer Perspective

Personal Profile, Loyalty,
Interest Match up Level,
Satisfaction, Package Optimization



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Customer Experience Analytics - From Sensing to Action

The Positives

- Long Duration Calls
- Repeated Downloads
- Content Forwards
- Regular Page Visits
- Buying Behavior

The Behavior

- Call Usage
- Data Consumption
- Recharges
- Payments
- Browsing History
- CC Interactions

Customer Experience Analytics

Customer Insight

Customer Intent
Moments of Truth

Deliver Action

The Negatives

- Service Outage
- Lost SMS/MMS
- Dropped Calls
- Hard Terminated IVR
- Multiple Call Transfers
- Abandoned Shopping
- Aborted Downloads

Sell

- Up-sell and Cross-sell
- Display personalized Ad
- Free trials
- Follow up Outbound Campaign

Retain

- Renewal campaign
- Modify terms of contract
- Win back discounts

Manage Receivables

- Prompt for payment
- eBilling sign-up
- Easy pay sign-up

Build Relationship

- Event-based help messages
- Life event based messages
- Share usage best practices

Customer Service

- Follow up on service outage
- Follow up on customer enquiry
- Offer promotions
- Sorry emails / SMS

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What has Big Data Analytics to do with all this ?

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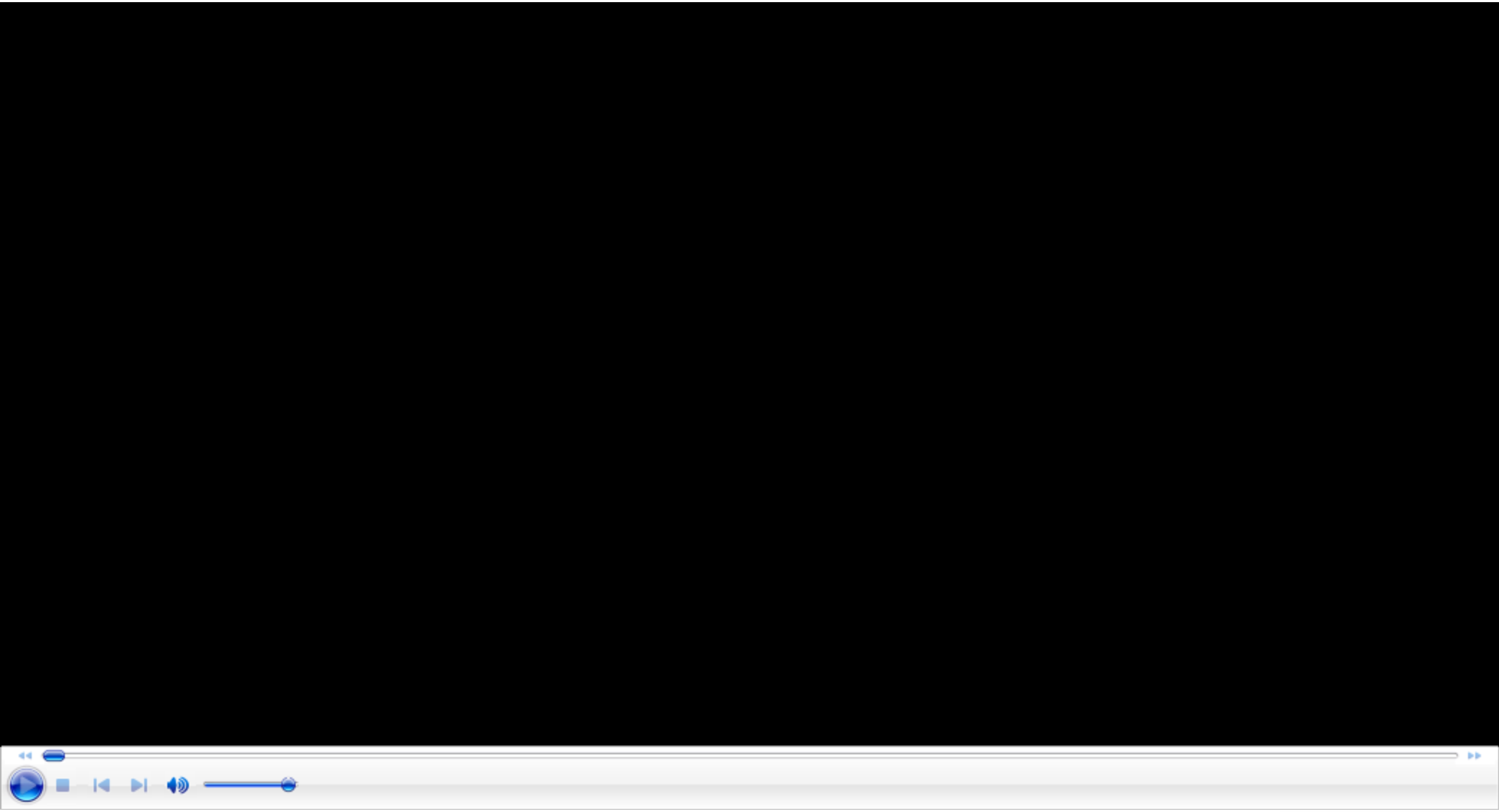
What happens in a Minute



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What happens in an Internet Minute

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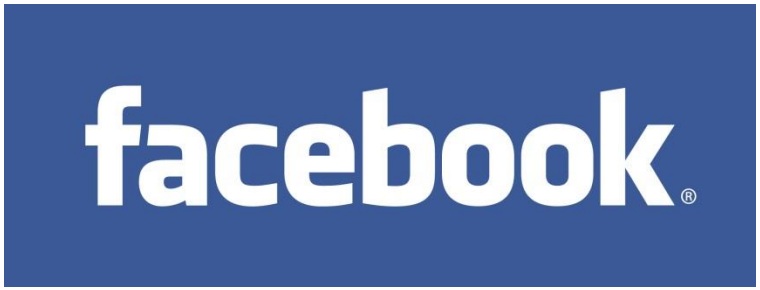
We are drowning in a sea of data

But Data is Opportunity

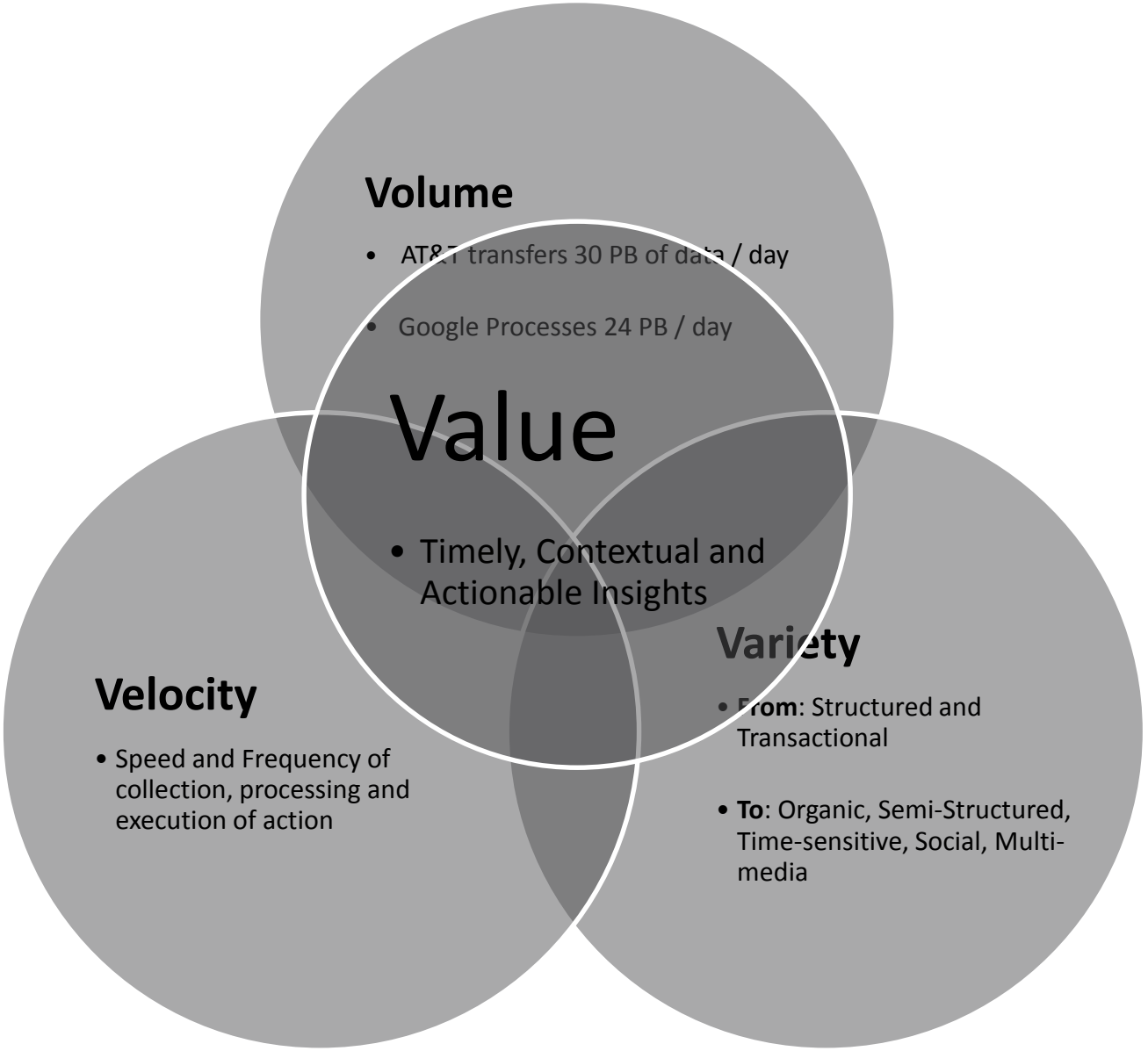


Advertisements

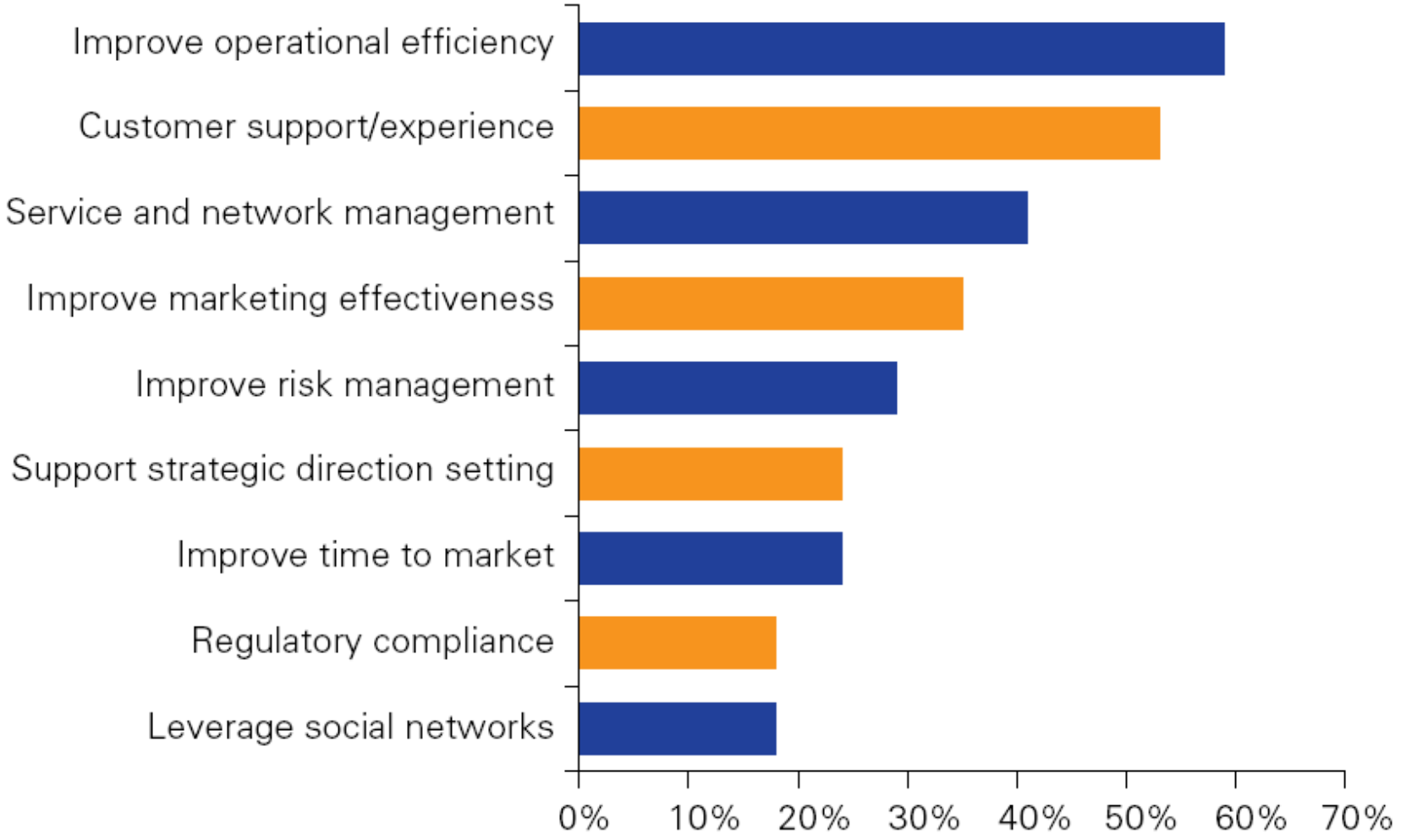
Recommendations

Anything that sells…

What is Big Data?



How Can Big Data Help ?



Source: TM Forum, 2012

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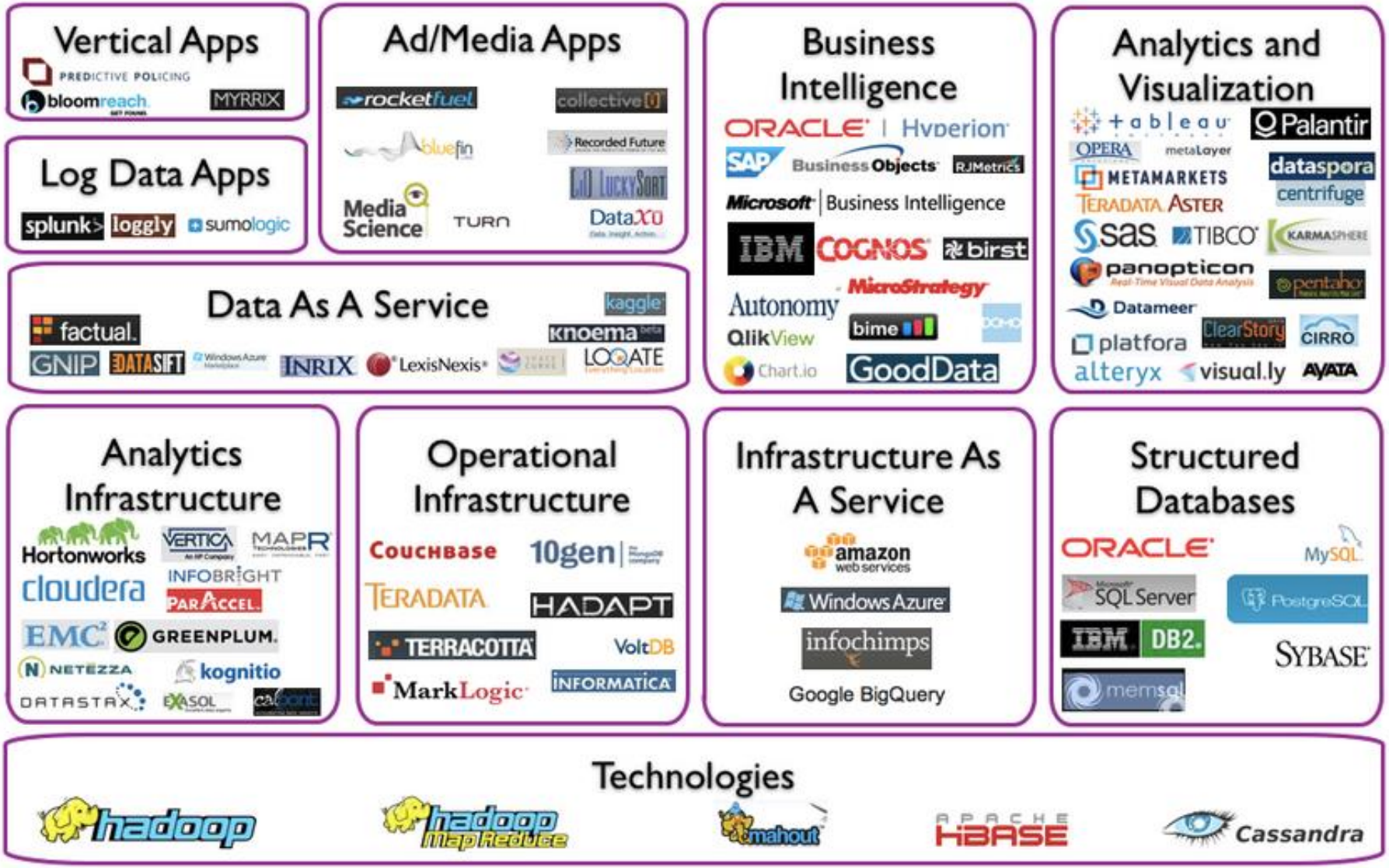
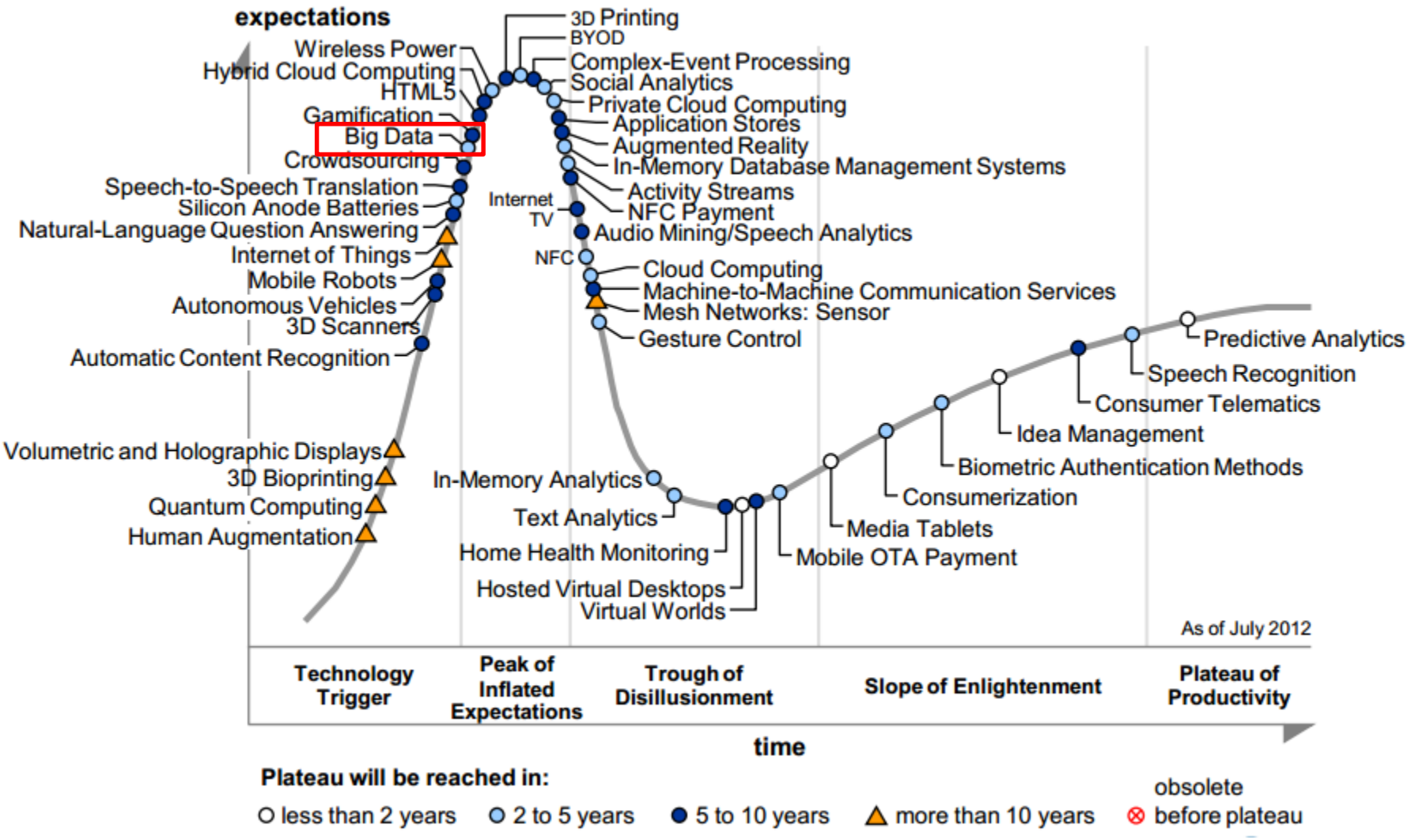
There are a lot of Players



And a lot of noise



Gartner's Emerging Technologies Hype Cycle 2012

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What are the Possible Applications of Big Data?

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Applications of Big Data Analytics to Optimize CE – Mature Markets

Objective	Approach	Targeted Business Outcomes
Mobile Analytics	• Measure and monitor customer experience across on-net, off-net and applications • Trend Consumption Patterns to understand Adoption Gaps • Campaign and Promotions Analytics	Increase in Service Adoption Orchestrated promotions and campaigns resulting in increase in consumption
Customer Life Time Value Enhancement	• Life Cycle Definition • Campaign Creation and Maintenance • Multi-Channel Campaign Execution	Increase breadth and depth of services and reduce churn through targeted campaigns
Targeted Advertising	• Deliver enhanced customer profile for targeted advertising • Micro-Segment based advertisements	Increase in overall Ad Revenue Increase in share of the customer's wallet due to personalized Ads
QoS Management	• Monitor, track and actively manage key QoS Parameters	Happy Customers due to a great QoS Compliance to QoS levels

Applications of Big Data Analytics to Optimize CE – Growth Markets

Objective	Approach	Targeted Business Outcomes
Reduce Dormancy of Transient Subscribers and Increase Stickiness	• Monitor dormancy by subscriber and service • Incent and stimulate usage through targeted campaigns	Lower levels and periods of dormancy, higher usage on network
Increase Recharge Amount and Frequency	• Monitor recharge behavior by segment • Increase recharge amounts and frequency through targeted stimulation campaigns	Higher levels of top-up activity for targeted customer segments
Increase ARPU of High Value Customers	• Identify micro-segments of high value customers with specific behavior patterns • Deliver targeted campaigns of value added services	Higher uptake of targeted data services Increased uplift on new offers
Increase Retention of High Value Customers	• Detect High Risk, High Value customers and proactively send retention offers • Proactively detect and fix negative experiences	Increased customer satisfaction among high value customers and higher retention levels

Building a Customer Experience Framework

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The Customer Experience 360° – *Perception.. Satisfaction.. Loyalty.. Profitability*

Awareness and Consideration

Perception
- Net Promoter Score
- Brand Equity
- Breadth of available devices
- Breadth of available services

Purchase

First Impressions
- Retail / POS Experience
- Competitive Pricing & Packaging
- Campaigns
- Discounts and Promotions

Service

Customer Fulfillment Experience
- Service Ubiquity
- Quality of Services
- Quality of Devices
- Quality of Service Partners
- Accuracy / Transparency of Billing
- Available Content & Applications

Support

Customer Care Experience
- Customer Self Service Quality
- Contact Center Quality
- Relationship / Account Manager

Advocacy

Transformation into Fans
- Loyalty Programs
- Personalization
- Contextual Offers
- Emotional Engagement

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Real Time Customer Insight Driving Customer Experience

Business Support Systems	Network	Social	Channel Interactions	Device
•Demographic Profile •Service Profile •Activation Context •Service Consumption •Payment History •Recharge History	•Quality and Coverage Data •Home Cell / Visited Cells •Cell Value •Cell Experience	•Social Media (FB, Twitter) •Surveys	•On Portal Browsing •Call Center Interactions •Self Service Interactions •Retail Interactions	•Off Portal Browsing •Offline Device Browsing •Device Configuration •Preferences

Building the all Important Customer Insight Model

Big Data Analytics Infrastructure

Correlation
Derived Profile Attributes
Value Based Micro-Segmentation

Integrated Customer Insight

Real-time Customer Insight as a Service

Customer facing Functions

Sales and Marketing | Contact Center | Collections and Dunning | Retail POS / Front Office

Best Action

Happy Customers

High Value Customers

Closing note on this subject

Take a step back, to understand the Big Picture

Identify the Business Case first.. Technology can follow

Get Top Management Support

Customer Experience is a collaborative and cross-functional effort

Take small steps, leverage initial successes, 'Big Bang' seldom works

Big Data – '*If you want to wrestle with an elephant get help*'

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Q & A session

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Use of Data Analytics in Audits

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Paradigm Shift in Audit Environment: *Continuous Changes in the Environment*

Continuous Changes in Business Environment

Globalization

Business Process Outsourcing

M&A

Deregulation

Privatization

Poses diverse risks in the business environment

Paradigm Shift in Audit Environment: *New Risks*

New Era = New Risks

Extrinsic Risk Factors

- Change
- Complexity
- Communication
- Corruption
- Conversion

Intrinsic Risk Factors

- Design Errors
- Data Errors
- Detection Errors
- Deployment Errors
- Development Errors

Paradigm Shift in Audit Environment: *Relation between Risk & Frequency*

What is your Risk Environment like?

What is your current IT environment like?

Do you wish to transform your audit techniques & optimally utilize your IT environment?

Not at all?

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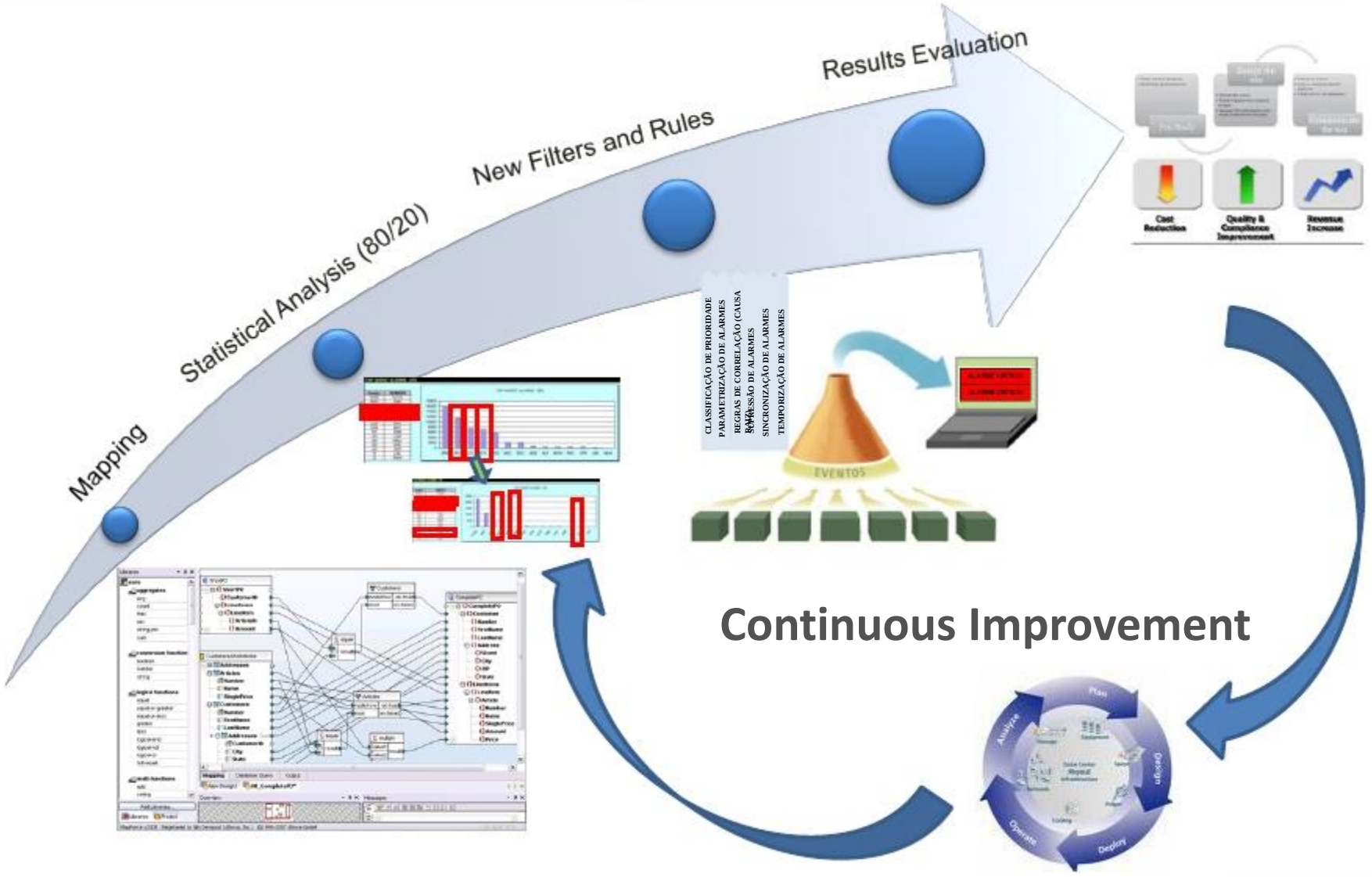
Paradigm Shift in Audit Environment: *Need of the Hour*



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How well do you know IIA standards?

International Standards for the Professional Practice of Internal Auditing

1000 – Purpose, Authority and Responsibility	2070 – External Service Provider and Organizational Responsibility for Internal Auditing
1010 - Recognition of the Definition of Internal Auditing, the Code of Ethics, and the Standards in the Internal Audit Charter	2100 – Nature of Work
1100 - Independence and Objectivity	2110 – Governance
1110 – Organizational Independence	2120 – Risk Management
1111 – Direct Interaction with the Board	2130 – Control
1120 – Individual Objectivity	2201 – Planning Considerations
1130 – Impairment to Independence or Objectivity	2210 – Engagement Objectives
1200 – Proficiency	2220 – Engagement Scope
1210 – Proficiency and Due Professional Care	2230 – Engagement Resource Allocation
1220 – Due Professional Care	2240 – Engagement Work Program
1230 – Continuing Professional Development	2300 – Performing the Engagement
1300 – Quality Assurance and Improvement Program	2310 – Identifying Information
1310 – Requirements of the Quality Assurance and Improvement Program	2320 – Analysis and Evaluation
1311 – Internal Assessments	2330 – Documenting Information
1312 - External Assessments	2340 – Engagement Supervision
1320 – Reporting on the Quality Assurance and Improvement Program	2400 – Communicating Results
1321 – Use of “Conforms with the International Standards for the Professional Practice of Internal Auditing”	2410 – Criteria for Communicating
1322 – Disclosure of Nonconformance	2420 – Quality of Communications
2000 – Managing the Internal Audit Activity	2421 – Errors and Omissions
2010 – Planning	2430 – Use of “Conducted in Conformance with the International Standards for the Professional Practice of Internal Auditing”
2020 – Communication and Approval	2431 – Engagement Disclosure of Nonconformance
2030 – Resource Management	2440 – Disseminating Results
2040 – Policies and Procedures	2450 – Overall Opinions
2050 – Coordination	2500 – Monitoring Progress
2060 – Reporting to Senior Management and the Board	2600 – Communicating the Acceptance of Risks

1200 – Proficiency (Internal Auditor must have adequate knowledge, skills to perform their individual responsibilities)

What proficiency should Internal auditor posses for better functioning of Internal Audit?

- Internal Auditor should have a professional qualification, such as CIA (Certified Internal Auditor), CA (Chartered Accountant), (CPA) Certified Public Accountant and CISA (Certified Information Systems Auditor)
- Internal auditors must have sufficient knowledge to evaluate the risk of fraud or have Fraud Related qualifications (Certified Fraud Examiner CFE)
- Internal auditors must have sufficient knowledge of key risks and controls of all processes

1210 and 1220 – Proficiency and Due Professional Care (Internal auditors must apply the care and skill expected)

Internal auditors must exercise due professional care by considering:

- Extent of work needed to achieve the engagement's objectives
- Probability of significant errors, fraud, or noncompliance
- Cost of assurance in relation to potential benefits
- Use of technology-based audit and other data analysis techniques
- Relative complexity, materiality, or significance of matters to which assurance procedures are applied

Need for Data Analytics

Trends in the Industry – Indicators for growing need for analytics to be used as an audit technique

Increasingly many CAE's are seeing the need to enhance their skill set towards data analytics, which indicates they have taken significant notice of the risks posed by increasing automation, transaction sizes and data volumes.

IIA Standards

- Standard 1220.A2 – "In exercising due professional care internal auditors must consider the use of technology-based audit and other data analysis techniques"

Protiviti Surveys

- Key findings of IA capability needs survey 2011 indicate Data analysis tools for statistical analysis and data manipulation is one of the key needs cited by most participants.

Competitors Past Surveys

- IT Auditors represent only 10% of Internal Audit headcount – 2007 Survey
- Over half of Internal Audit functions have implemented continuous auditing through technology – 2007 Survey. Over 90% of Internal Audit functions use data analytics, however, less than half consider these skills as pervasive – 2007 Survey

Best Practice

- IIA's GTAG No. 3 on Continuous Auditing states "the power of continuous auditing lies in the intelligence and efficient continuous testing of controls. By changing their approach auditors will develop a better understanding of the business environment and risks to the company."

Types of Data Analytics

What analytics can be done? - elaborated

This service entails analysis of accounting and financial statements and their elements, an indicative service list would involve:

- **Financial Statement Ratio analysis**
- **Debtors analysis**
- **Creditors analysis**
- **Procurement analysis**
- **Spend analysis**
- **Performance dashboards**

This service aims to support protiviti audit teams across of the world , an indicative service list would be:

- **Control analytics**
- **Fraud analytics**
- **Revenue Assurance Analytics**

This service aims to provide key management insights into customer behavior:

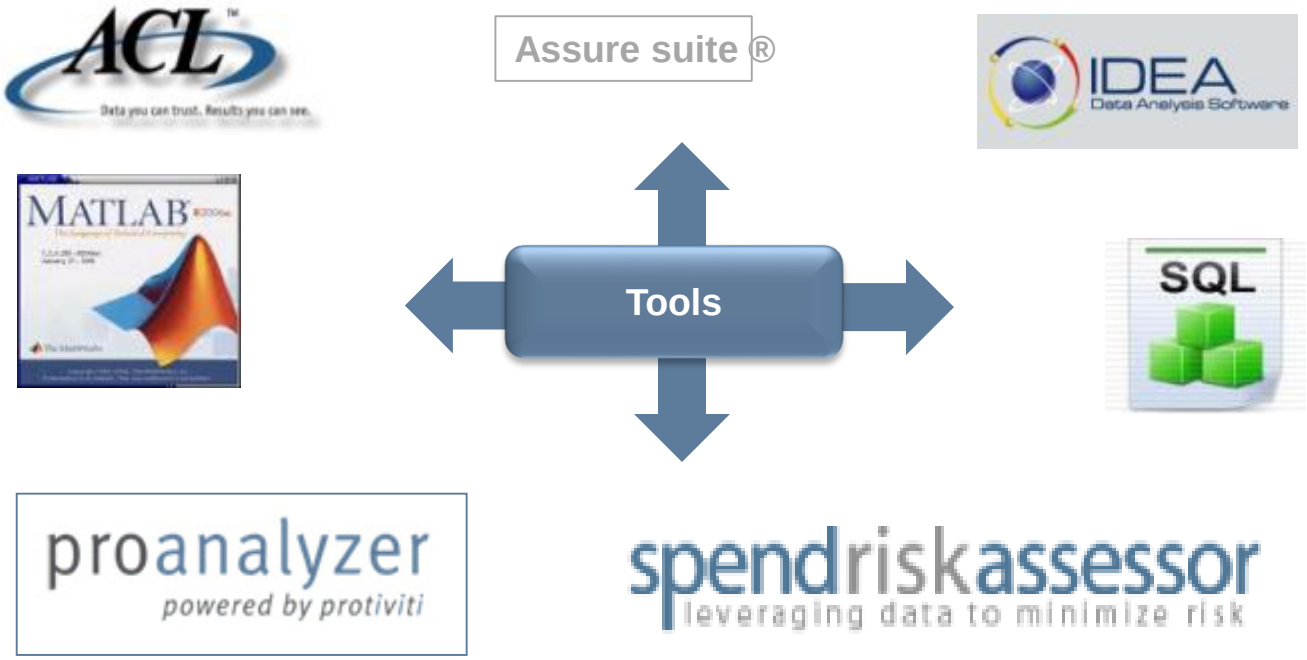
- **Customer Behavior**
- **Churn Analysis**
- **Process Efficiency analysis**
- **Balanced score card**
- **Segmentation Analysis**
- **Research Analysis**

Our Off shore ERP analytics help clients in risk management and mining their ERP data giving out meaningful decision support and investigative reports, Indicative services include:

- **SOD assessment**
- **Configuration analysis**
- **ERP control analysis**
- **ERP security analysis**

Tools used for Data Analytics

Required proficiency in analytics tools

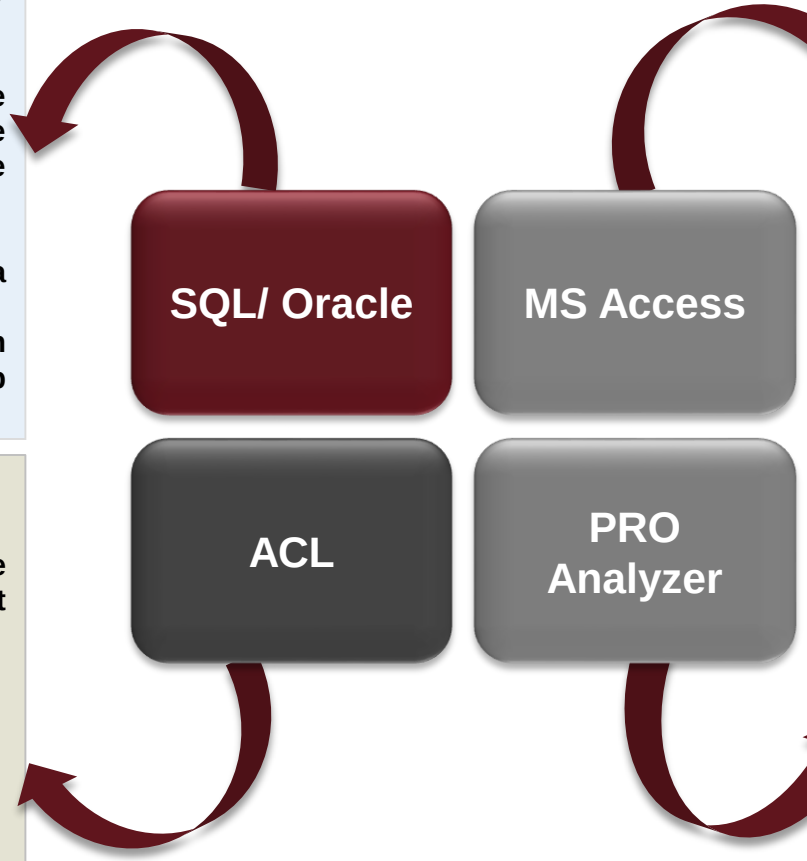


Tools used for Data Analytics *(Contd.)*

Brief summary of some key tools that may be used more often for analytics

Used for complex analytics solutions. Ability to manage large volumes of data in a systematic manner . Key advantages include:

- **Analysis on a huge sample of data, hence providing high assurance to clients**
- **Structured analysis**
- **More business value at a lesser cost**
- **Backend databases in most of the top organizations**



MS Access is a very handy tool and easily available (As part of MS Office) to analyze reasonable data in a structured form

- **Cost Effective**
- **Quick turn around time**
- **Easy to use**
- **Non technical**
- **Helps in creating customized tools for clients using the 'Forms'**

ACL is an industry wide accepted tool for Audit analysis.

- **Quick turn around time**
- **Flexible and user friendly**
- **Accepted Audit tool**

Pro Analyzer is in house solution developed by Protiviti for Telecom industry and especially for Revenue Assurance Function. Its advantage include:

- **Industry specific analysis**
- **End to end solution for client**
- **Ability to manage huge data**

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Concept of the Off shore Data Analytics Lab

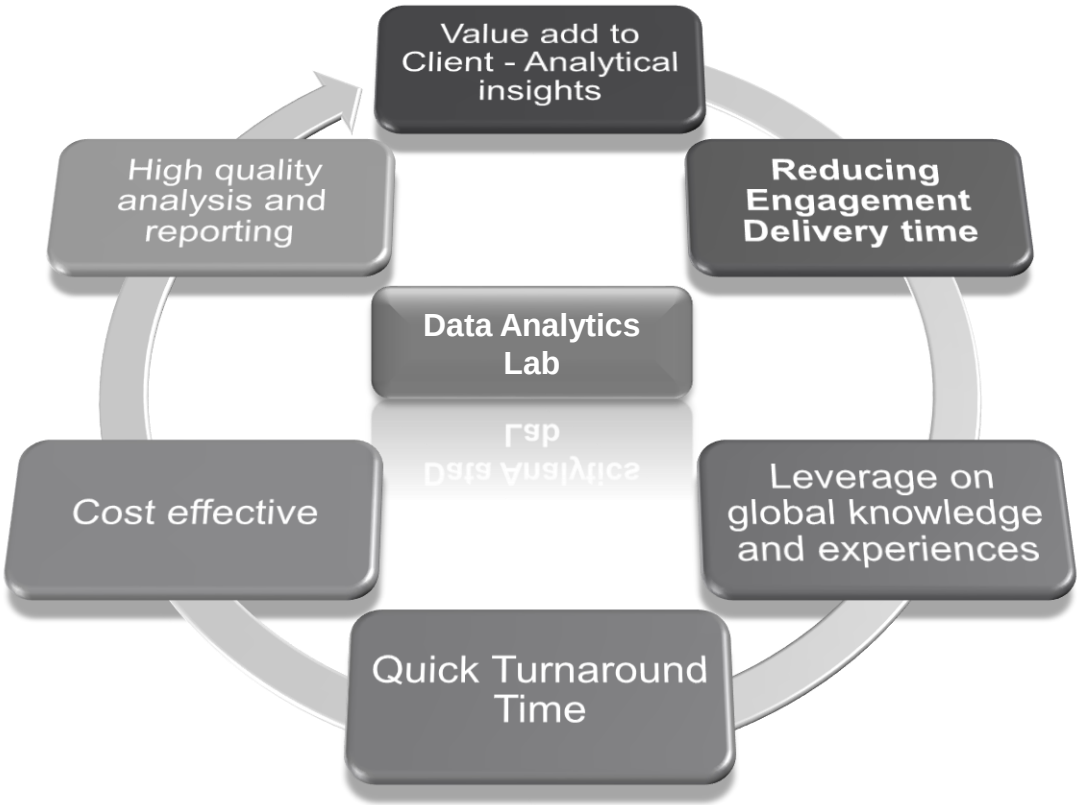
What is the Value proposition ?

Grow. Strengthen. Succeed.

Grow– Efficient Delivery Mechanism

Strengthen– Empower our Onsite teams with power Insights through offshore research

Succeed– Through Competitive Pricing and wider margins



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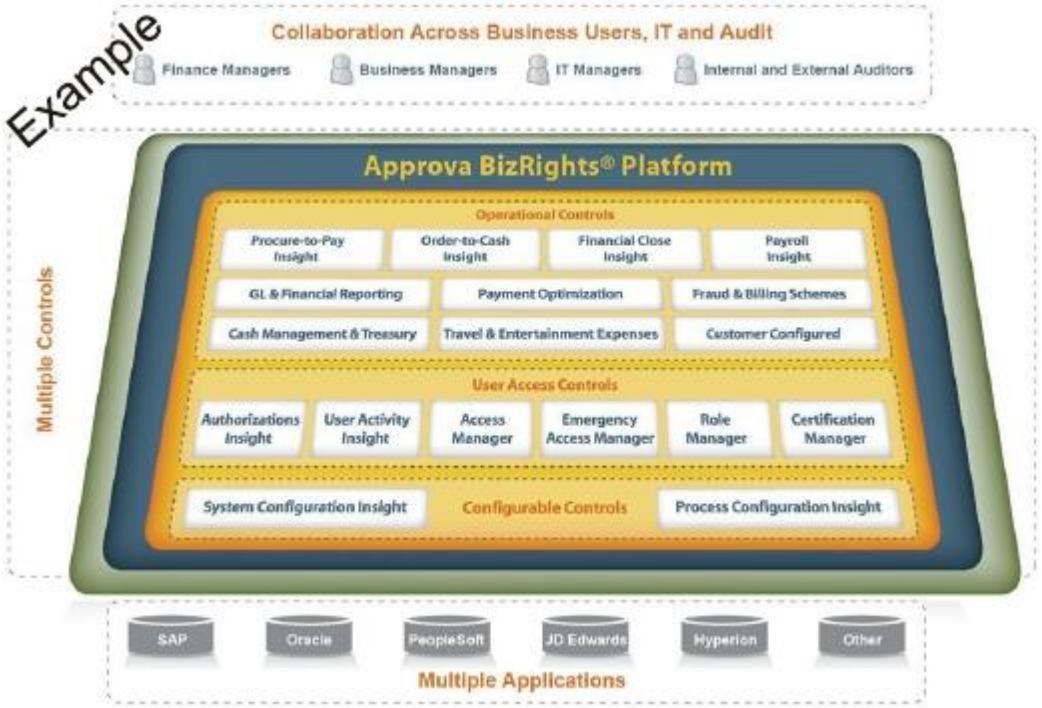
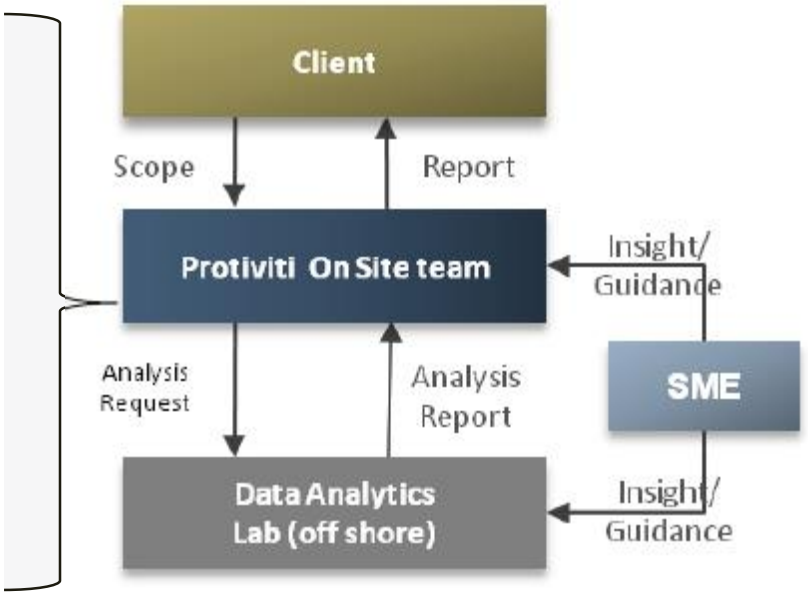
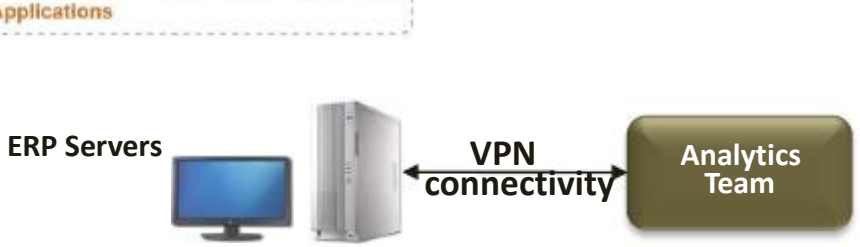
Continuous Auditing through CAAT –

For ITGC (Example of a Delivery Model)







The firewall and router / switch / server rule base would be edited by the IT team to grant access of the ERP client to the Analytics team that will be based out of Remote locations.

2310 – Identifying Information (Internal auditors must identify sufficient, reliable, relevant, and useful information to achieve the engagement's objectives)

What do you understand by term sufficient information?

- It should be factual, adequate, and convincing so that a prudent, informed person would reach the same conclusions as the auditor

What do you mean by reliable information?

- It is the best attainable information through the use of appropriate engagement techniques

What does relevant information mean?

- Relevant information must support engagement observations and recommendations and is consistent with the objectives for the engagement

2320 – Analysis and Evaluation

- Internal auditors must base conclusions and engagement results on appropriate analyses and evaluations

Standards on Internal Audit (SIA)

Standards on Internal Audit (SIA) by Institute of Chartered Accountants of India

SIA 1 - Planning on Internal Audit
SIA 2 - Basic principles Governing Internal Audit
SIA 3 - Documentation
SIA 4 - Reporting
SIA 5 - Sampling
SIA 6 - Analytical Procedures
SIA 7 - Quality Assurance in Internal Audit
SIA 8 - Terms of Internal Audit Engagement
SIA 9 - Communication with Management
SIA 10 - Internal Audit Evidence
SIA 11 - Consideration of Fraud in an Internal Audit
SIA 12 - Internal Control Evaluation
SIA 13 - Enterprise Risk Management
SIA 14 - Internal Audit in an Information Technology Environment
SIA 15 - Knowledge of the Entity and it's Environment
SIA 16 - Using the Work of an Expert
SIA 17 - Consideration of Laws and Regulations in an Internal Audit
SIA 18 - Related Parties

SIA 14 - Internal Audit in an Information Technology (IT) Environment

- The overall objective and scope of an internal audit **does not change** in an IT environment
- Consider the effect of an IT environment on the **internal audit engagement**
- Should have sufficient knowledge of the **information technology systems to plan, direct, supervise, control and review the work performed**

- If specialized skills are needed, **the internal auditor should seek the assistance of a technical expert possessing such skills**, who may either be the internal auditor's staff or an outside professional.
- The internal auditor should obtain an **understanding of the systems, processes, control environment, risk-response activities and internal control systems**.

The internal auditor should:

- Review whether the information technology system in the entity considers **the confidentiality, effectiveness, integrity, availability, compliance and validity of data and information processed**.
- Review the robustness of the IT environment and consider any weakness or deficiency in the design and operation of any IT control within the entity
- Document the **internal audit plan, nature, timing and extent of audit procedures performed** and the conclusions drawn from the evidence obtained.

Relevant “Audit Standards” issued by ICAI

Relevant Audit Standards – *Revised Standards (Auditing, Review and Others)*

SA 300 – Planning an Audit of Financial Statements
SA 320 – Materiality in Planning and Performing an Audit
SA 500 – Audit Evidence
SA 501 – Audit Evidence – Specific Considerations for Selected Items
SA 520 – Analytical Procedures
SA 530 – Audit Sampling

SA 300 (revised)- Planning an Audit of Financial Statements

Planning the audit so that it will be performed in an effective manner

- Perform **preliminary engagement** activities
- Establish an audit strategy that sets **the scope, timing and direction**
- Develop an audit plan which includes **description of nature, timing, resources and extent of planned risk assessment**.

SA 320 (revised) - Materiality in Planning and Performing an Audit

Amounts set by the auditor at less than the materiality level for particular classes of transactions, account balances or disclosures

- Determine the **materiality for the financial statements**.
- Determine performance materiality for purposes of assessing the **risks of material misstatement, nature, timing and extent of further audit procedures**.

SA 500 (revised)- Audit Evidence

Information used by the auditor in arriving at the conclusions on which the auditor's opinion is based

- Audit evidence is necessary to support the auditor's opinion and report. Can be **inspection, observation, confirmation, recalculation, re-performance and analytical procedures**.
- Obtaining **reasonable assurance** when sufficient appropriate audit evidence is obtained to **reduce audit risk**.
- Audit Evidence is based upon **risk assessment procedures, tests of controls, substantive** and **analytical procedures.**

SA 501 (revised) - Audit Evidence—Specific Considerations for Selected Items

Obtaining sufficient appropriate audit evidence with respect to certain aspects of inventory, litigation and claims involving the entity

- Obtain audit evidence **by observing compliance and reliability** of management's count procedures.
- Understand **risk assessment procedures and environment** to assist the auditor to become aware of litigation and claims.

SA 520 (revised)- Analytical Procedures

Analytical procedures means evaluations of financial information through analysis of plausible relationships among both financial and non-financial data.

- Determine the suitability of particular **substantive analytical procedures** for given assertions.
- Evaluate the **reliability of data** from which the auditor's expectation of recorded amounts or ratios is developed
- Perform **analytical procedures** near the end of the audit that assist the auditor when forming an overall conclusion as to whether the financial statements are consistent with the auditor's understanding
- Inquire management and obtain **appropriate audit evidence** relevant to management's responses.

SA 530 (revised)- Audit Sampling

The application of audit procedures to less than 100% of items within a population of audit relevance such that all sampling units have a chance of selection in order to provide the auditor with reasonable basis

- Audit sampling enables the auditor to **obtain and evaluate audit evidence characteristic** of the items selected in order to form or assist in forming a conclusion concerning the population from which the sample is drawn.
- Evaluate whether the use of **audit sampling** has provided a reasonable basis for conclusions about the population that has been tested.

CASE STUDIES

CASE STUDY 1: *Procure to Pay Cycle*

Analyze the supplier master file to identify potential risk for fraud, potential duplicate payments and other misaligned information.

28,029 Active Suppliers
18,702 in client system 1 (67%); 9,327 in client system 2 (33%)

Step 1 – Consider Inactivation

Suppliers with No Activity since 1/1/2006	Suppliers with No Activity in the last 24 months	Suppliers with No Activity in the last 18 months
17,706 (63%)	359 (1%)	872 (3%)

9,092 active suppliers remain after inactivation consideration

Note: Suppliers listed in Step 1 were not included in the population of suppliers in Step 2.

Step 2 – Review / Update

Duplicate Suppliers	Suppliers With Missing Address Information	Suppliers With Missing PAN only	Suppliers with Invalid ST
1,711 (6%)	70 (0.2%)	26 (0.1%)	1,414 (5%)

- 63% of suppliers (17,706) had no payment activity since 1/1/2006
- Of the suppliers for inactivation consideration:
  - 66% are from client system 1
  - 34% are from client system 2

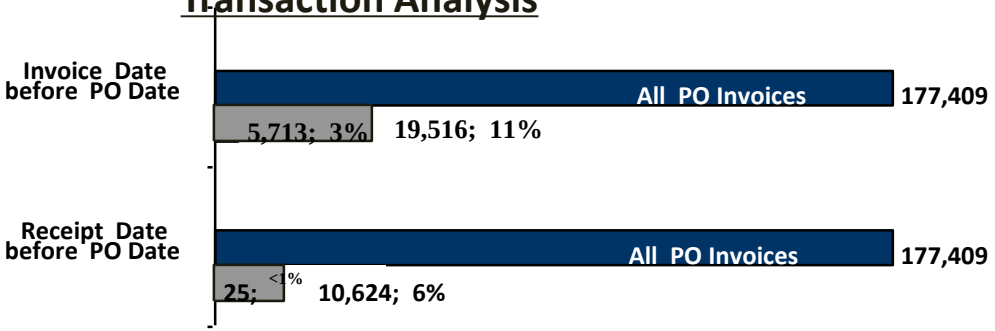
- 1,711 suppliers are identified as potential duplicates:
  - 33% are from client system 1
  - 67% are from client system 2
- 1,510 suppliers are recommended for updates and/or additional data:
  - 62% are from client system 1
  - 38% are from client system 2

A well-controlled VMF reduces the risk of financial leakage and fraud while increasing processing efficiency

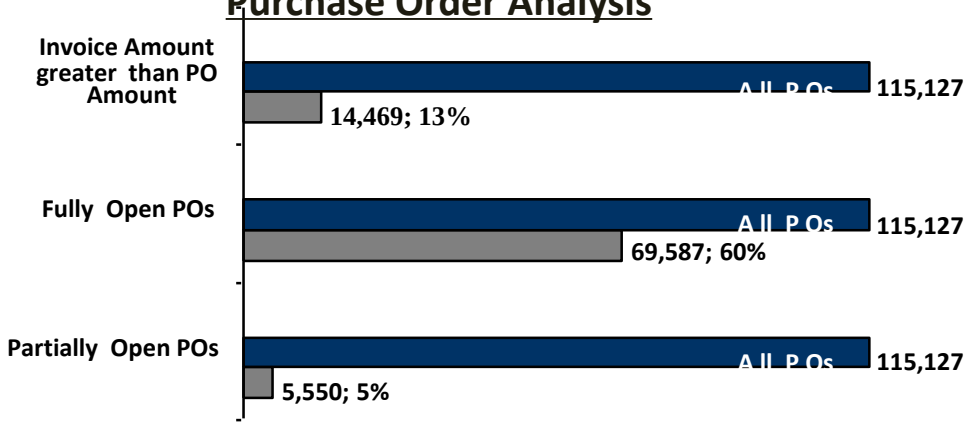
CASE STUDY 1: *Procure to Pay Cycle (Contd.)*

Review various purchase order metrics to assess compliance and utilization of current processes.

Transaction Analysis



Purchase Order Analysis



Findings and Observations

Invoice Date before PO Date

- Duplicate PO numbers exist in client system.
- The PO number sequence used for one location in a prior year Invoice dates were entered incorrectly

Receipt Date before PO Date

- Root cause appears to be related to professional services (labor categories) where PO's are not created until the work is delivered

Sum of Invoices greater than PO Amount

- Additional differences can be attributed to freight charges, pricing and quantity differences between PO and invoice, and invoices voided, replaced or credited

Open POs

- Dates were entered as the item unit price which caused POs to be created for $X millions

General Observations

- Procedures should be implemented to ensure that POs are issued in a timely manner
- Need approval of direct POs at the plant level to ensure that inaccuracies in PO creation are identified immediately
- Procedures should be implemented to ensure open POs are reviewed and closed in a timely manner

CASE STUDY 1: *Procure to Pay Cycle (Contd.)*

Duplicate payments are identified using a variety of analytic tools and research before validation with the stakeholder team.

PriorityGrouping	#ofTotalClaims FlaggedFor Review	TotalInitialClaim Amount	#ofClaims Targetedby ProjectTeam	TotalIdentified ClaimAmount	EstimatedRecovery Amount
High	754	$7,373,678	41	$627,195	$286,135
Medium	1,085	$10,853,659	22	$1,902,832	$841,591
Low	3,997	$81,060,768	9	$1,151,996	$282,860
TotalDuplicate PaymentsTargets	5,836	$99,288,103	72	$3,682,023	$1,410,586

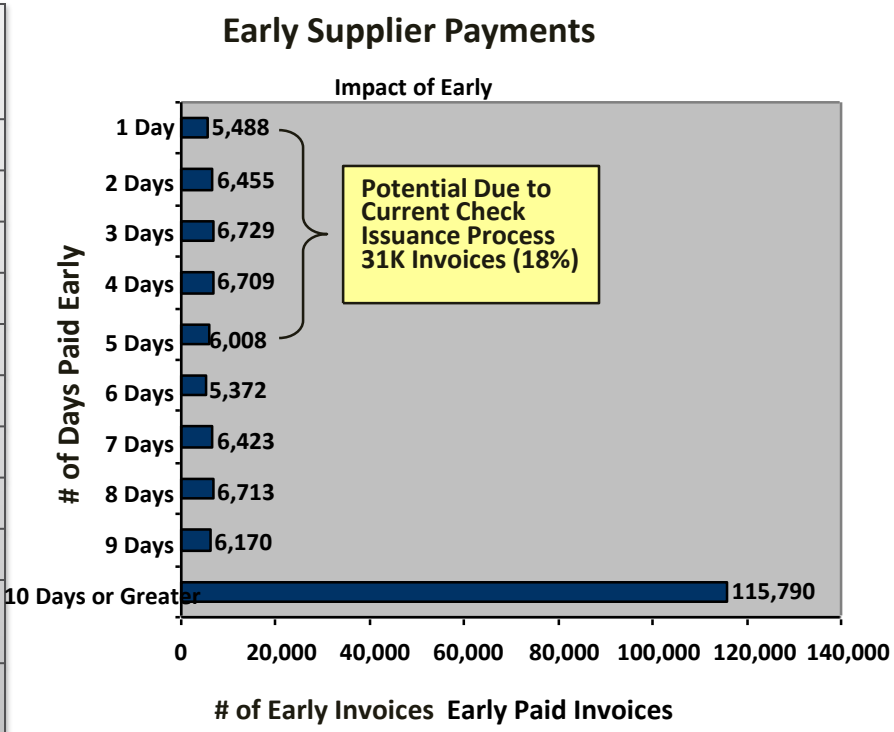
Observations

- **Roughly $3.68 million in payments have been identified for further review and validation with the stakeholder team.**
- **Based on our experience with our clients, we estimate that over $1.4 million will be recovered.**
- **In reviewing the duplicate payment detail, we observed that CompanyA does not appear to be utilizing a best-in-class invoice numbering policy, evidenced by the following:**
  - **Invoice dates were frequently entered as invoice numbers**
  - **Spacing within invoice numbers was inconsistent**
  - **Special characters were included to differentiate invoice numbers**

CASE STUDY 1: *Procure to Pay Cycle (Contd.)*

Typically, accounts payable departments use a standard weekly process to pay invoices to reduce transaction costs, but payments are often processed days before it is necessary.

DaysEarly	#ofEarly Paid Invoices	%of Total Invoices	TotalSpend	Costof Capital Lost
1Day	5,488	2%	$22,303,546	$4,400
2Days	6,455	2%	$25,877,792	$10,209
3Days	6,729	2%	$29,550,086	$17,487
4Days	6,709	2%	$26,965,353	$21,277
5Days	6,008	2%	$25,612,619	$25,262
6Days	5,372	2%	$20,907,364	$24,715
7Days	6,423	2%	$19,590,376	$27,051
8Days	6,713	2%	$22,213,259	$35,054
9Days	6,170	2%	$22,402,915	$39,773
10Daysor Greater	115,790	40%	$425,169,322	$1,831,021
TotalImpactof EarlyPayment	171,857	58%	$640,592,632	$2,036,278



Observations

233,973 invoices (58%) were paid prior to the negotiated payment terms

Only 18% of early payment of invoices stems from payments paid early to meet the check cutting cycle

82% of early payments were paid more than 6 days early

CASE STUDY 1: *Procure to Pay Cycle - Sample observations (Contd.)*

Results Delivered
• Duplicate Purchase Orders / Unauthorized POs including Split POs • Purchase Orders beyond Procurement limits / thresholds • Variation between PO rate and invoice rate • Duplicate payments / Split payments to evade DOA limits • Payment without GRN (Good receiving note) • Invoice Amount vs Payment Dump reconciliation • Payment to Individual Names or Vendor not in Master List • Elapsed time for payment approvals by different Subjects • Evaluate the Web cycle authorization structure and compare it with the one of the previous year • Approvals as per Delegation of authority

CASE STUDY 2: Analysis using ACL

Identify data source

Data understanding

Case Study

- Central Wrehouse
- Stock Receivable and stock Received
- Current stock level is zero indicating all stocks have been issued
- Transported who delivers the stock at central warehouse is resposible to deliver the same on site
- Stock are received and issued only against approval of either of 8 warehouse incharge
- There are total 3 different transporter working for the company
- System generates a unique transaction-id for each line of successful transaction (stock issued/stock receivable)
- The current analysis of one euipment type –"AB1"

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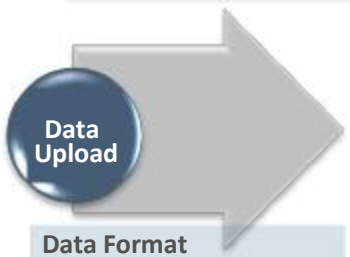
CASE STUDY 2: Analysis using ACL *(Contd.)*



Data Format
Data cleansing
Data integrity
Data Upload

Uncleardata

- Data Format — Text, CSV, excel, dump, access database etc
- Data Cleansing

Selection by: User 0300E20003

Number of transactions selected: 140

TCode	Transaction Text
CS01	Create Material BOM
CS02	Change Material BOM
CS03	Display Material BOM
MB02	Change Material Document
MB03	Display Material Document
MB1A	Goods Withdrawal
MB1B	Transfer Posting
MB1C	Other Goods Receipts
MB51	Material Doc. List
MB59	Material Doc. List
MB90	Output Processing for Mat. Documents
MBGR	Displ. Material Docs. by Mvt. Reason
MBST	Cancel Material Document
ME21N	Create Purchase Order
ME22N	Change Purchase Order
ME23	Display Purchase Order
ME23N	Display Purchase Order
ME2L	Purchase Orders by Vendor
MEK1	Create Conditions (Purchasing)
MEK2	Change Conditions (Purchasing)
MEK3	Display Conditions (Purchasing)
MI02	Change Physical Inventory Document
MI03	Display Physical Inventory Document
MI04	Enter Inventory Count with Document
MI05	Change Inventory Count
MI06	Display Inventory Count
MI07	Process List of Differences
MI20	Print List of Differences
MI21	Print physical inventory document
MI24	Physical Inventory List

User	TCode	Transaction Text
0300E20003	CS01	Create Material BOM
0300E20004	CS02	Change Material BOM
0300E20005	CS03	Display Material BOM
0300E20006	MB02	Change Material Document
0300E20007	MB03	Display Material Document
0300E20008	MB1A	Goods Withdrawal
0300E20009	MB1B	Transfer Posting
0300E20010	MB1C	Other Goods Receipts
0300E20011	MB51	Material Doc. List
0300E20012	MB59	Material Doc. List
0300E20013	MB90	Output Processing for Mat. Documents
0300E20014	MBGR	Displ. Material Docs. by Mvt. Reason
0300E20015	MBST	Cancel Material Document
0300E20016	ME21N	Create Purchase Order
0300E20017	ME22N	Change Purchase Order
0300E20018	ME23	Display Purchase Order
0300E20019	ME23N	Display Purchase Order
0300E20020	ME2L	Purchase Orders by Vendor
0300E20021	MEK1	Create Conditions (Purchasing)
0300E20022	MEK2	Change Conditions (Purchasing)
0300E20023	MEK3	Display Conditions (Purchasing)
0300E20024	MI02	Change Physical Inventory Document
0300E20025	MI03	Display Physical Inventory Document
0300E20026	MI04	Enter Inventory Count with Document
0300E20027	MI05	Change Inventory Count
0300E20028	MI06	Display Inventory Count
0300E20029	MI07	Process List of Differences
0300E20030	MI20	Print List of Differences
0300E20031	MI21	Print physical inventory document
0300E20032	MI24	Physical Inventory List
0300E20033	MIGO	Goods Movement

- Data Integrity — Total number of column and rows

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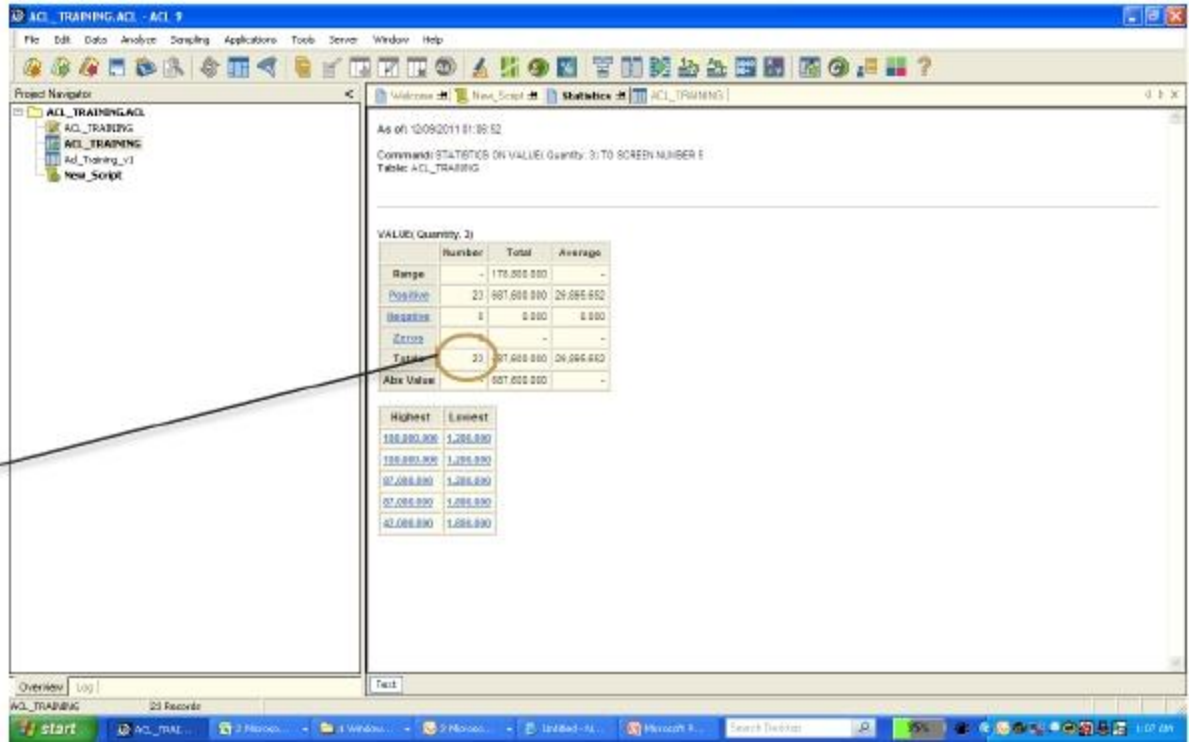
CASE STUDY 2: Analysis using ACL *(Contd.)*

Data Analysis

- Data Integrity Check

Data Integrity check
Duplicate check
Sequencecheck
Arithmetic Operations
Reconciliation
Ageing
Trending

Total rows imported =27



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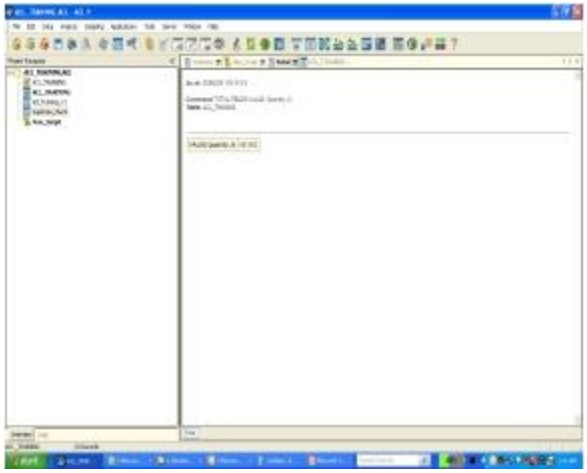
CASE STUDY 2: Analysis using ACL *(Contd.)*

Data Analysis

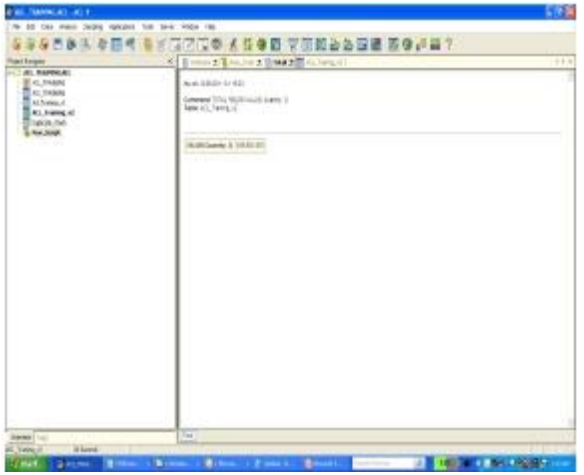
- Data Integrity check
- Duplicate check
- Sequencecheck
- Arithmetic Operations
- Reconciliation
- Ageing
- Trending

Arithmetic Operations

Sum Received



Sum Issued



687,600

688,800

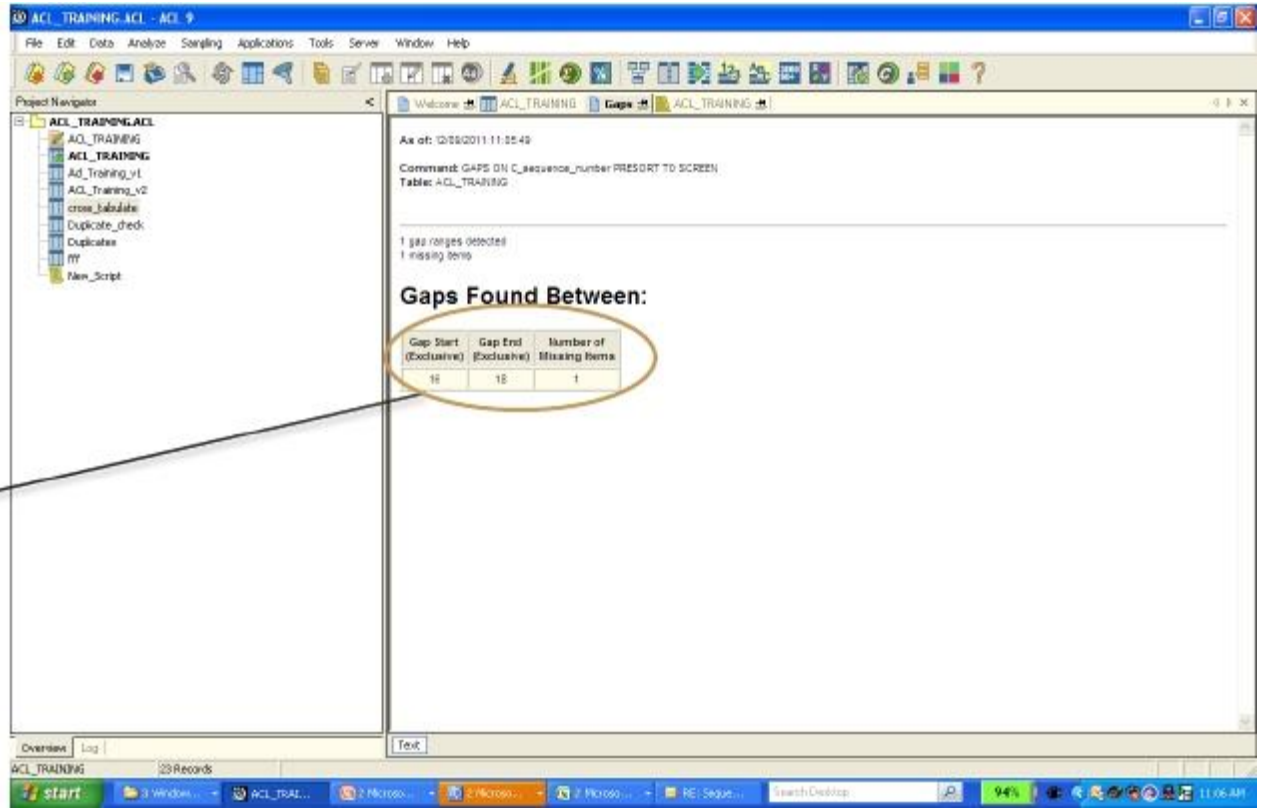
Difference-12,00

CASE STUDY 2: Analysis using ACL *(Contd.)*

Data Analysis

- Data Integrity check
- Duplicate check
- Sequencecheck
- Arithmetic Operations
- Reconciliation
- Ageing
- Trending

Sequence Check



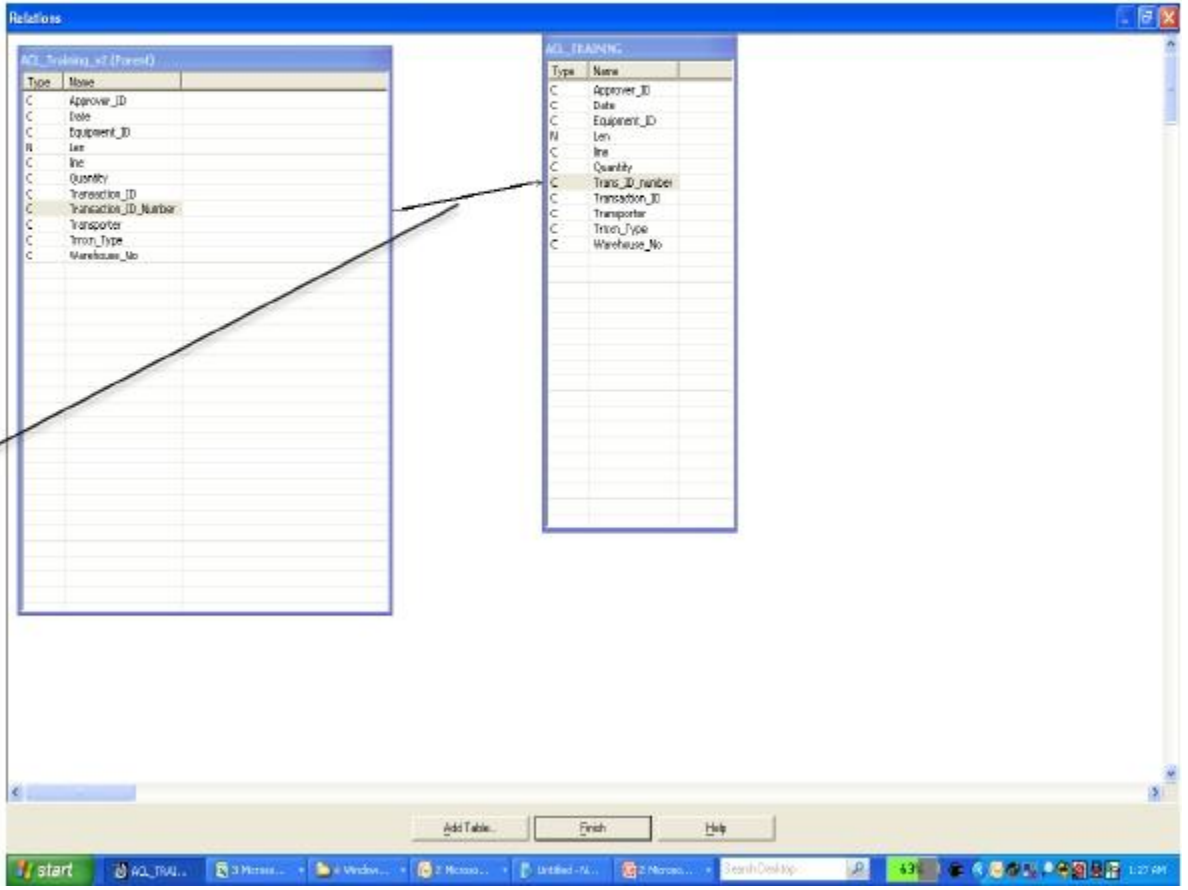
Transaction sequence missing- RTRNSC17

CASE STUDY 2: Analysis using ACL *(Contd.)*

Data Analysis

Data Integrity check
Duplicate check
Sequencecheck
Arithmetic Operations
Reconciliation
Ageing
Trending

Reconciliation



Creating a relationship between tables based on primary key

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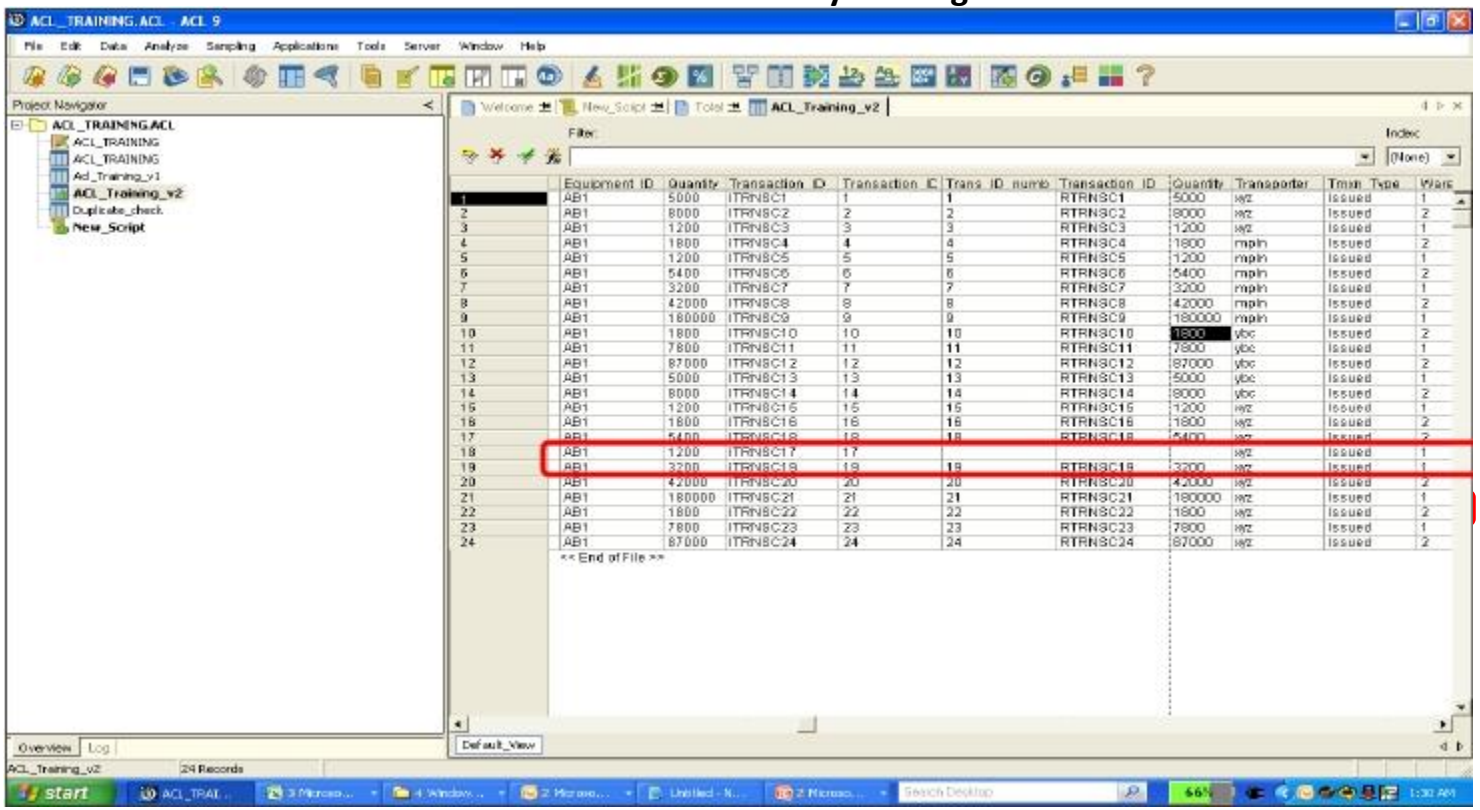
CASE STUDY 2: Analysis using ACL *(Contd.)*

Data Analysis

- Data Integrity check
- Duplicate check
- Sequencecheck
- Arithmetic Operations
- Reconciliation
- Ageing
- Trending

Reconciliation

One to one knock-off reconciliation to identify missing line item transaction



Stock issued, however corresponding stock receivable line item (RTRNSC17) is missing on database

CASE STUDY 2: Analysis using ACL *(Contd.)*

Data Integrity check
Duplicate check
Sequencecheck
Arithmetic Operations
Reconciliation
Ageing
Trending

Reconciliation Outcome

Date	Transaction ID	Warehouse No	Equipment ID	Trnxn_Type	Quantity	Approver ID	Transporter
2-Jan-11	ITRNSC1	1	AB1	Issued	5000	A1	xyz
4-Jan-11	ITRNSC2	2	AB1	Issued	8000	A1	xyz
6-Jan-11	ITRNSC3	1	AB1	Issued	1200	A1	xyz
8-Jan-11	ITRNSC4	2	AB1	Issued	1800	A1	mpln
10-Jan-11	ITRNSC5	1	AB1	Issued	1200	A1	mpln
12-Jan-11	ITRNSC6	2	AB1	Issued	5400	A1	mpln
14-Jan-11	ITRNSC7	1	AB1	Issued	3200	B1	mpln
16-Jan-11	ITRNSC8	2	AB1	Issued	42000	B4	mpln
18-Jan-11	ITRNSC9	1	AB1	Issued	180000	B1	mpln
20-Jan-11	ITRNSC10	2	AB1	Issued	1800	C2	ybc
22-Jan-11	ITRNSC11	1	AB1	Issued	7800	H1	ybc
24-Jan-11	ITRNSC12	2	AB1	Issued	87000	B1	ybc
26-Jan-11	ITRNSC13	1	AB1	Issued	5000	C1	ybc
28-Jan-11	ITRNSC14	2	AB1	Issued	8000	D1	ybc
30-Jan-11	ITRNSC15	1	AB1	Issued	1200	H4	xyz
1-Feb-11	ITRNSC16	2	AB1	Issued	1800	H4	xyz
5-Feb-11	ITRNSC18	2	AB1	Issued	5400	H4	xyz
2-Feb-11	ITRNSC17	1	AB1	Issued	1200	H4	xyz
7-Feb-11	ITRNSC19	1	AB1	Issued	3200	H4	xyz
9-Feb-11	ITRNSC20	2	AB1	Issued	42000	H4	xyz
11-Feb-11	ITRNSC21	1	AB1	Issued	180000	H4	xyz
13-Feb-11	ITRNSC22	2	AB1	Issued	1800	H4	xyz
15-Feb-11	ITRNSC23	1	AB1	Issued	7800	H4	xyz
17-Feb-11	ITRNSC24	2	AB1	Issued	87000	H4	xyz

Record no (RTRNSC17) missing on stock receivable database

Date	Transaction ID	Warehouse No	EquipmentID	Trnxn_Type	Quantity	ApproverID	Transporter
2-Feb-11	RTRNSC17	1	AB1	Received	1200	H4	xyz

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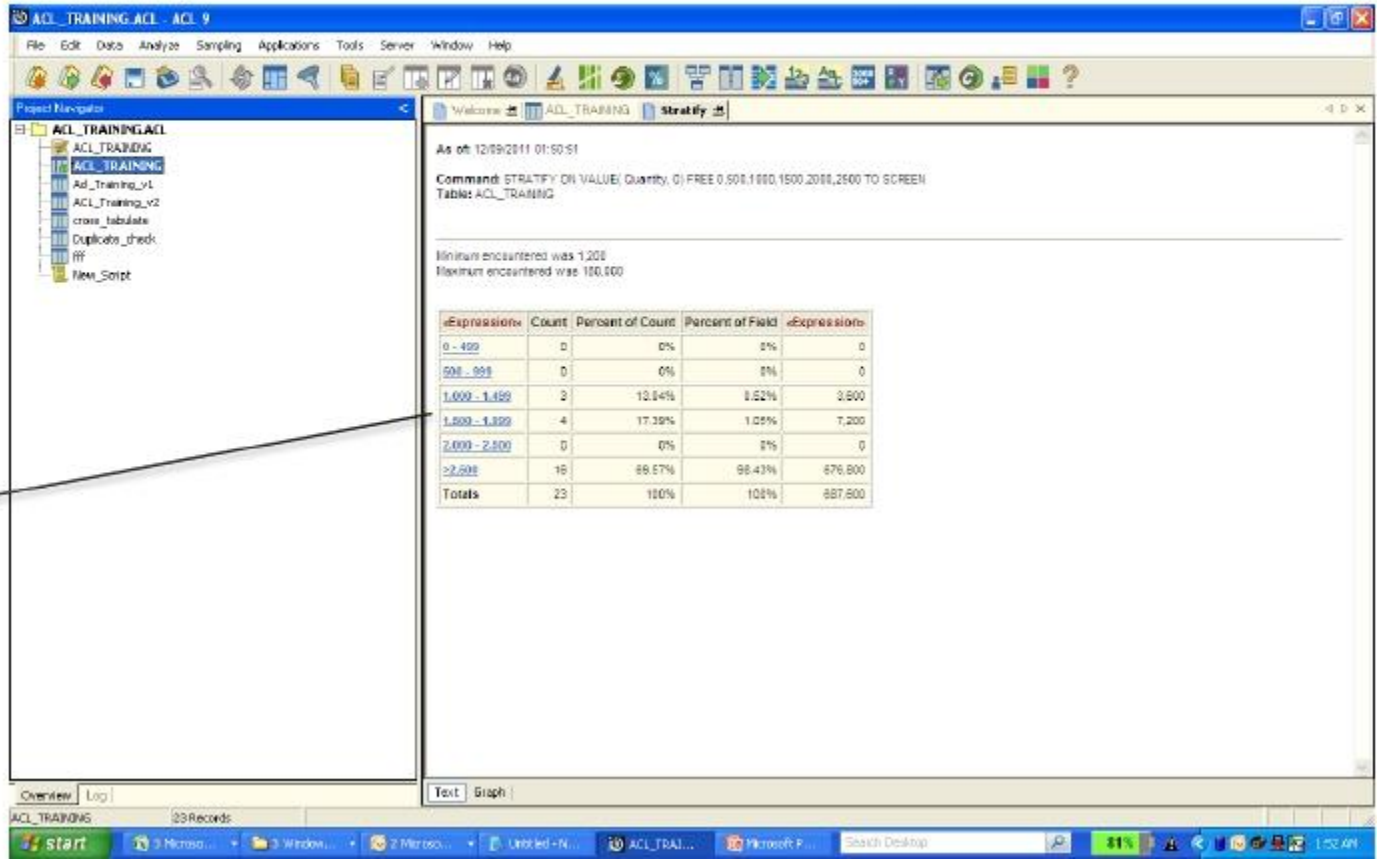
CASE STUDY 2: Analysis using ACL *(Contd.)*

Data Analysis

- Data Integrity check
- Duplicate check
- Sequencecheck
- Arithmetic Operations
- Reconciliation
- Ageing
- Trending

- Additional Data analysis

Bucketing/ageing Analysis



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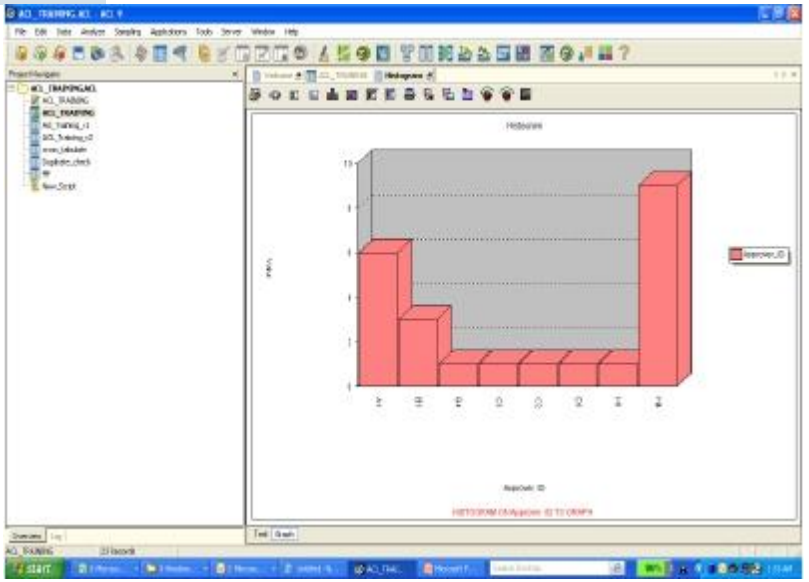
CASE STUDY 2: Analysis using ACL *(Contd.)*

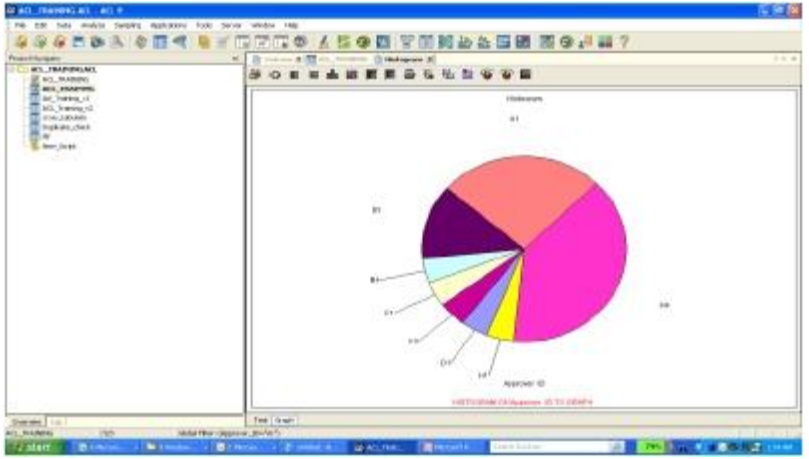
Data Integrity check
Duplicate check
Sequencecheck
Arithmetic Operations
Reconciliation
Ageing
Trending

- Trend Analysis

Histogram



Pie Chart



Computer Assisted Auditing Technique (CAAT)

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Benefits of CAAT

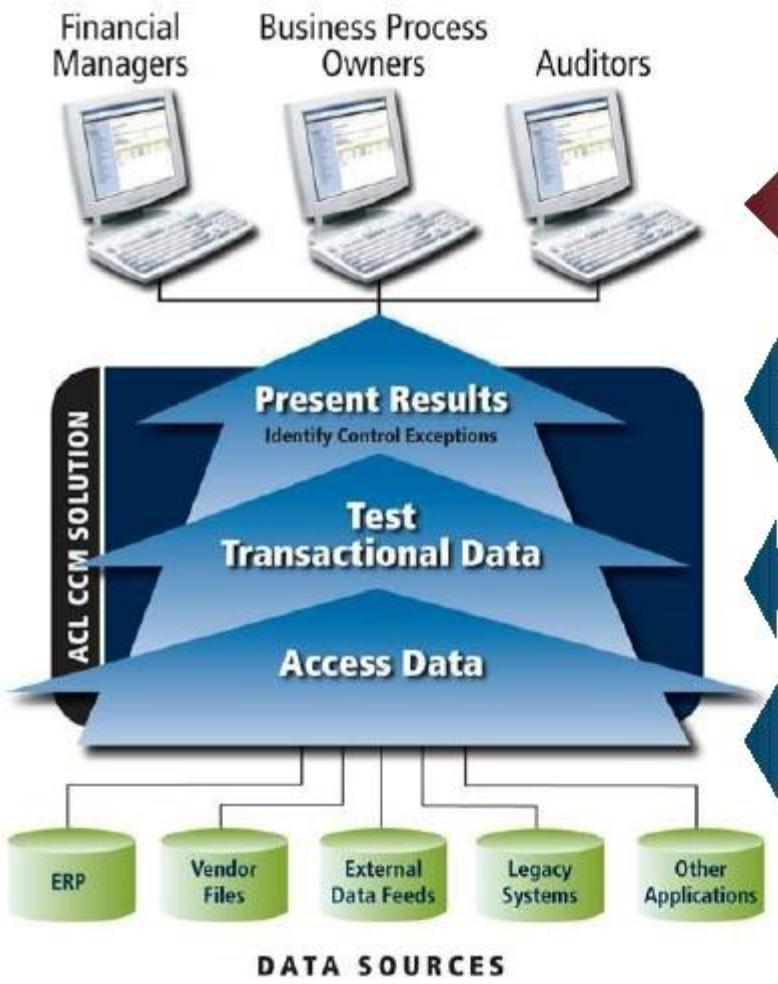
CAATs add significant value to both auditors & auditees by providing

- **Flexibility – The same data sets can be used to perform a number of test procedures**
- **Speed – Tests are performed using automated tools as opposed to manually**
- **Efficiency – Tests, once designed, documented, & performed, can be re-performed with ease**
- **Coverage – Tests can be performed using entire data populations as opposed to samples**

- **'CAAT Tools' support both auditing and monitoring**

- **Broaden audit coverage through 'CAAT Tools'**
  - **Complement to the traditional audit strategy**
  - **Proactive vs. Reactive auditing**
  - **Key Opportunity to identify control breakdowns as they occur**
  - **Reduce the audit cycle**
  - **Set recurring testing intervals**
  - **Mechanize data access and analysis with ACL scripts to move to a continuous auditing approach**

Continuous Auditing through CAAT



Provides visibility into controls health to all stakeholders

Presents quantified control exceptions

Applies automated tests to critical control points

Review 100% of transactions across all systems & platforms

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Continuous Auditing through CAAT – *Illustrative CAAT Areas*

1 Internal Audit

Procureto Pay
- Productwise / vendor wise analysis to select key vendors
- Key products procured from multiple vendors
- Price configuration analysis
- Duplicate payment analysis
- Duplicate invoice booking
- Debitnote Vs. invoice analysis
- Sample selection for control testing

Sales to Collection
- Selection of key customers and key sales transactions to be tested
- Tariff validation
- Credit note Vs. sales invoice trend
- Ad-hoc collection adjustment analysis
- Ageing analysis of Receivables

Other Areas
- Depreciation calculation
- Inventory ageing analysis
- Quantitative reconciliation of inventory
- Valuation of inventory
- Warranty calculation

2 Consulting

Loss Prevention
- SKU wise shrinkage analysis
- Wastage/ refuse levels analysis
- Age on rack analysis
- Expired Inventory analysis
- Days to expiry analysis
- Stock loss analysis
- Brand wise spoilage analysis
- Store wise spoilage analysis

Revenue Risk
- POS Price List analysis
- POS Discount rule analysis
- Customerreturns analysis
- Discount& Free goods value analysis

Supply Chain Management
- Inventory ageing analysis
- Delayed delivery analysis
- Spoilage/ damage in transit analysis
- Damage in transit analysis
- Storage costs Vs. price analysis
- Expired Inventory analysis
- Days to expiry analysis
- Warehouse stock levels analysis
- Warehouse usage analysis
- Comparative warehouse storage cost analysis
- Delivery capacity utilization(FTL / HTL analysis)

3 Excellence

FinancialStatement Analysis
- MIS preparation and analysis
- Accounting support & Data entry
- Budget Vs. Actual Variance analysis

WC Optimization
- Collection Analysis & DSO analysis
- WC utilization analysis
- Cash flow preparation

BusinessAnalytics
- Revenue Assurance
- Predictive business analytics to estimate churn, service levels, margins, liquidity levels

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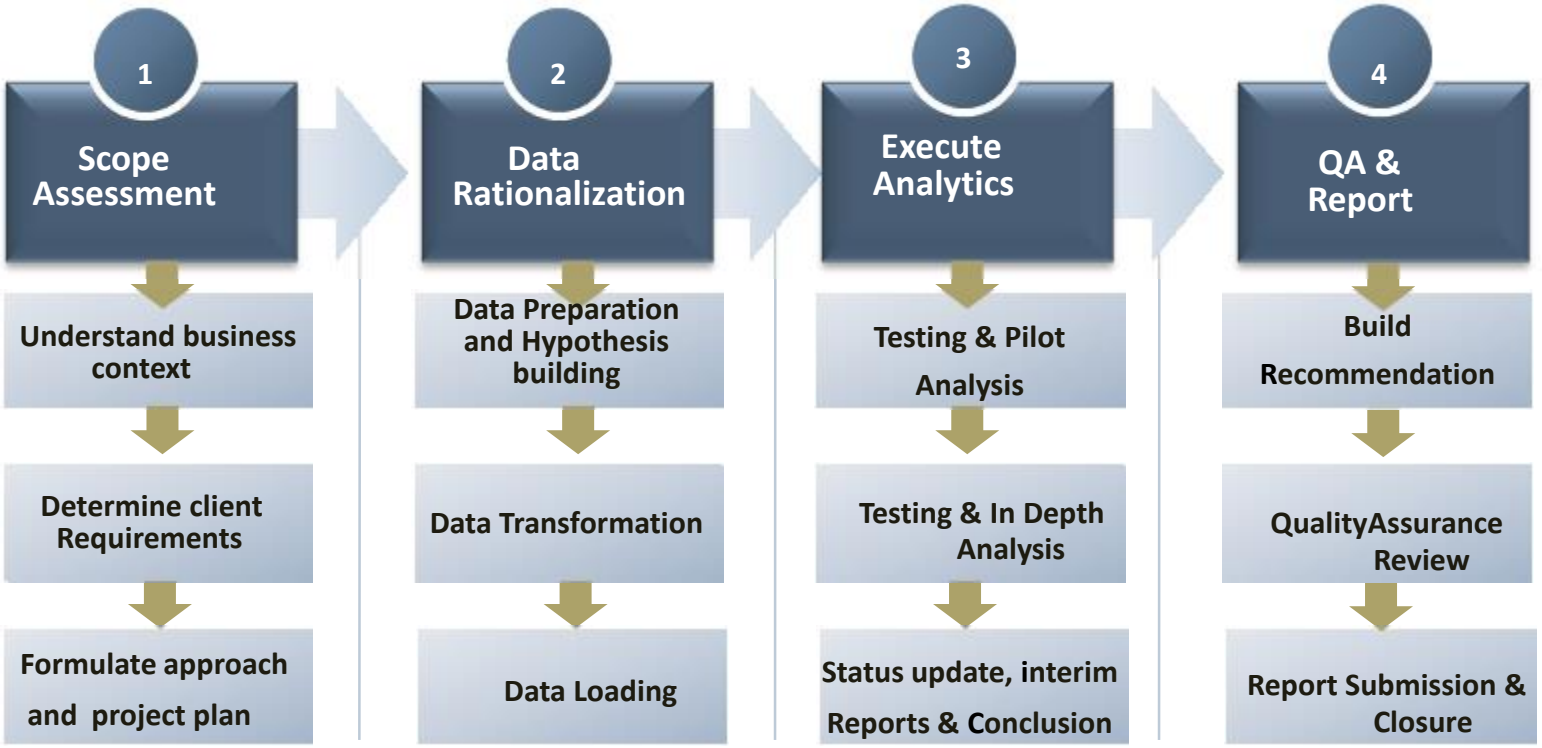
Data Analytics Methodology & Delivery Models

*Methodology for Data analytics **



**** Protiviti Data Analytics Methodology*** *TM*

Internal Audit and Big Data Analytics

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Managing Big Data Through Internal Audit

Following are issues of big data that an internal audit can help mitigate:

Complex Big Data	Most companies collect large volumes of data but they don't have comprehensive approaches for centralizing the information. Therefore through internal auditing, big data can be managed by helping the companies to streamline and collate the data effectively
Big Data Security	Maintaining effective data security is increasingly recognized as a critical risk area for organizations. Loss of control over data security can have severe ramifications for an organization, including regulatory penalties, loss of reputation and damage to business operations and profitability. Auditing can help organizations to secure and have control over the data collected
Big Data Accessibility	Giving access of big data to the right person and at the right time is another challenge which is faced by many organizations. Segregation of Duties (SoD) is an important aspect that can be checked by an IA
Big Data Quality	Due to large volume, data quality remains an issue. The more data one accumulates, the harder it is to keep everything consistent and correct. Through internal auditing the quality of big data can be checked
Big Data Understanding	Understanding and interpretation of big data remains one of the primary concerns for many organizations. Hence the auditors can play an effective role to simplify the data and make it understandable for the organizations

Q & A session

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Thank you

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