P&C
Industry Financial Data Needs & Aligning BPO Technology Solutions

Property Casualty Insurance Industry Review:
Business process improvement methods that meet insureds financial risks through advanced use data analysis and technology

Tom Everett, Business Operations Solutions Leader

inniti alliance

The Types

GENERAL LIABILTY
This will cover lawsuits and the possible payments that may arise due to medical expenses, injury negligence. or slander.

ERRORS & OMISSIONS
(Professional Liability)
Service businesses use this type of insurance to protect against payments on claims related to malpractice. errors. or omissions in the service of clients.

PRODUCT LIABILITY
if your company manufactures. sells. or distributes products, product liability insurance can protect you against financial losses due to products that cause harm.

PROPERTY INSURANCE
This type of insurance protects the cost of business property (building. equipment, money, documents. etc.) from fire, hail, crime or other disturbances. Make sure you get a policy that covers all the possible perils you are concerned about.

OWNER'S HEALTH INSURANCE
Your health insurance will be what reduces or eliminates costs for doctor's visits. medical care. surgeries. medrcine, and more.

OWNER'S DISABILITY INSURANCE
Consider an insurance policy that will kick in if you are unable to work for a time due to serious injury or illness. You may want to even seek a disability policy that Will cover your business inventry or employee expenses, not justyour personalliving/salary

WORKER'S COMPENSATION INSURANCE
Required in most states thathire employees outside of their immediate family. workers' compensation insurance covers medical expenses and lost income. or permanent disability, for employees injured on the job.

BUSINESS AUTOMOBILE INSURANCE
If you conduct business with your vehicles (e.g. delivery. limousine. janitorial servrce/supply transport) then business auto insurance will insure your vehicles and provide injury or loss coverage. your personal living/salary.

HOME-BASED BUSINESS INSURANCE
Since most homeowners or renters insurance policies do not cover business losses. you may want to obtain home-based business insurance to cover your business property.

P&C Industry Lines of Business

Industry Aging Systems & BPO Solutions

1

Many carriers rely on back-office servers to handle policy administration, sales, marketing and other functions, and this infrastructure is badly in need of updating.

2

Migrating or retrofitting these systems to meet new business demands may produce bottlenecks due to coding or interoperability challenges.

3

BPO's value proposition includes due diligence and testing are key to ensuring that adoption of new IT capabilities don't disrupt mission-critical business operations.

4

Solutions for insures requires leading edge consumer value that include a best match between coverage, affordability, risk viable and easy application accessible.

Industry Financial & Rating Data Model

- Insurance underwriters and actuaries use data models to help them convert large amounts of individual data points into actionable information.

- The models provide a framework for ratemaking decisions, capital allocation decisions, lines of business to target or avoid, even how much reinsurance a company should purchase.

- In order to make these models best predictors of accuracy and lower risk exposure to insurance companies best in breed data solutions are required.

- Premium paid loss ratio guidelines drive the need for controlling premium paid loss ratios such as 63% and 73% respective to non-mutual (share holder) and mutual companies.

- Data capture and research, computing loss experience and predicting financial metrics requires just in time modeling tools from BPO's.

BPO Insurance Data Model Solutions

Advanced Analytics & Data Mining

- Statistical Modeling, Data Mining, Optimization Services.
- What if analysis with scenario building with dashboards.
- Cloud hosted Predictive Analytics & Machine Learning

High Performance Data Management

- Streaming Data collection and near real-time processing.
- Online and Real-time reporting of risk events, alerts
- Modernization of Data warehouses on to BigData analytics

Core Data Management

- Large volume Databases, Ent. Datawarehouses & Marts.
- ETL expertise in commercial and open source tools.
- Upgrading of legacy data processing systems.

Big Data & Predictive Analytics

- Big Data Migration strategy development, execution
- Predictive Modelling and Machine Learning using Spark, R.
- KPIs, Score cards and Predictive Algorithms' development and implementation.
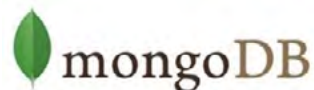
Examining Industry Data Risk Needs

- Insurance companies protect businesses from financial loss by assuming billions of dollars in risks each year.

- It is the underwriter's responsibility to evaluate a business's risk of loss and decide whether to insure the business and if so, at what price.

- Evaluating risks involves considerable research for both publicly traded shareholder or policy owners in mutual type companies.

- Information on applications is often supplemented with reports from loss control consultants, medical reports, information from data vendors, and actuarial studies.

- Based on its research, the underwriting department may require the applicant to make changes to improve safety, or decide not to provide coverage.

- Setting the price of coverage is known as the "rate making" process.

- Determining the proper rate is quite complicated, as the risks posed by no two businesses are exactly alike and the total amount of future claims is not known at the time the insurance policy is issued.

- The Internet has greatly enhanced the resources available to underwriters doing research on a business.

- Better data science solutions from BPO's are required to meet the needs.

Data Sciences for Insurance Industry

	Data Management & Reporting	Advanced Analytics	BIG Data Consulting & Analytics
High (Degree Of Complexity)	• Data Duality • Data Federation • Data Integration • Data Governance	• Campaign Analytics • Data Miring Predictive Analytics • Customer Lifecycle - Acquire, Grow. Retain • Customer loyalty & cohort Analyacs	• Cloud used analysis clusters • Streaming and Reaffirm Data • Social Media Data Analytics • LOB analytical widgets • Dynamic KPIs & Alerts
	• BI & Reporting • Enterprise DW / Marts	• Classification & Segmentation • Market Basket Analysis • Scorecards and KPIs	• Claims Data Analytics • Claim Aging and Timing analytics • Settlement / Loss Ratios • Claims Forecasting • Claims Process efficiency measures
Low	• Executive Summaries • Regulatory Reports	• Hypothesis Testing • Standard Reports	• Modernizing Datawarehouses • Legacy Data Transformations

Low — No.of Assets Built — High

Visualization Tools And Technique →

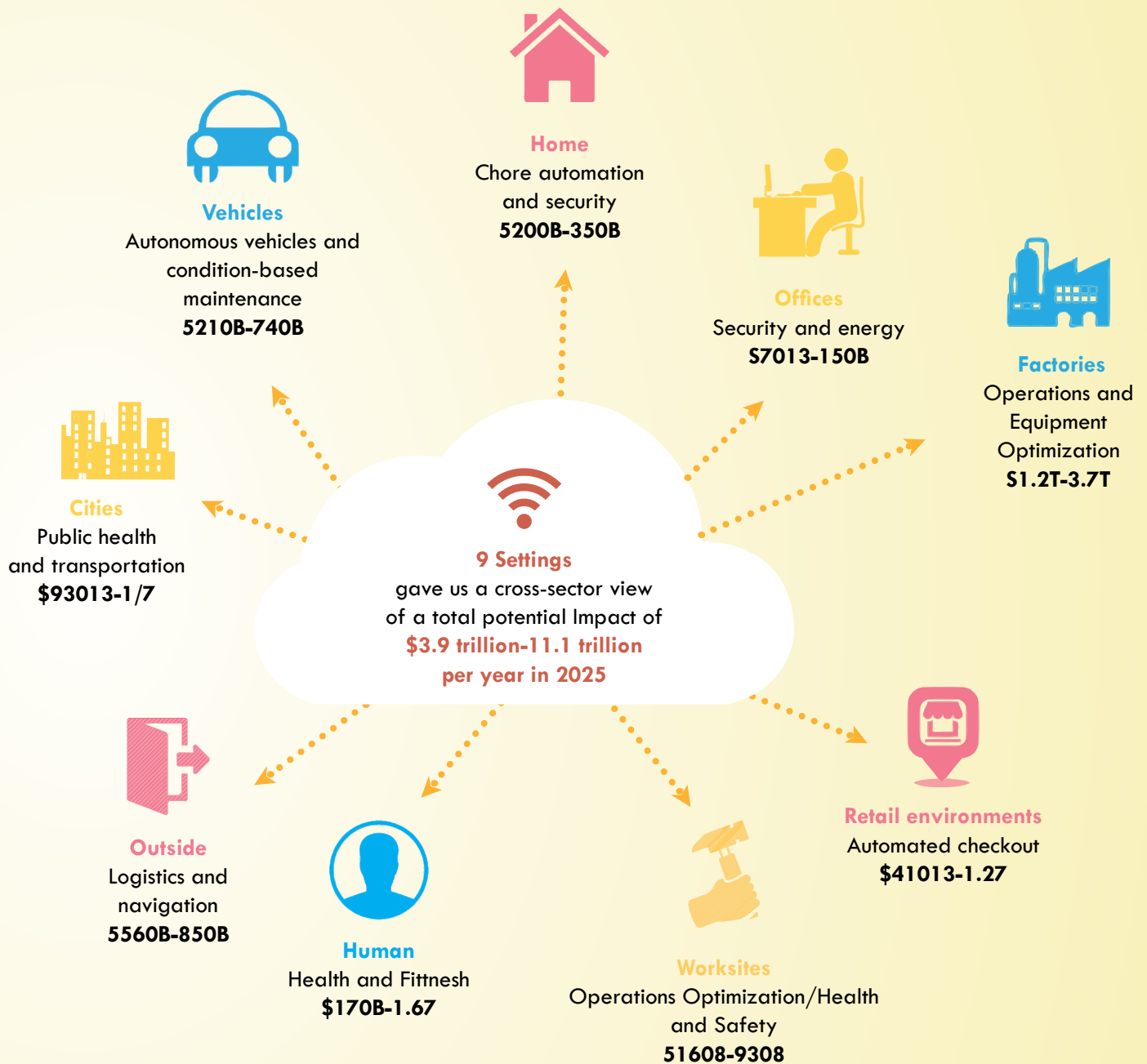# Industry Tech Gaps & Data Knowledge that is Interoperable

- The insurance industry data management capabilities are aging and needs to invest in new and emerging data technology solutions.

- As businesses environment become more sophisticated and connected through social media and IoT, insurers need to improve rating risk and highly accurate claims handling processes stay up-to-date.

- Assessment of risk with local, state and national data stores requires an increase in interconnected risks and globalization, large cost claims are increasingly complex and less random.

- Episodes or claim cases will with increasing frequency typically involve more parties, can be multi-jurisdictional and can involve numerous claimants.

- Insures require capabilities to aggregate data for multiple insured and technology abilities to sort, consume and rate risk and process or litigate large claims.

- Insurers need advancing data management technology solutions to offset risk from the challenge of a low yield environment and low premium rates, which creates counter-producing impact on expenses and can create tensions in claims handling.

Data Management Advanced Model

Inniti Alliance analytics value chain
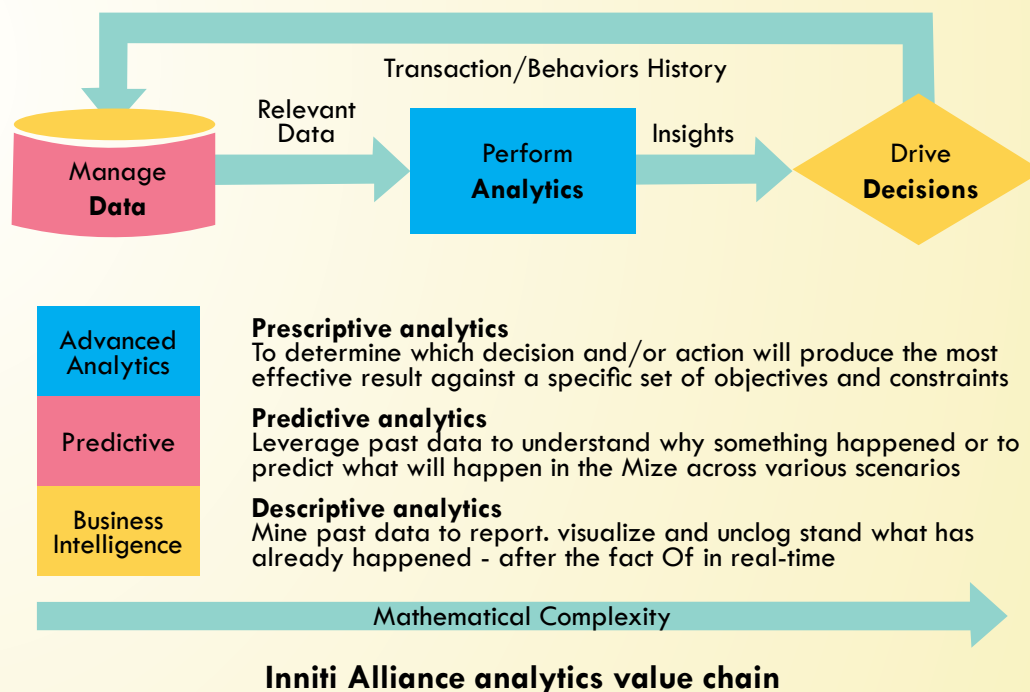
1. Begin with leveraging leading tools and techniques to manage and extract relevant data from big data sources.

2. Applications of analytics can range from historical reporting. through to real-time decisionsupport for organizations based on future predictions.

3. Use the insight generated by the analysis to drive change.

The Internet of Things & the Insurance Industry

Home
Chore automation
and security
5200B-350B

Vehicles
Autonomous vehicles and
condition-based
maintenance
5210B-740B

Offices
Security and energy
S7013-150B

Factories
Operations and
Equipment
Optimization
S1.2T-3.7T

Cities
Public health
and transportation
$93013-1/7

9 Settings
gave us a cross-sector view
of a total potential Impact of
**$3.9 trillion-11.1 trillion
per year in 2025**

Outside
Logistics and
navigation
5560B-850B

Human
Health and Fittnesh
$170B-1.67

Worksites
Operations Optimization/Health
and Safety
51608-9308

Retail environments
Automated checkout
$41013-1.27

- The "Internet of Things" will economic value create trillions in economic value Throughout the global economy by 2025

- What opportunities, challenges will this create for insurers?

- What are the impact on the insurance industry "value chain.?

Understanding Changing Data Analysis

- The ever expanding quantity of data available in the P&C industry suggests that dependence on statistical analysis will increase in the future.

- As the insurance industry continues to seek better understanding of dynamic loss exposures and enterprise-wide risk management, anticipate the need and use of advanced modeling and data-analytics to reduce risk.

- Liability losses that are unexpected or un-planned, i.e. reinsurance from big claim payments will vary in scale.

- Liability exposures for corporations will arise from third parties, products, fraud and the location, behavior or environment, as modern day technology advances.

- To better understand the scope and characteristics of these liabilities for control, the insurance industry will want to gain better data collection.

- Information and new BPO applications will make data more accessible, useable for root cause analysis and rely on machine learning to make it predictable with these types of technology solutions:
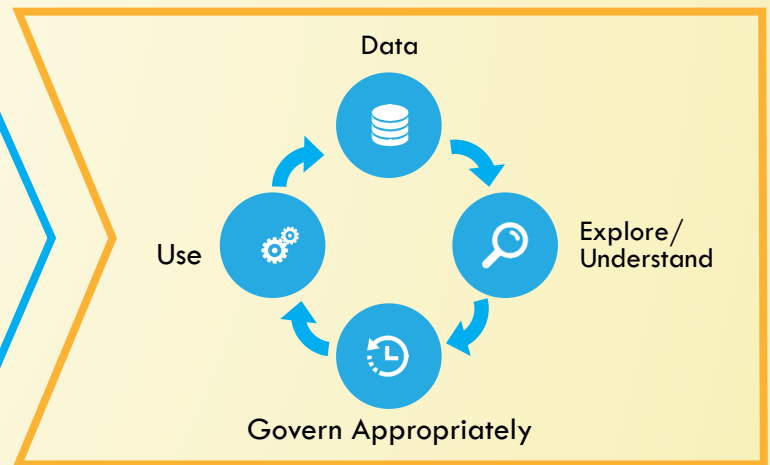
Data Sourcing & Collection Streams

Context Requires Governance; Agility Requires a Unique Big Data Approach to Governance

Traditional Approach

Data → Govern to Perfection → Respository → Use
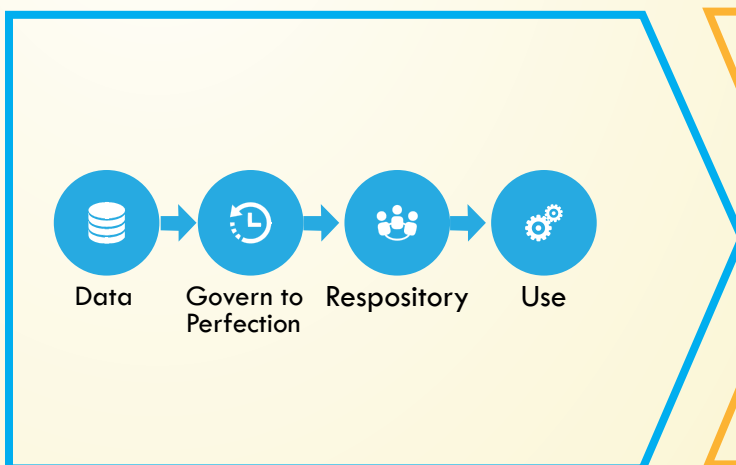
Govern data to the highest standard. Store it, then use it for multiple purposes

Big Data Approach

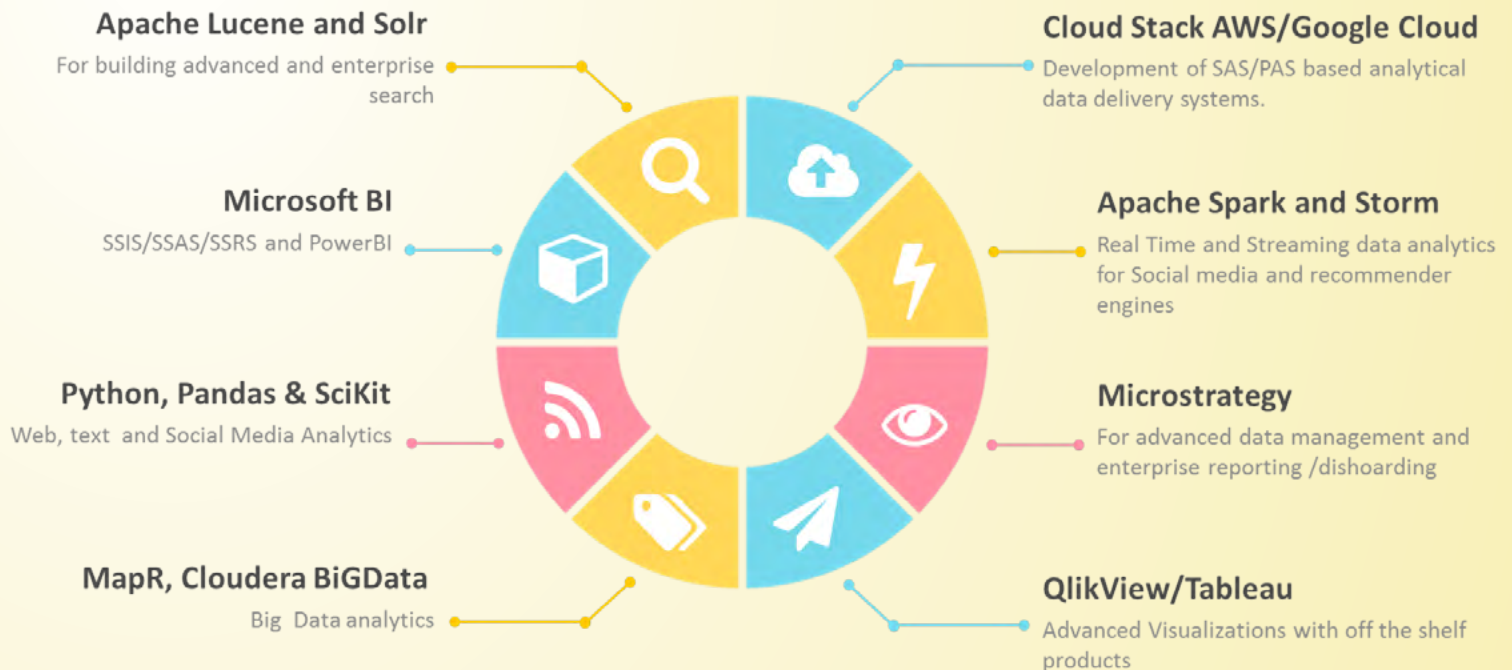Data → Explore/Understand → Govern Appropriately → Use

Understand data and usage. Govern to the appropriate level. Use it, and iterate

Growing Industry Complexities of Claims Expense & Risk

- The changing environment of property and casualty is becoming more complex and potentially more challenging to assign or parc responsible risk

- For example, an auto traffic accident involving an autonomous vehicle expands the expense vectors from the vehicle manufacturer, software provider and the fleet operator, as well as third parties involved in the accident.

- As expressed above the increasing entities that will share and be apportioned liabilities and expense creates new business liabilities that require greater capabilities to research and consume large data stores.

- In addition to effectively capture business and personal data and navigate privacy borders, new technology tools are required to secure information from cyber security risks.

- As follows are technology solutions that effective troll evident and in-evident cyber security data sources.

Advanced Analytical Technology Stack

Open Source and Vendor Source

Apache Lucene and Solr
For building advanced and enterprise search

Microsoft BI
SSIS/SSAS/SSRS and PowerBI

Python, Pandas & SciKit
Web, text and Social Media Analytics

MapR, Cloudera BiGData
Big Data analytics

Cloud Stack AWS/Google Cloud
Development of SAS/PAS based analytical data delivery systems.

Apache Spark and Storm
Real Time and Streaming data analytics for Social media and recommender engines

Microstrategy
For advanced data management and enterprise reporting /dishoarding

QlikView/Tableau
Advanced Visualizations with off the shelf products

Advanced Data Analysis & Practices are Disrupting the Industry

- Insurers should consider a technology solution that:

- Verifies documents quickly & accurately – helping insurers reduce wait times during the claims process.

- Utilizes data analytics to verify important documents and is capable of substantiating anything from passports to birth certificates and other important claims-related documentation.

- Uses Machine Learning or other smart technologies that allow the solution to adapt to ever-changing behaviors of fraudsters.

- Leverage data stores and analytical vendor solutions across the industry that develop trends and patterns for investigation.

- Access statistical models that are AI data driven to determine proper risk or assessment of actual events that are potential catastrophic forecasts, i.e. weather cases and NOAA data.

- Automate credit card data point of sale and Gather social media information for policy applicants.

- Use ANSI electronic standards that are interoperable across computer systems.

- Connect with "Property Casualty 360" type data sources that include health exchange in a box.

- Capture of for example manufactures information that use 3D Printing technology and represents new liability exposures to manage.

BPO Predictive Analytical Tools &Techniques

- **Regression :**

Predicting output variable using its cause-effect relationship with input variables etc, using OLS Regression, GLM, Random forests, etc.

- **Classification :**

Predicting the item class. Using Decision Trees, Logistic Regression, SVM, Naïve Bayes classifier etc.

- **Time Series Forecasting :**

Predicting future time events given past history. AR, MA, ARIMA, Triple Exponential Smoothing, Holt-Winters etc.

- **Association rule mining:**

Mining data for things occurring together, using Apriority and similar algorithms, market basket analysis.
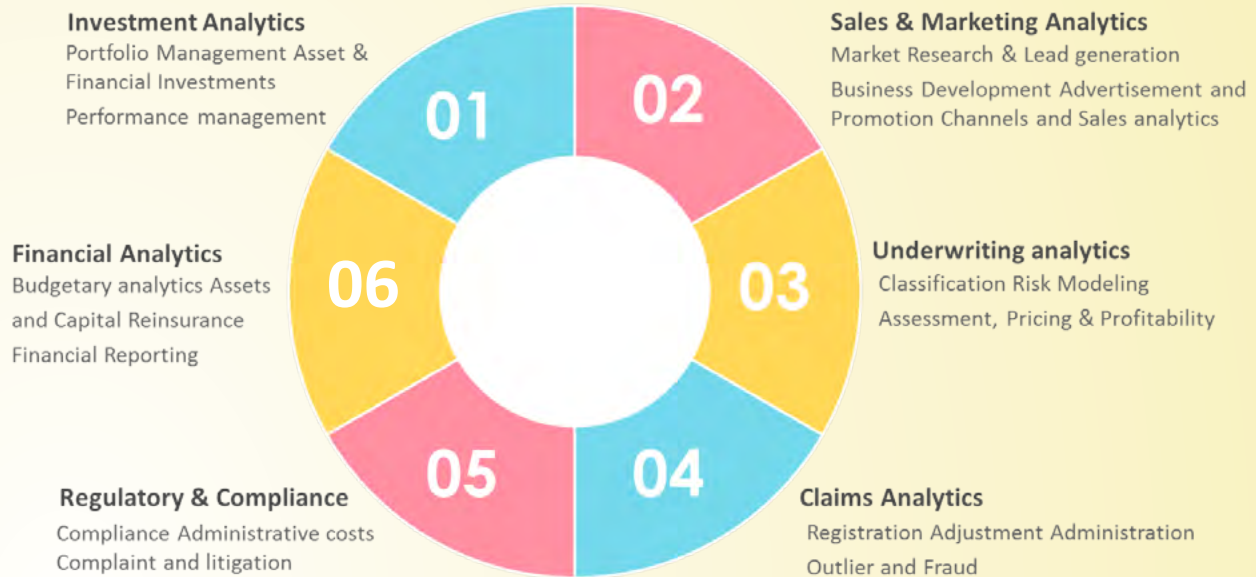
- **Clustering:**

Finding natural groups or clusters in the data using K-means, Hierarchical, Spectral, Density based EM algorithm etc.

- **Web and Text mining:**

Model and structure the information content of textual sources. Sentiment Analysis, NLP.

Our understanding of your probable needs

Investment Analytics
Portfolio Management Asset & Financial Investments
Performance management

Financial Analytics
Budgetary analytics Assets and Capital Reinsurance
Financial Reporting

Regulatory & Compliance
Compliance Administrative costs
Complaint and litigation

Sales & Marketing Analytics
Market Research & Lead generation
Business Development Advertisement and Promotion Channels and Sales analytics

Underwriting analytics
Classification Risk Modeling
Assessment, Pricing & Profitability

Claims Analytics
Registration Adjustment Administration
Outlier and Fraud

Industry Waste & Fraud Claims Liabilities

Every year, claims and underwriting fraud cost - $34 billion, negatively impacting insurers' business

Cost of fraud bome by US P&C Insurers

Fraud At Point of Sale

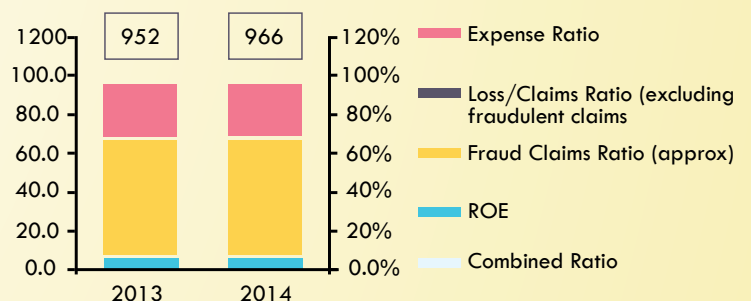fraud at the POS stage enodes 10% of Insurance revenue

Workers' compensation fraud is higher in Southern states, where-30% of construction workers have been wrong by classified as independent contarctors, amounting to annual losses of $400 million in florida, $467 million in North Carolina, and $1.2 billion in texas.
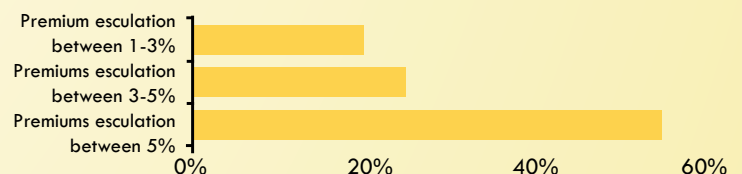
Fraud At Claims Stage

Claims fraud costs insurers 5-10% of their cliams volume and can be as high as 20%.

Loss due to fraudulent claims in personal line* insurance increased in last two years to reach $185 billion, in 2014.
- Organized fraud is also high in personal line insurance this business line reported to the highest number of referals to NICB* [10,659 questionable claims (QCs) out of 13,014 QCs]

Impact insurers Profitability

- Expense Ratio
- Loss/Claims Ratio (excluding fraudulent claims
- Fraud Claims Ratio (approx)
- ROE
- Combined Ratio

Limit Unsurance Ability to Offer Competitive Premiums

Predictive Modeling of Claim Risk

Our Client

A mid sized P&C Insurance provider, with business presence in 3 of American states and looking to expand to other regions and making foray in other areas of risk.
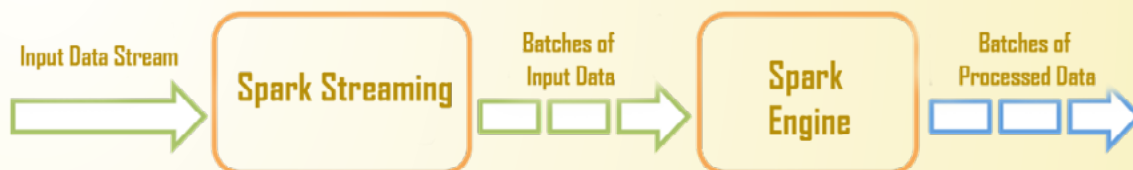
Business Challenge

Predict probabilities, build forward looking systems to to support planning and scheduling of various business aspects of insurance including financial flows, possible abuse and fraud alerts using advanced Mathematical and Statistical methods.

Solution Synopsis

Our Fluid data analytical model that enables collection and mining of data for business intelligence – Data Mining to see the historic data and use predictive algorithms to have futuristic and actionable insights.

Exception reporting , reporting the descriptive KPIs and Parameters, periodic forecasting of defined critical business ratios with built in alert management.

The data models were built with data pipelines to fetch new data at frequent intervals. Used R and Python based data mining implementations to churn data on periodic basis.

Benefits

Short term and long term view of business needs, Possible Abuse and fraud situations, continuously improve detection by feedback and machine learning.

Strategy and product managements have prospective view of business.

Fraud alert systems and recoveries have become more efficient that directly impacts profitability.

Input Data Stream → **Spark Streaming** → Batches of Input Data → **Spark Engine** → Batches of Processed Data
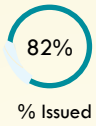
Data Visualization Capabilities

Once data models and advanced analytics is created the user requires report tools to gain understanding and support continuous process improvement.

Advanced Data Analytics Dashboards and Widgets

% Division National ⌄   ◯ **Region** All ⌄   ◯ **Branch** All ⌄

82%
% Issued

ANP/NOP
Submission	**125,876**	(325)
Issued	**103,652**	(283)
Pending	**22,224**	(42)

68%
13th Month
Persistency

REVENUE LOSS
Revenue Loss	**22,87,954**
Projected Revenue Loss	**4,187,900**

SALES FORECAST
1,250,000

-11.80
% Growth

Sales Scorecard

Key Metrics	Target	Actual	Achieved		LY Actual	Variance	Trends
ANP Submission	154.79	148.32	95.20%	🟡	129.82	27.09%	⬆
ANP Issued	134.79	128.32	95.20%	🟡	119.82	7.09%	⬆
FYP Collected	105.98	108.1	102.00%	🟡	103.76	4.18%	⬆
NBP Issued	165.72	112.87	68.11%	🔴	154.87	27.12%	⬇
VONB (Million)	31.76	36.76	116%	🟢	32.87	11.83%	⬆
VONB (%)	31.76	36.76	116%	🟢	32.87	11.83%	⬆
NOP Submission	1682	1782	120%	🟢	1952	12.73%	⬆
NOP Issued(000)	1652	1762	107%	🟢	1952	9.73%	⬆

ANP Sub by Region

ANP Sub by Region

Legend: ● Target ● Actual ◯ %
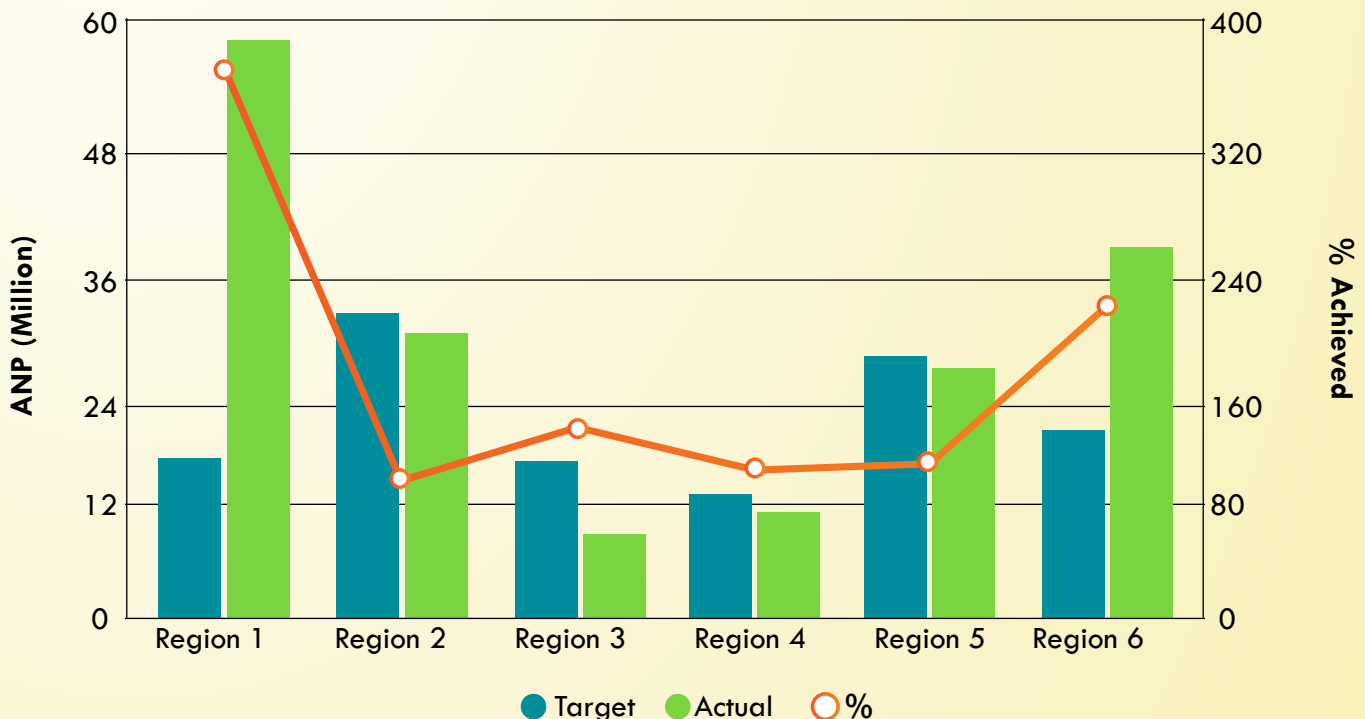
Advanced Data Analytics Dashboards and Widgets

Claims Intimation by Channel
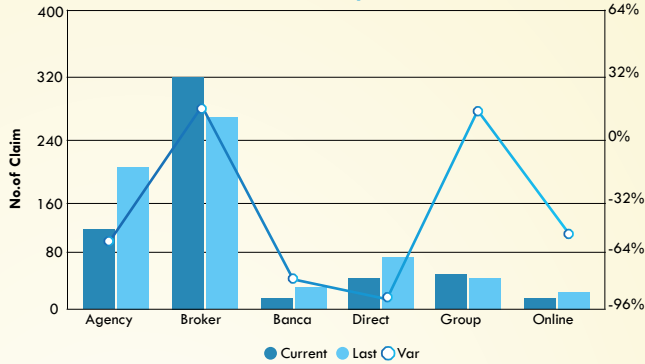
Legend: ● Current ● Last ○ Var

Categories: Agency, Broker, Banca, Direct, Group, Online

Left axis (No.of Claim): 0, 80, 160, 240, 320, 400
Right axis: -96%, -64%, -32%, 0%, 32%, 64%

Claims by Region

Legend: ● Current ● Last ○ Var

Categories: Northern, Central, Eastern, Western, Southern

Left axis (No.of Claim): 0, 60, 120, 180, 240, 300
Right axis: -40%, -32%, -24%, -16%, -8%, 0%

Average Cost Per Claim

Actual TAT 65,763
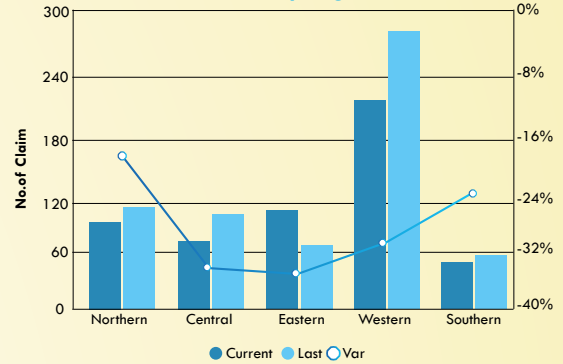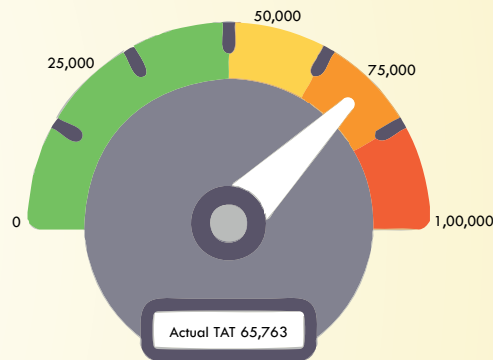
	Settlement Ratio		
86.3% % Issued	Claim Intimation	38.50	
	Claim Settled	33.23	↑

	Loss Ratio		
55.6% % Issued	Total Claim Paid	30.65	
	Earned Premium	55.12	↓
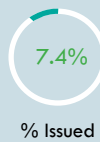
	Pending Claim		
7.4% % Issued	Total Claim Received	536	
	Pending Claims	494	↑

Claim Scorecard

Key Metrics	Current Month	Last Month	Variance		YTD Actual	LY Actual	Trend
Claim Intimation(C)	536	615	-15%	●	2680	2872	↑
Claim Settled(C)	494	541	-10%	●	2470	2573	↑
Claim Intimation(V)	38.5	35.35	8%	●	203	235.87	↑
Claim Settled(V)	33.23	30.21	9%	●	167.87	186.82	↓
Claim Paid(C)	432	501	-16%	●	2160	2356	↑
Claim Paid(V)	30.65	28.76	6%	●	153.76	145.87	↑

Summary of Industry Data Needs & BPO Data Science Solutions

The Property and Casualty insurance industry needs for managing policy financial risk, delivering affordable coverage that is in demand for a consumer driven market, with an aging data management system infrastructure is at all times challenging. BPO companies can support the industry's need for advance data analysis with technology solutions that are knowledgeable about specific data requirements. These data science solutions will fully integrate into insurer enterprise relationship management systems.

Solutions will provide fully scalable data capture and data processing for income, claims expense, and underwriting information from disparate data stores from target data sources. Once these data models and advanced analytics tools are delivered the user requires report visualizations tools to fully understand and support continuous financial risk process improvement. In conclusion to support financially viable insurance policies for share holder or mutual company companies.