Process Mining in Insurance: Measuring and Managing Activity Costs

Casualty Actuarial Society

Ratemaking and Product Management Seminar

Wednesday March 27, 2019

With you today

Tony Beirne, Director

Tony is in KPMG's Actuarial practice and has over 15 years' experience in American and Australian financial services industries.

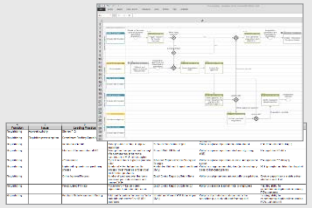
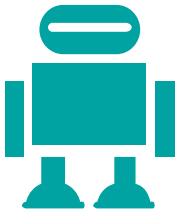
He advises clients on actuarial, modeling, business process, analytics, data quality, regulatory change, credit risk, technology, financial reporting, controls, and due diligence issues leveraging actuarial, operations, finance, and IT teams.

Jonathan Wong, Director

Jonathan is a Director in KPMG's Actuarial and Insurance Risk Advisory practice with more than 15 years of business experience in the insurance industry.

Over his career Jonathan has advised his clients to develop and execute transformation across the insurance value chain including, process optimization, intelligent automation, and data and analytics.

KPMG Risk Analytics Insurance Process Solutions

Tool	Use	Description	
Enterprise Value Accelerator (EVA)	• KPMG iPad enablement tool that identifies pain points, actions and solutions	• P&C and Life insurance value chain focused • >300 solution use cases • 19 value chain components	
Process Mining	• Investigation, discovery, and documentation of current processes • Celonis Software	• System log data analysis • Identify concentrations, bottlenecks, and dependencies • Synthesize process action/outcome analysis	
Process Simulation	• "What if" analysis and visualization • Change design • Process management • ARIS software	• Design and document • Manage a 24 hour workday handoffs • Simulate process changes, with downstream impacts (e.g. timing, FTEs)	
Post-Analysis Applications & Enhancers	• Cognitive Contract Management • RPA/IPA • Smart Action Tools	• Natural Language processing to automate unstructured document intake, interpretation, and structuring • Automated action responses with for faster, lower costs, and/or better downstream actions	

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Process Mining: What & Why?

Overview

What is Process Mining?

- Process mining uses system-log data to objectively measure business process activity.
- Using traditional methods, intermediate step activities can be difficult to observe, but can lead to significant costs and bottlenecks.
- Initial business intelligence and visualization analysis can be matured with predictive analytics.
- Process Mining is an analysis and visualization step that informs later stage process optimization activities, along the journey below.

Why use it?

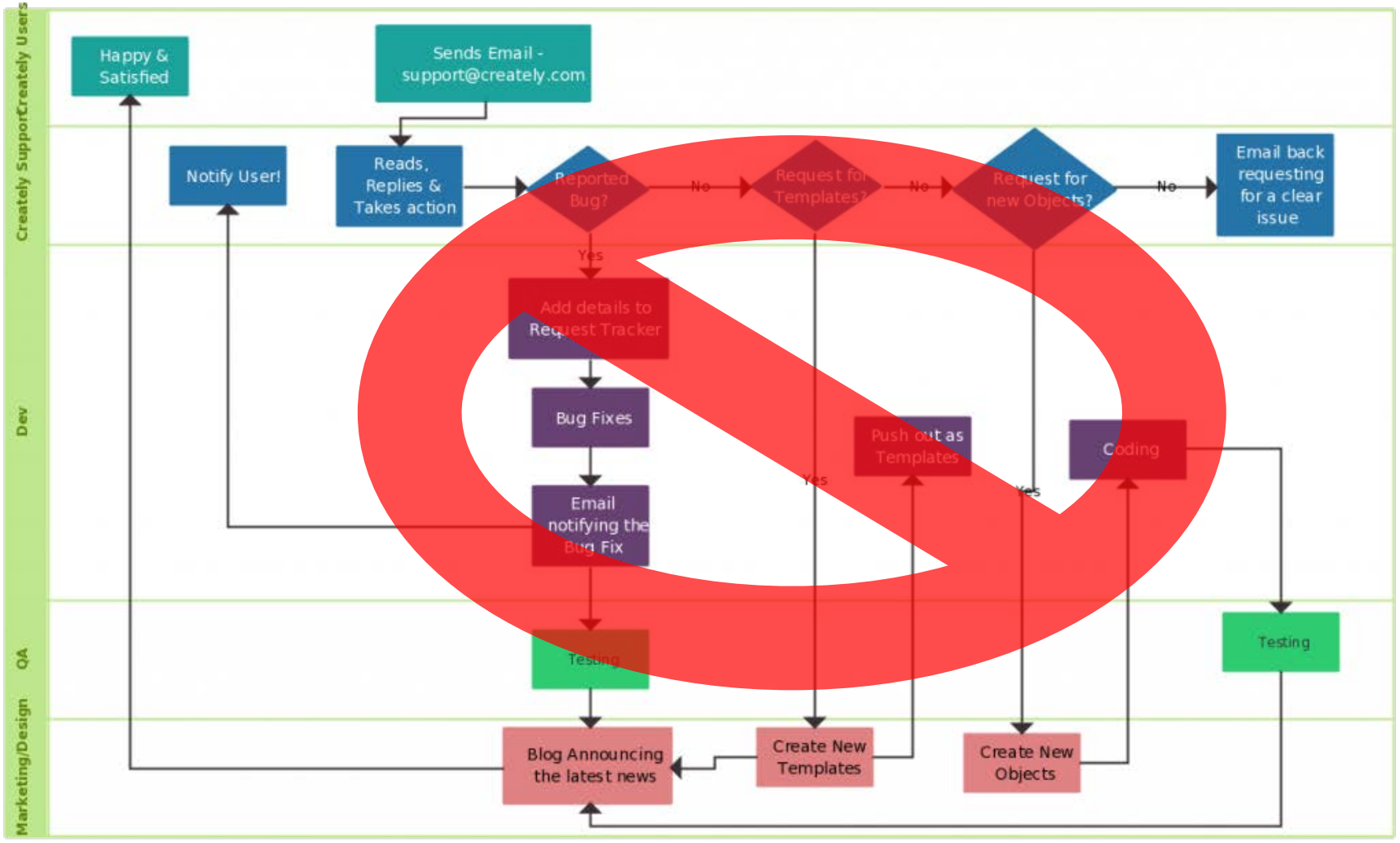
Data

- **Objectively measure** system activity
- **Granular task and timing** information
- **Faster to collect** than interview-based methods

Analysis

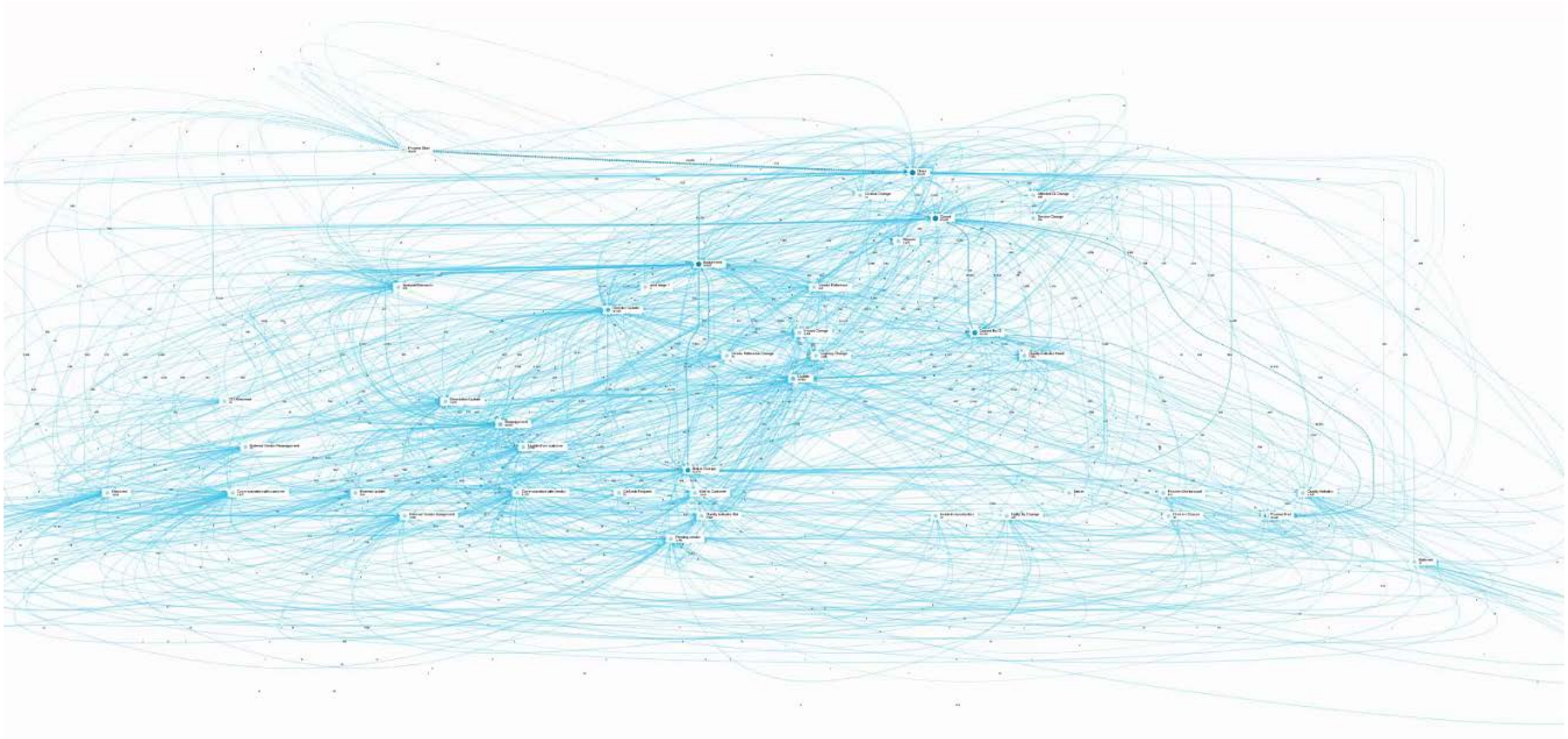
- **Intuitive synthesis** of complex transactions
- **Core transaction and outlier analysis** in a common tool
- **Segmentation** possible by customer, transaction, resource, etc.
- **Track implementation progress in real time** towards redesign objectives

Use data; not stories



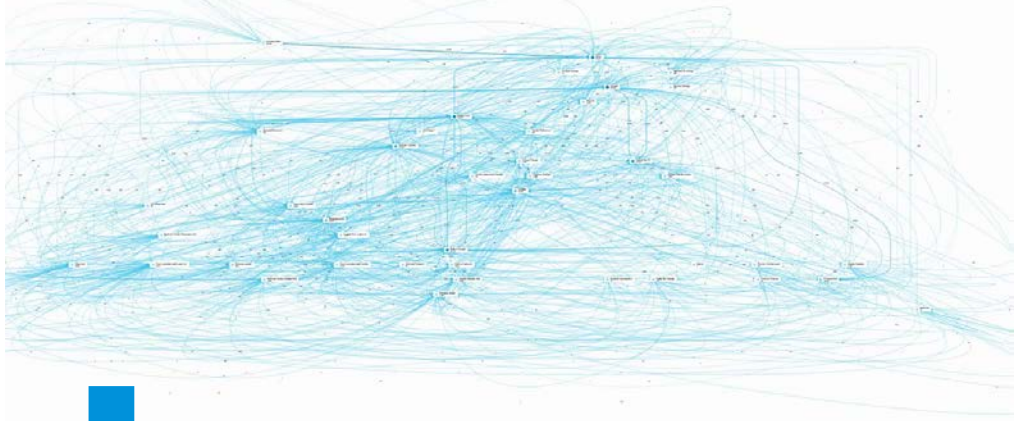
https://creately.com/blog/diagrams/flowchart-guide-flowchart-tutorial/

Process Mining in action: Raw Admin System Data

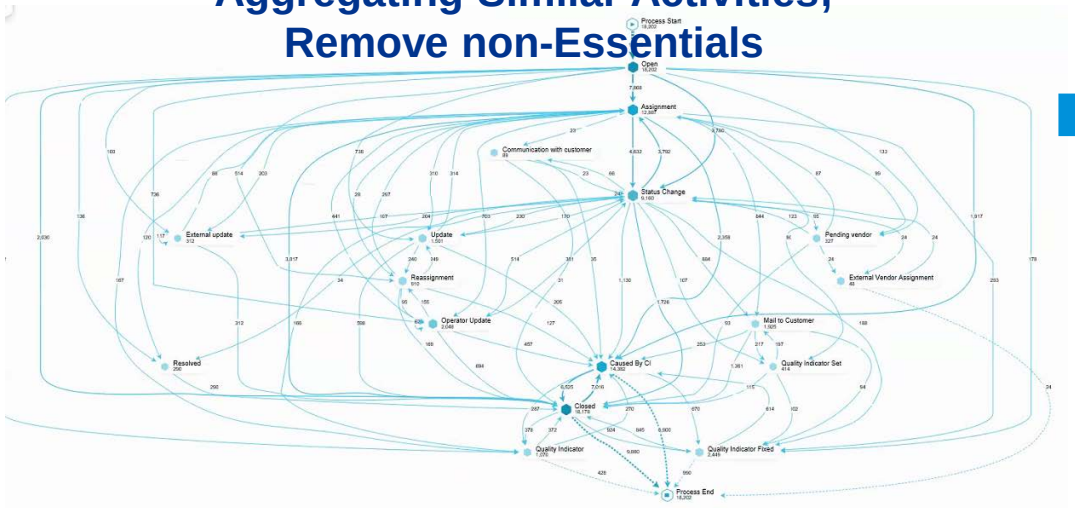


Process Mining in action

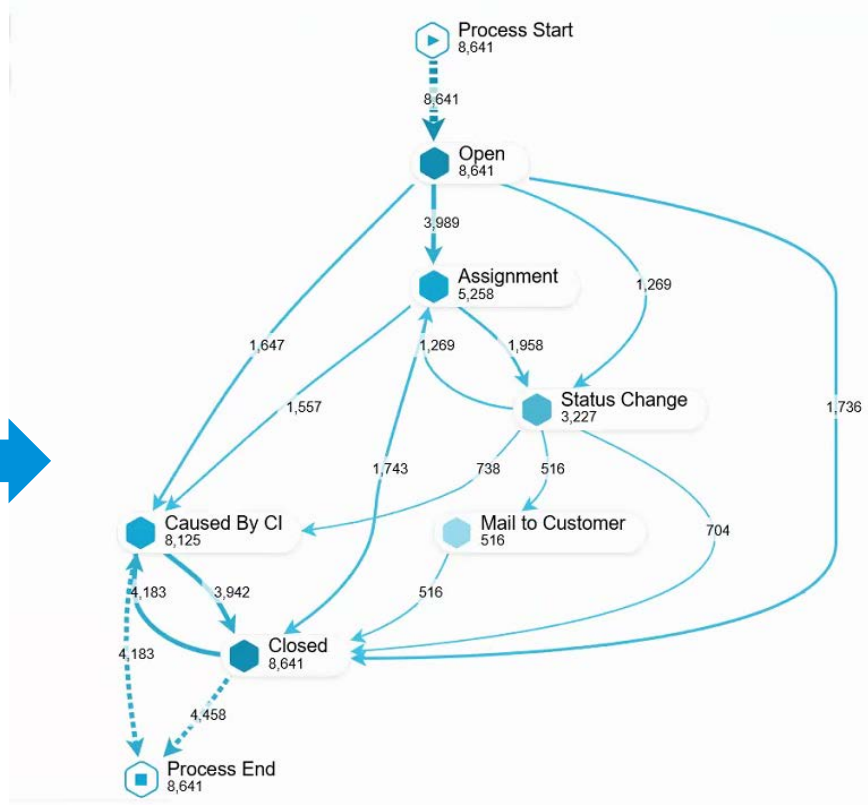
Raw Administration System Data

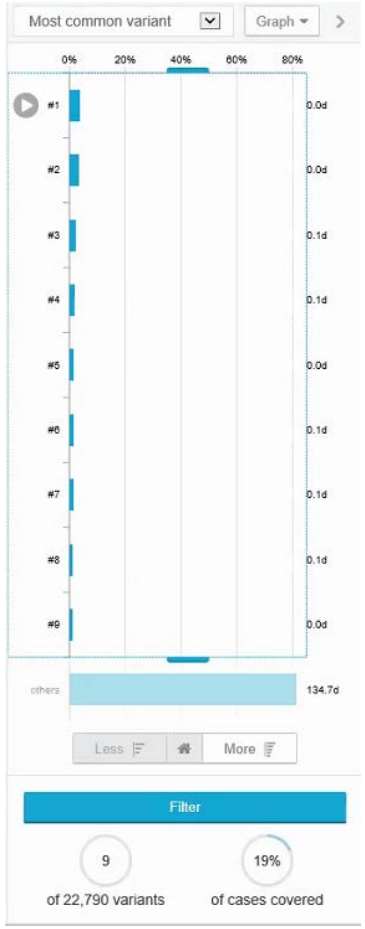


Aggregating Similar Activities; Remove non-Essentials



Top 10 Variants

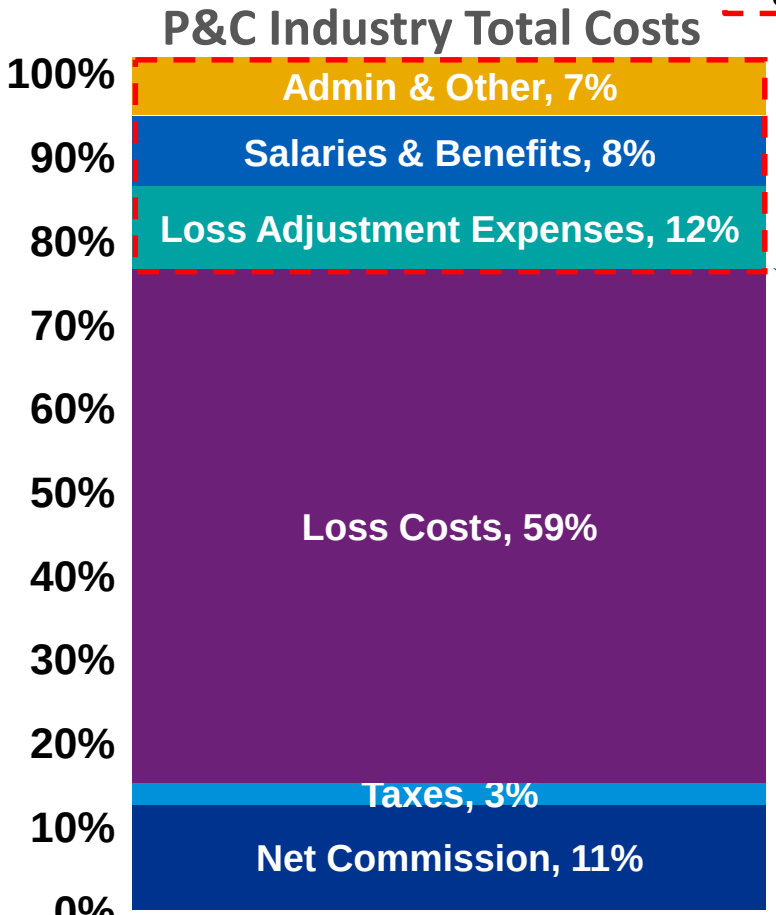




Core Problem: Processes are manual—and therefore difficult to measure

Improved process management would help the P&C industry better manage over 1/4th of its cost base. Larger savings are possible for specific carriers, lines, and processes.

- **5% of LAE equates to $378B per year**
- **5% of Underwriting costs equates to $878B per year**



Underwriting, Administration, and Other costs have substantial FTE resource costs, related to teams executing business processes. These are mostly managed indirectly via Finance or Actuarial allocations—but are usually not directly observed.

Input salary costs are more easily observed than output production without process tools

Loss adjustment expenses are 12% of total costs, and a mix of:

- Cash out the door costs
- ALAE manual adjuster and management FTE time
- Overhead allocations for ULAE, including manual processes and management loads

The last two of these are difficult to manage, without process-oriented tools

Losses involve cash out the door, so are currently:

- Easy to measure
- Intensely managed now, with varying degrees of success

Taxes and Commissions are contractual costs, which result in cash out the door. They are currently tightly managed, with minimal scope for improvement from process tools.

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Process Mining “How?”

KPMG's General Approach to Process Mining

1 Processing

Clients workflow system data enriched with better practices and benchmark data

Policy/Claims Admin. System Logs → Extracted data → Data transformation → End-to-end process view

2 Analysis

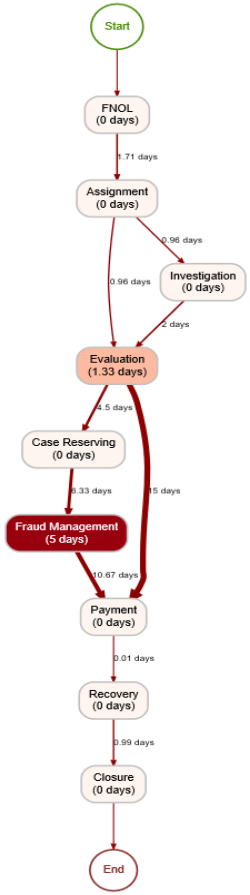
I. Process Flow	II. Process Patterns/ Model validation	III. Process Analytics, Conformance
		

3 Results

Final results report provided detailed insights and provides measures to improve ICS & process performance

Summary / Benchmarks	Performance & Compliance reports	Detailed findings and documents	Recommendations & measures
			

Variant + Cost Models



Variant Model

Orders activities by:

- Transaction # (e.g. claim, policy number)
- Activity type
- Timestamp

Used to analyze:

- Where processes “break”
- The impact on cycle time, throughput counts, or other metrics
- Differences between good/bad paths

Can be done in R, but process mining tools like Celonis provide much easier user interface

Cost Model

	Time per activity
*	**Resource Cost (per Hour)**
*	**Activity Count**
$	**Total Costs**

Simple matrix multiplication

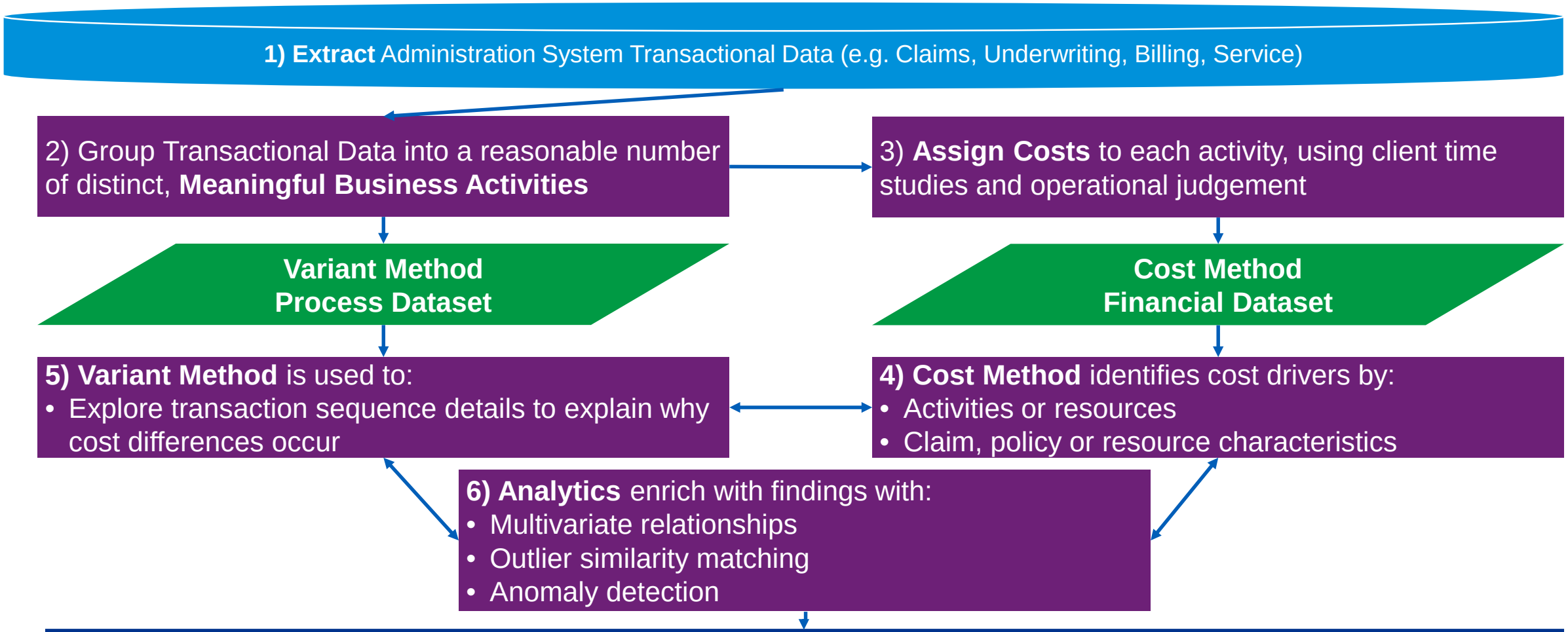
Used to analyze:

- Operational costs of process differences

Execution:

- Calculate in any tool (e.g. Excel, R, SAS, SQL)
- Then merge back onto the Variant model by Transaction # for deeper analysis

KPMG's Insurance-specific Process Mining modules



Data Requirements and Considerations

Data Requirements:

- Unique Identifiers, Action Names, Start Times, Action Costs, Action Executor

Unit Number	Action Code	Action Created	Policy State	Estimated Amount	Executor
01-A	File Start	9/10/2017 9:37AM	MA	1012.31	Matt
01-A	Assignment	9/10/2017 10:39AM	MA	31.50	Brian
01-A	Outbound Correspondence	9/11/2017 8:30AM	NJ	200.10	Julia
02-A	Unit Open	9/11/2017 10:24AM	NJ	12.15	Brian
02-A	Initial Contact with Rep	9/10/2017 9:45AM	NJ	36.22	Andrew
02-A	Document Arrival	9/17/2017 2:12PM	MA	22.78	Steve
03-A	Document Arrival	9/17/2017 3:09PM	MA	23.40	Steve
03-A	Call	9/29/2017 10:13AM	MA	51.26	Joe
03-A	Reassignment	10/01/2017 11:03AM	MA	64.25	Brian
04-A	Call	10/30/2017 9:45AM	NJ	48.98	Maria
04-A	Document Arrival	11/4/2017 10:42AM	MA	33.64	Steve
04-A	Inspection Complete	11/25/2017 3:07PM	MA	189.34	Mike
05-A	Unit Closed	11/25/2017 4:10PM	MA	44.65	Brian
05-A	Payment Created	11/26/2017 12:09PM	MA	1770.58	Rachel
05-A	Document Arrival	11/26/2017 2:12PM	NJ	1770.58	Rachel

The data needed for process mining analysis is:

- Simple to prepare, with few required fields
- Readily available from most policy and claims administrating systems
- Easy to join to wider analysis data using the policy/exposure or claimant number

Additional internal and external data can be used to supplement the core process mining analysis to derive claim-type or customer-segment insights.

Internal Data

- ❑ Policy type, state, coverage options
- ❑ 1st versus 3rd party coverage
- ❑ Loss type, severity
- ❑ Policyholder and claimant demographics
- ❑ Customer Satisfaction Scores
- ❑ Geographic
- ❑ Vendors involved

External Data

- ❑ Psycho/Firmo-graphics
- ❑ 3rd party exposure, loss assessment, and vehicle history data
- ❑ Geo-Environmental

How the models work: Sample Claim Path

Raw Data

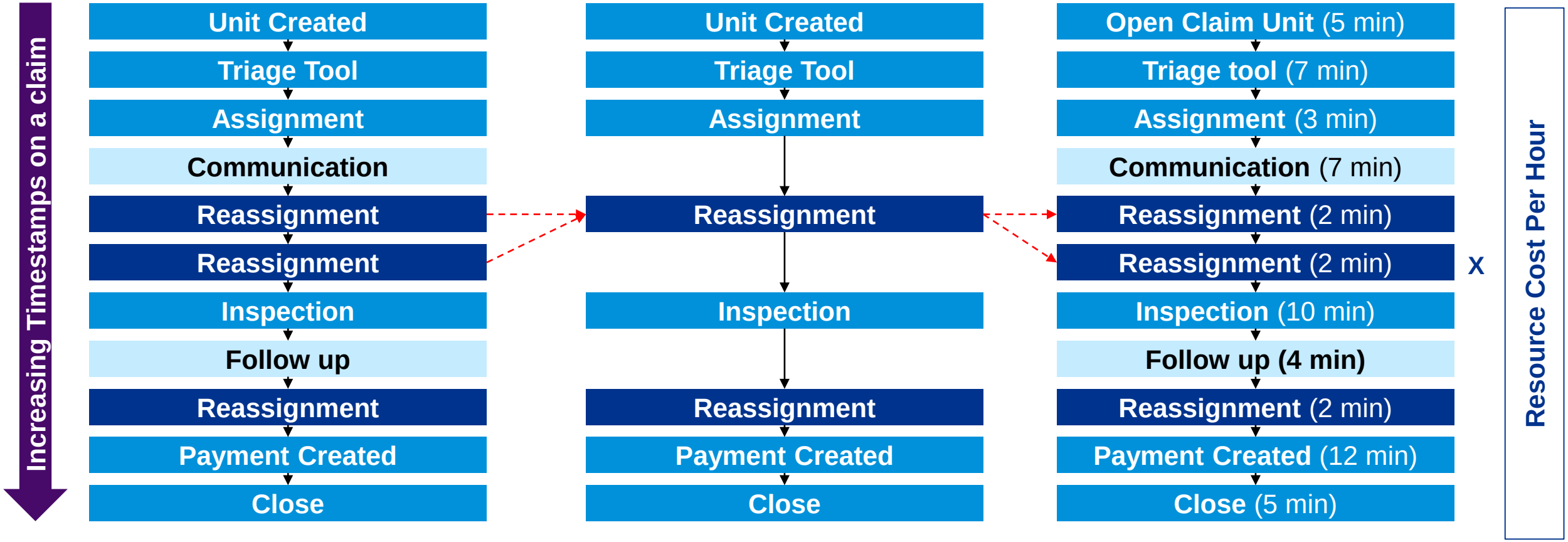
Many repetitive action codes in the same stage.

Variant Model

Collapses down repetitive steps in the same state, and removes non-core actions (e.g. communication) for more intuitive analysis.

Cost Model

Includes repetitive steps and non-core actions to capture all activities. Adds time per activity and multiplies by resource cost rates.

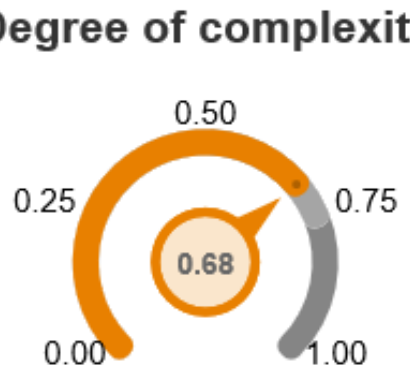


Outputs

Dashboard Legend

Inspection Days: 35

E2E Days: 63



Adjuster Effort: $92

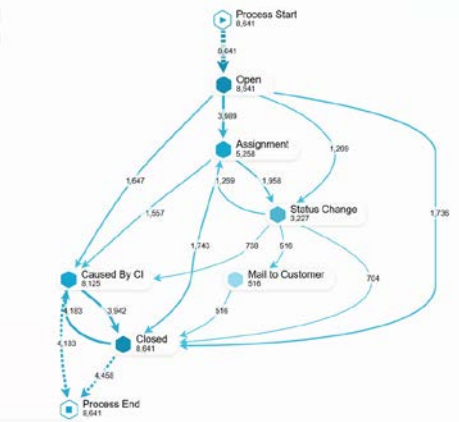
Claims: 243,593

Loss Severity: $4,288

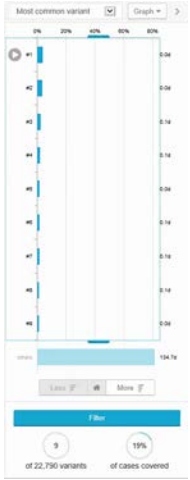
Avgerage Days to Inspect	Number of days from the first action to the completed inspection on a claim file
Avgerage (E2E) in Days	Number of days from the first action to the last action on the claim (including reopens)
Avgerage Effort	Claims adjuster effort cost per claim in the cohort ($)
Degree of Complexity	Number of variants / Claim Count in the cohort
Cases	Number of claim units in the cohort
Avgerage Indemnity	The average Indemnity paid for claim units in the cohort ($)

Interpreting the Results

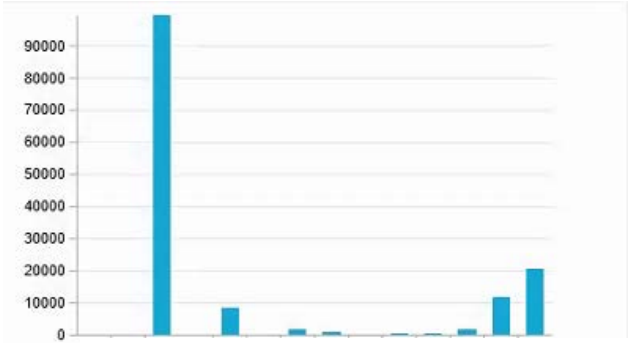
Frequency & Throughput



Concentration

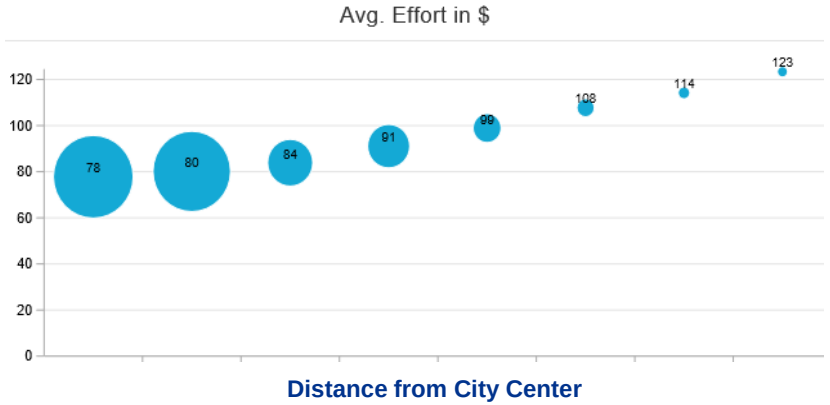


Activity Cost



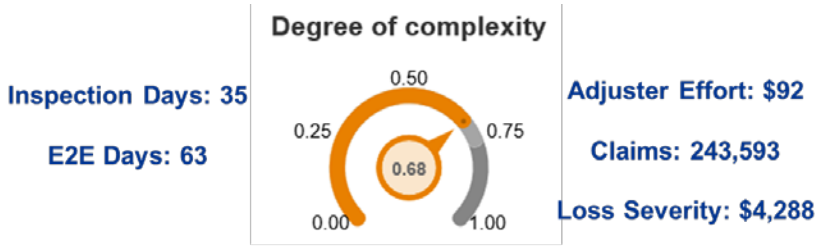
Adjuster Cost by Intake Channel

Cost-Dimensional Analysis



Distance from City Center

Complexity Dashboard



Successful process mining projects

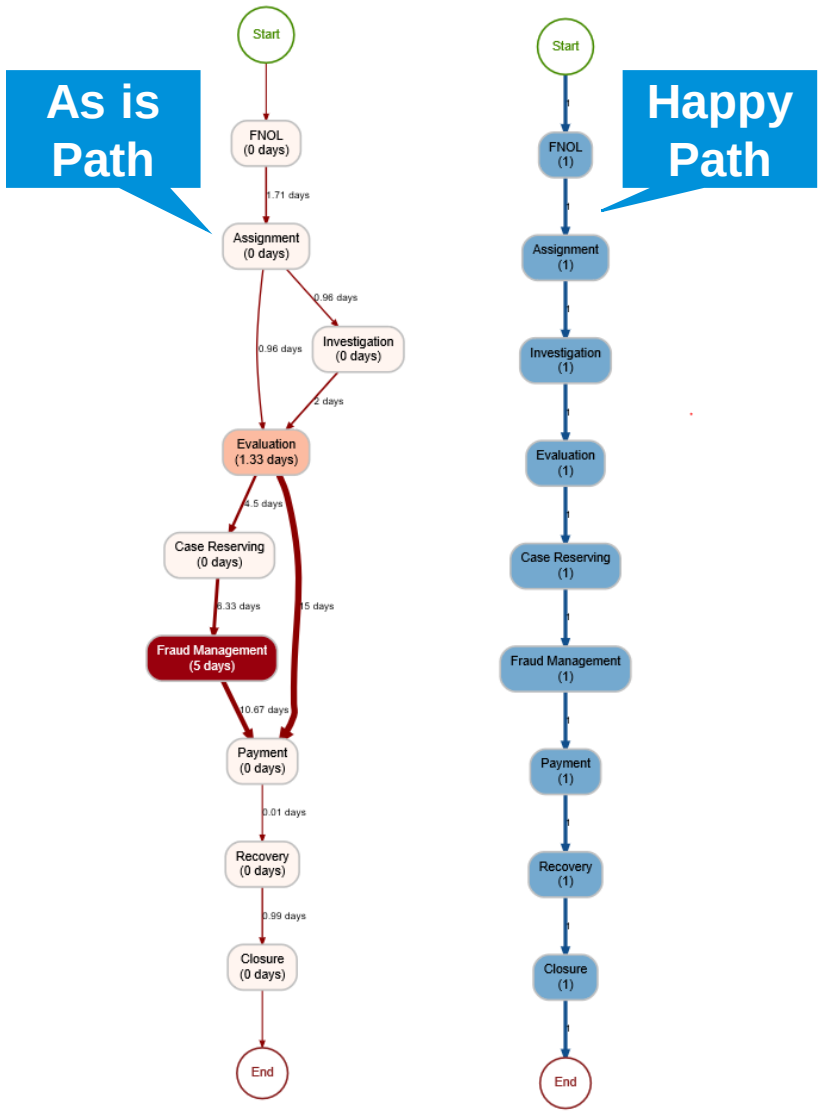
"Happy Paths" can be based on either the most frequent policy/claim journeys, or business views of "should be" process flows. Comparing "as is" versus "happy paths" identifies anomalies, potential conformance risk, and other issues impacting the customer.

In this example, not all claims are completing required Investigation steps prior to Evaluation. Later in the journey, some payments occur without case reserves, which may be a compliance issue.

Typical Phase 1 process mining projects help management visualize:

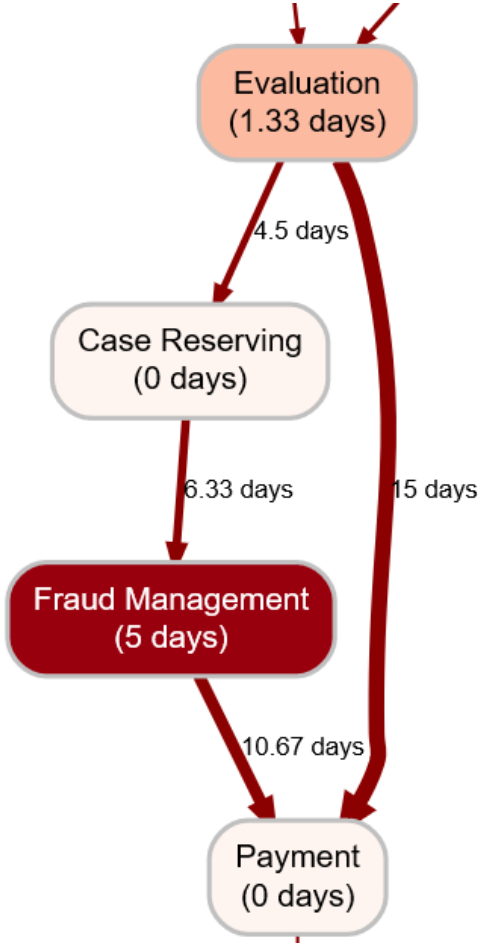
- How often processes follow the happy path
- If variants are more common with particular claim, policy, or resource cohorts
- Triggers—and effects—of processes falling off the happy path

Process changes to address these issues can then be proposed to improve future operations.

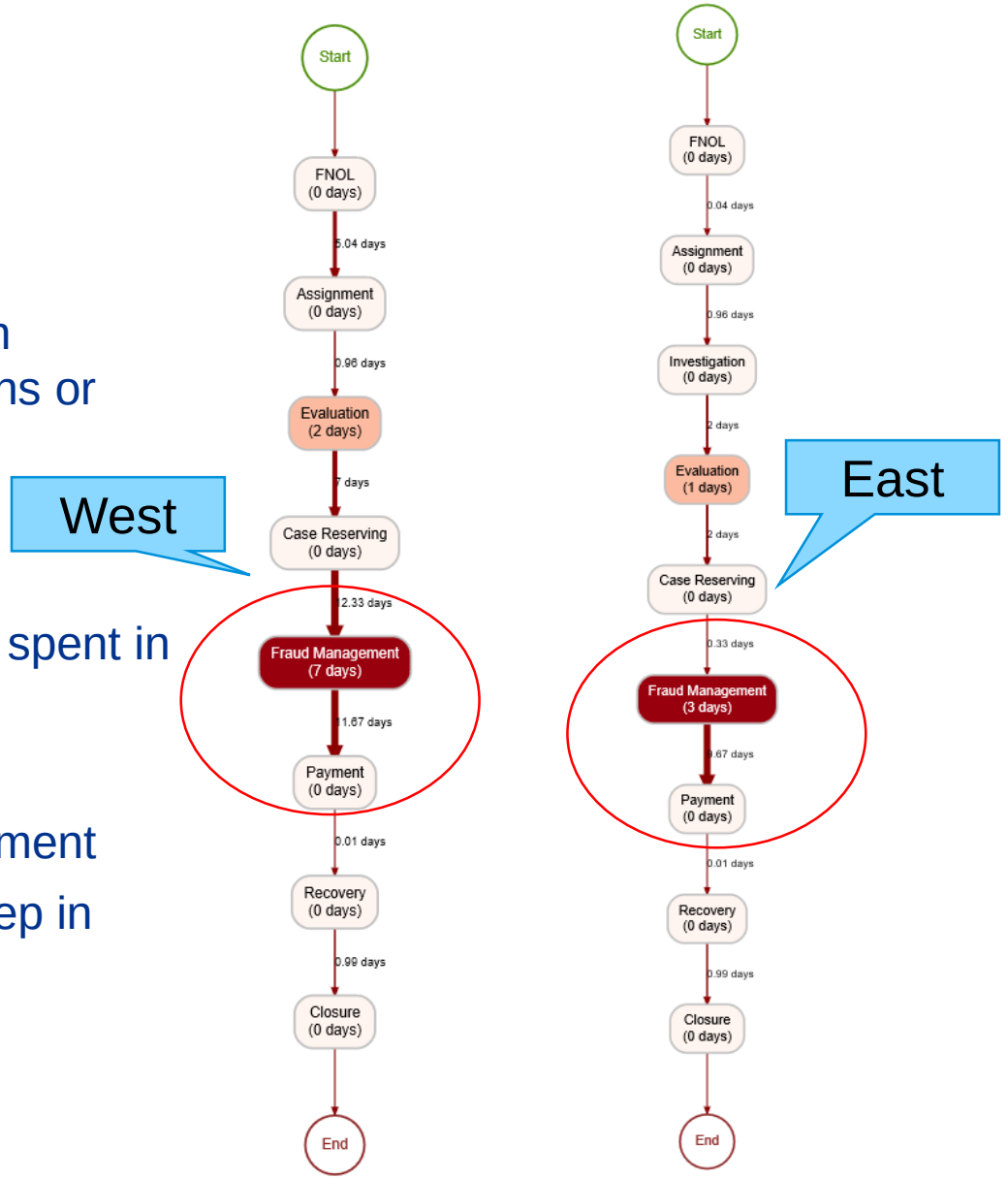


Bottlenecks and Benchmarking

SIU (expectedly) adds 2 weeks to the process



- Benchmarking can be based on internal management dimensions or industry standards
- The main cycle time difference between East and West is time spent in fraud management
  - More fraud in the West
  - Inefficient fraud management
  - Included investigation step in Fraud Management
- 2 days difference from Fraud Management to Payment



Celonis Demo

Celonis Demo

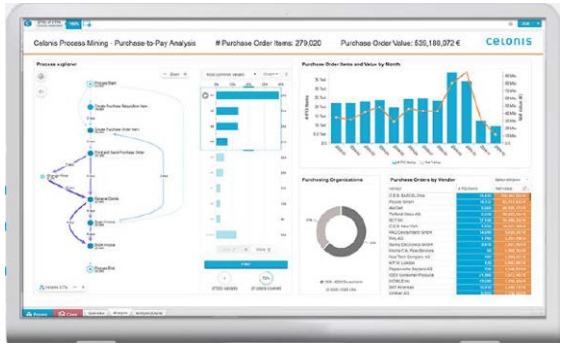
- Many process mining tools are available, including vendor solutions through freeware (R packages)
- **Celonis** is our favorite since it is so easy to use
  - This expands the analyst pool from the Data Science team to anyone who can use Business Intelligence (BI) tools

- ***To Celonis…***

How Process Mining Solves The Problem

Process mining takes data from your Policy and Claims Administration system—which is often not analyzed today. It then:

- Identifies (un)common policy or claims juries through your processes
- Produces visuals which help management synthesize the information
- Helps you identify throughput and inefficiencies in your processes, such as identifying the task or resource types that typically are involved in good/bad outcomes



Transparency	Process Mining allows for a visual flow analysis, incorporating KPIs (cycle time, bottlenecks, process variants), with options to benchmark results.
Optimize processes	Visualizations help management identify problem areas (or best in class outliers), support the case for process change, and mature solution hypotheses.
Reduced walkthrough reliance	System log data is faster to gather, and more objective than traditional interview-based information gathering.
Monitor outcomes	Process Mining continuously monitors the process changes during implementation, helping management adjust on the fly to achieve targets.

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Process Simulation

Understand process ➔ Simulate for constrained optimization

Analysis of as-is processes

- Dynamic correlation of processes
- Semantic correctness of process modeling
- Throughput times of processes with given resources
- Wait (= wasted) times
- Detection of resource bottlenecks and low resource utilization
- Execution of (end-to-end) processes within determined period of time
- Determination of critical paths (time, cost)

Optimization of to-be processes

- Removal of bottlenecks
- Evaluation of process variants for Benchmarking
- Reduction of throughput times and costs
- Increasing number of process deliverables within given time
- Capacity planning
- Optimization of resource utilization

KPMG uses for process simulation

Process-related areas

- **Events: Process /activity times**
  - Processing time
  - Wait / orientation time
  - Total time
- **Process costs**
  - Cost rates (busy / idle time)
  - Material / supply / energy
  - Depreciation / repair / maintenance
- **Rules / process routing**

Resource areas

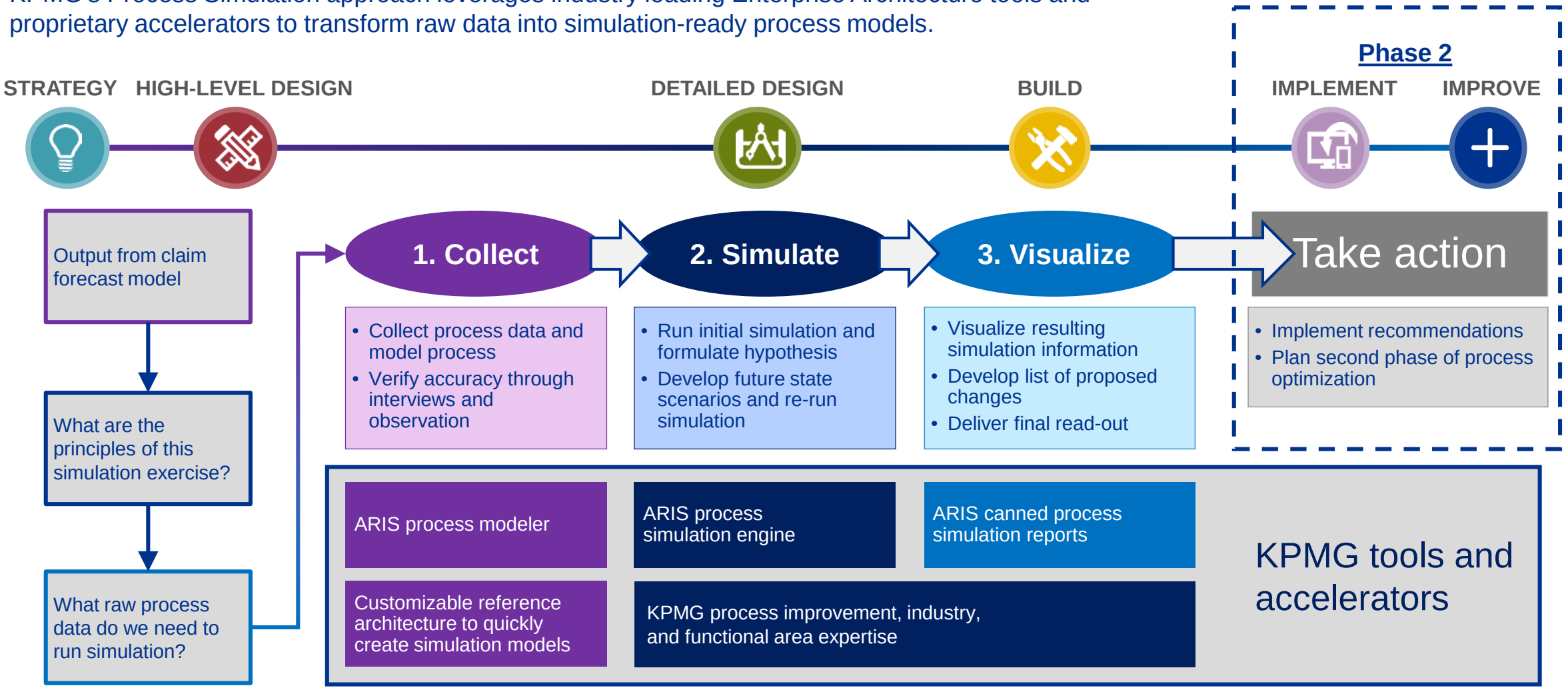
- **Human resources**
  - Org units / roles utilization
  - Idle / overtime
  - Resource allocation (locking to activity); interruptions
  - Human resource costs
- **Technical / capacity resources**
  - Tech / capacity utilization
  - Scheduled time / idle / overtime
  - Interruptions
  - Tech / capacity costs

Other areas

- **Risk / controls**
  - Occurrences / prevented occurrences
  - Amount of damages / prevented damages
- **Calendar impact**
  - (Seasonal) spikes or unscheduled times
  - Recurrences

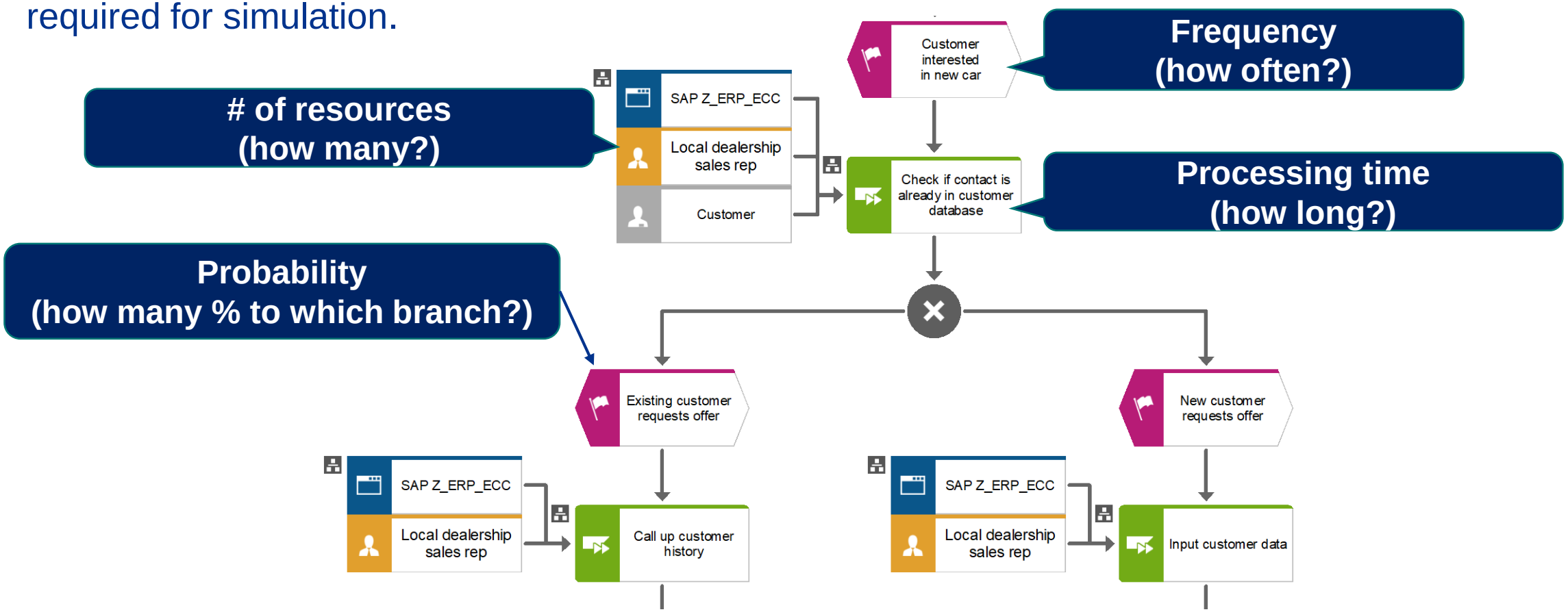
Approach to Process Simulation

KPMG's Process Simulation approach leverages industry leading Enterprise Architecture tools and proprietary accelerators to transform raw data into simulation-ready process models.

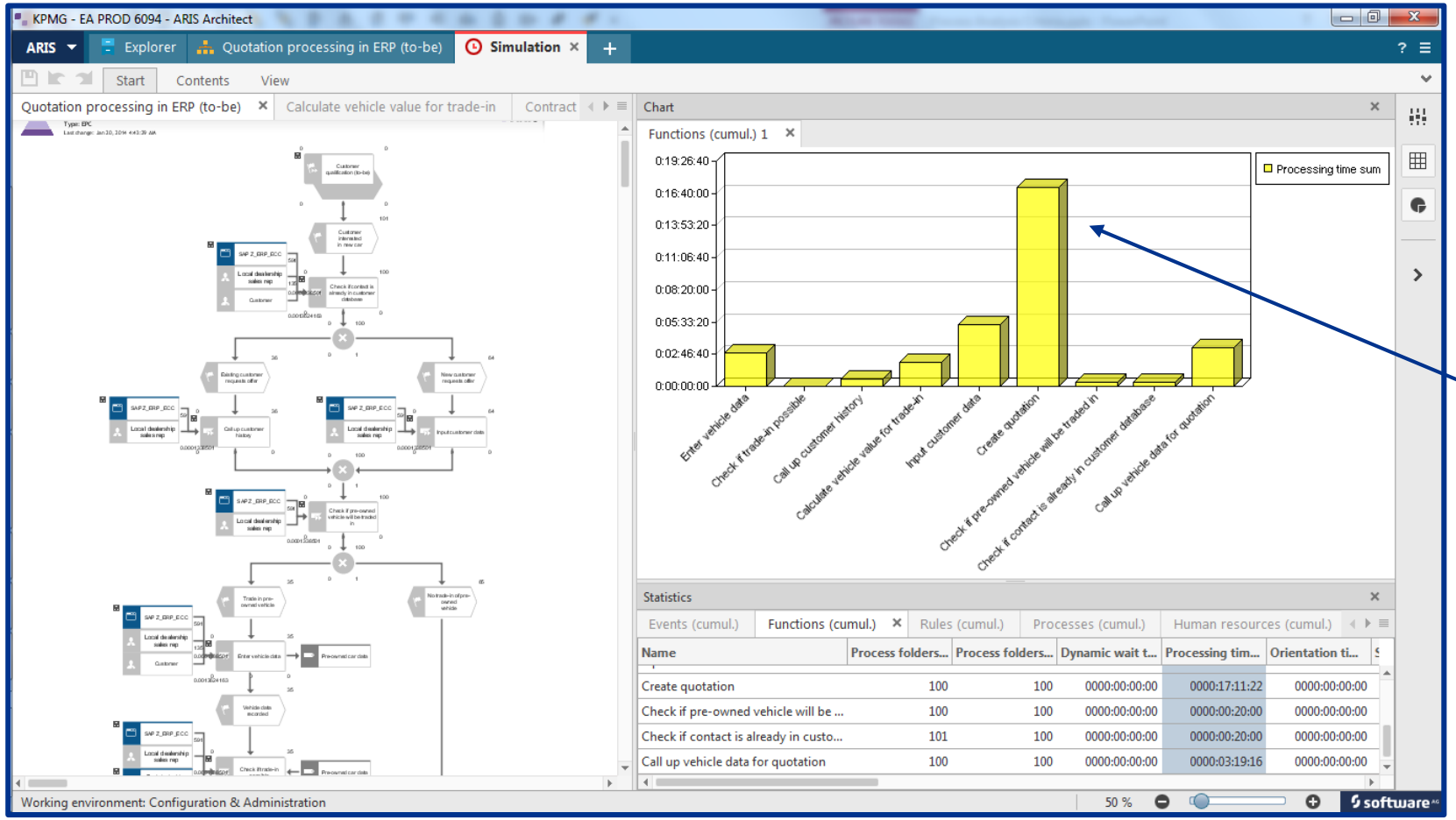


ARIS Process Simulation Example

Slide shows a sample process model in ARIS and indicates the type of process information required for simulation.



Process simulation results: Processing time of a particular statistical outlier



"Create quotation" seems to be a bottleneck.

Why?

- Not enough resources?
- Complicated process flow?
- Technology availability?

The simulation result triggers additional simulations with adjusted parameters

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Adjacencies & Accelerators: Ignite ➔ CCM + IPA

KPMG's AI Enabled Portfolio: KPMG Ignite

Ignite unlocks the value of AI by enhancing and accelerating our clients' long-term strategies for intelligent automation and cost management, growth and customer engagement, and risk and regulatory compliance.

KPMG Ignite includes methods, tools, approaches and resources that focus on improving the consistency, efficiency and time to make decisions and take action. In addition, we wrap this portfolio with highly-skilled resources who know apply relevant domain knowledge to leverage these capabilities and continue to innovate on emerging technologies.

KPMG Ignite Technology Ecosystem
An ecosystem of leading technology partners, like Google, that we utilize to build and deliver AI solutions

KPMG Ignite Platform
KPMG-built accelerators and patterns and tools that enable rapid AI solution development and delivery

KPMG Ignite Frameworks and Methods
A set of frameworks and methods that describe and guide how we approach client-specific AI solutions and make them repeatable.

KPMG Ignite Teams
Highly skilled resources that utilize the best tools and approaches to build AI solutions (tech agnostic)

KPMG Ignite Research, Innovation, Development
Ongoing testing, prototype development and innovation on emerging AI tools and approaches

Ignite

KPMG's portfolio of artificial intelligence capabilities

KPMG's Ignite: Cognitive Contract Management ("CCM")

KPMG's Cognitive Contract Management (CCM) solution uses modular artificial intelligence capabilities to ingest, analyze and automate decision making throughout the contract lifecycle.

Cognitive Contract Management provides flexible capabilities:

Read Documents
The ability to read/ ingest documents, such as contracts, invoices, amendments, price lists, catalogs, financials, etc.

Understand Information
NLP enables Cognitive Contract Management to understand the meaning of the text based on trained subject matter expertise.

Interpret Contract
Solution utilizes custom built assessment criteria using pre-existing policy, rules, regulations, and business objectives to extract information and transform it into a structured, enabled format.

Automate Decisions
Cognitive Contract Management is able to make decisions and provide answers to questions, produce insights, identify patterns and anomalies.

Ability to ingest thousands of contracts and perform database searches

Using client built and prefabricated business rules, quickly review current and new contracts to determine compliance to legal terms

Quickly perform analytics to identify and quantify commercial leakage across your contract library

Determine where unbalanced amounts exist and provide cognitive remediation recommendations

What type of contracts can KPMG CCM handle?

- KPMG CCM has already been leveraged to support leasing agreements, investment management agreements, commercial credit agreements, securities prospectus documents, services contracts, supplier contracts and more.
- KPMG CCM can be trained to handle any type of contract and customized to the specific objectives for extraction, comparison and compliance desired.

Robotics and Intelligent Process Automation (RPA/IPA)

What is Intelligent Process Automation (IPA)?

- IA can be defined as the combination of Artificial Intelligence (AI) technologies such as Natural Language Processing (NLP), Machine Learning (ML) and Machine Vision (MV) with Robotic Process Automation (RPA).
- The RPA based solutions involves automation of activities that are largely repetitive and rule based in nature. When combined with AI technologies, IA solutions (RPA combined with AI) can perform non-routine tasks that require intuition, judgment, or problem solving. These IA solutions can directly assist people in the performance of non-routine tasks or even automate those tasks entirely.

$152.7 billion

The global market for robots and artificial intelligence is expected to reach $152.7 billion by 2020. The adoption of these technologies could improve productivity by 30 percent.
Bank of America Merrill Lynch

55%

A recent study by HfS Research and KPMG LLP reports that 55 percent of North American enterprises are looking at new opportunities available with RPA systems.

Recent research from London School of Economics suggests a return on investment in robotic technologies of between 600% and 800% for specific tasks.

600% and 800% ROI

MarketsandMarkets estimates that the AI, or cognitive computing marketplace, will generate revenue of **$12.5 billion by 2019**

$14.9 billion

$1.7 billion

According to Quid, from 2010 to 2014, private investment in AI has grown from $1.7 billion to $14.9 billion, and was on track to grow nearly 50 percent year-on-year in 2015 alone.

Top 5

Gartner predicts that by 2020, smart machines will be a top five investment priority for more than 30% of CIOs.

McKinsey research suggests that smart robots will replace more than **120 million knowledge workers** by 2025.

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Use Cases

Use Cases and Benefits

Use Case	Description	Benefits
Process Discovery	Uncover what really happened, spot long runners and unusual process paths.	▪ Understanding process flows and deviations ▪ Happy-path flow versus manual interventions (non-touched orders) ▪ Root cause analysis for process improvements
Conformance Checking	Compare the desired process (to be) model against the actual process (as is)	▪ Global program template adherence ▪ Anomalies in the process flow (for Internal controls and Internal audit) ▪ Process standardization
Benchmarking	Compare processes between geographies and companies to improve performance	▪ Shared service center business process harmonization ▪ Scoping and targeting improvement programs ▪ Finance transformation and excellence
People Behavior	Insights into system usage behaviors and variances amongst teams	▪ Compare businesses to understand the differences in process execution ▪ Identify which teams are most productive and which interactions result in lost time or bottlenecks ▪ Analyze extent of source system usage
Dashboard & Monitoring	Customized and interactive KPI dashboards enables real-time analysis.	▪ Build process metrics and KPIs ▪ Performance insights and controls monitoring ▪ Real time assessment (with the right IT infrastructure)

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Case Studies

Claim Settlement Actions

Insurance Auto Physical Damage
Measuring Claim Settlement Effort Differences—and Associated Costs

Context / Client Challenge

The client sought to improve performance on vehicles repaired through their preferred body shop network.

Claims administration system log data was mined to understand claim settlement:

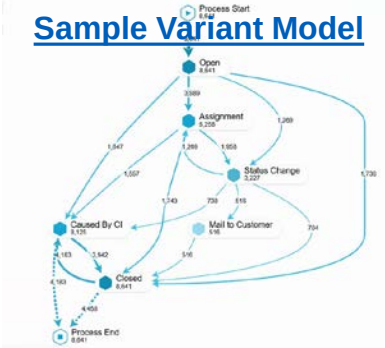
- Bottleneck and cycle time issues
- Common settlement pathways
- Variations from the “should be” process flows that the client derived through interviews with claims handlers and managers
- Cost to settle various types of claims, based on the:
  - ❑ Number and types of settlement actions needed
  - ❑ Time to complete each action
  - ❑ Staff level and associated resource cost of the actor, with management overhead

Approach

KPMG assisted the client to execute their first process mining project, including:

- Aligning system log data with real-world settlement actions
- Developing a cost model to quantify the resource-labor cost associated with each settlement action
- Examining cost and throughput differences in a variant model, which facilitated analysis of where—and how often—claim paths diverged

Sample Variant Model



Benefits

Insights helped the client to:

- Identify that 4 action types contributed >2/3rds of settlement effort costs
- Quantify LAE costs at the action-level, rather than allocating-down balance sheet values
- Analyze settlement costs by claim and policy holder dimension
  - ❑ Many low-cost claim types were labor intensive to settle (or vice versa), implying cross-subsidization
- Link claim settlement actions and sequences to customer service scores
- Identify new relationships between settlement actions and claim outcomes, while confirming several previously unverified suspicions
- Develop new analytics skills, ahead of the broader insurance sector

Document Intake and Management

Document Intake Process
Generating Process Efficiencies in Shared Services

Context/client challenge

- Production line issues in the document intake process – multiple entry points, stations, queues – resulted in process bottlenecks, increased cycle times, and higher resource costs
- Identifying major process improvement levers - effort/load distribution, shift patterns, number of queues and prioritization – by simulating multiple production line scenarios for each process variant
- Establish targeted benchmarks for end-to-end processing time
- Prioritize and sequence process improvement opportunities
- Develop roadmap to implement recommended levers across the DMS intake process

Approach

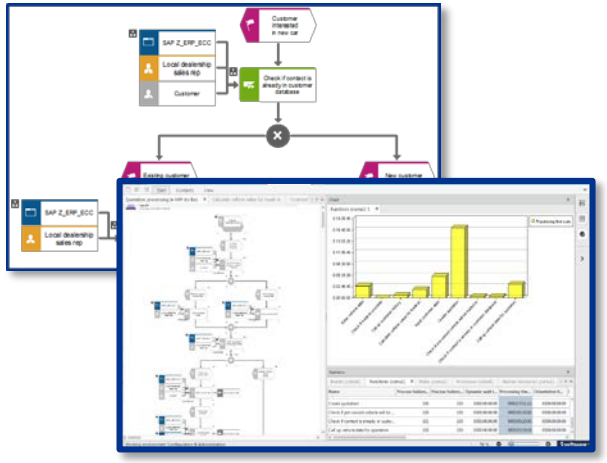
KPMG assisted the client to:

- Document current state processes including on-site interviews with process resources and documentation review
- Establish of benchmark process assumptions – such as cycle time and process path probability – for use in simulation modeling
- Simulate processes and test scenarios to identify process improvement opportunities
- Prioritize recommendations to improve processes
- Develop a roadmap to implement recommendations

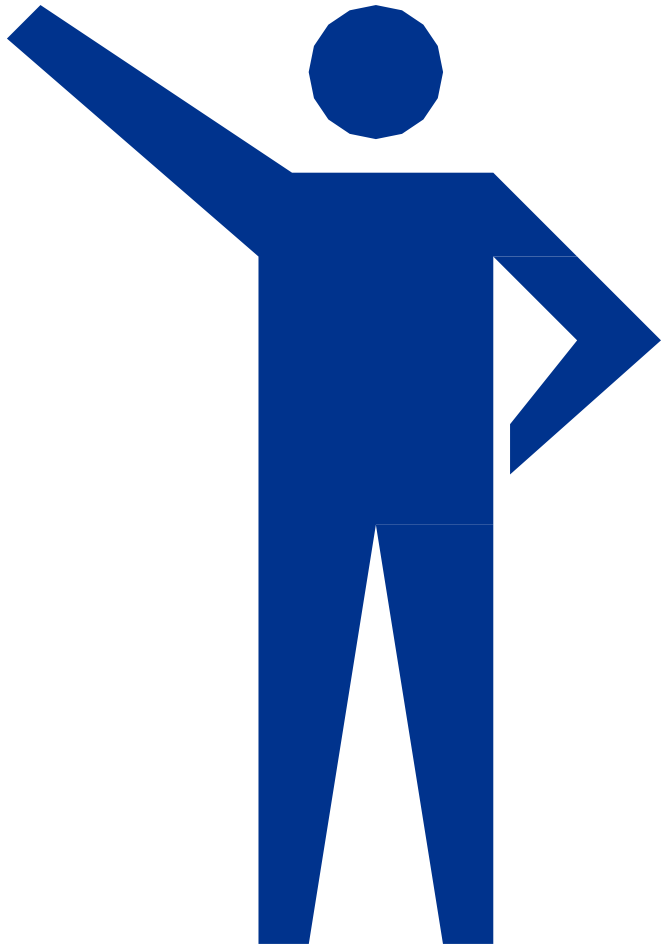
Benefits

Through process simulation the client is able to:

- Generate insights into process inefficacies such as bottlenecks, wait times, etc.
- Simulate scenarios to better plan and manage resources
- Reduce throughput time and costs



Questions?



Thank you

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KPMG Team

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Function and specialization

Scott is a principal in KPMG's advisory practice and focuses on the insurance industry. He is based in Hartford, CT and specializes in operational excellence, data analytics, pricing and product management

Education, licenses, certifications & professional associations

- B.A., Mathematics, State University of New York at Binghamton
- Associate, Casualty Actuarial Society
- Member, American Academy of Actuaries

Background

Scott A. Shapiro is a Principal in KPMG's Risk Analytics practice and leads the Risk Consulting practice for the Insurance industry. He joined KPMG in 2012 and is based in Hartford, CT. He has over 25 years of experience in both industry and consulting.

Professional and industry experience

Scott's focus is insurance operational and performance improvement in areas including data analytics and transformation. His client work focuses on process improvement, intelligent automation, predictive modeling, data validation and visualization, product management. Prior to joining KPMG in early 2012, Scott was Senior Vice President at The Hartford Financial Services Group, most recently responsible for Advanced Analytics and Product Development.

Throughout his career, Scott has held a wide variety of leadership roles and served clients in lines of business across P&C, Life and Annuity, including:

- Led an enterprise organization of 150 P&C and Group Benefit professionals in the advanced analytics and product function
- Lead partner for large United States insurer
- Designed and executed a $500 million intelligent automation cost take-out assessment roadmap.
- Led the major rewrite of a large insurer's small commercial product
- Senior Underwriting Officer for Consumer business of nearly $1 billion
- Regional VP accountable for all agency management, sales, underwriting
- Developed and delivered multi-year, multi-function pricing technology program
- Lead partner for a large self-insured for Workers Compensation reserve analysis, model enhancements and management reporting
- Assisted clients with building predictive models including: claimant large loss, BOP rating, small commercial workers compensation rating, HO by-peril rating, asbestos defense cost and indemnity, life wholesaler sales behaviour, and Universal Life mortality/surrender/premium
- Assisted hotel and airline travel company with loyalty program reserve estimation
- Assisted small commercial writer with advanced competitor classification pricing analysis
- Assisted large insurer in data scientist organizational job role development
- Evaluated the operating model for large global insurer's claim recovery unit including benchmarking, operating model, and dashboard development.
- Created KPI visualization dashboard for operational area of major global insurer
- Delivered IT readiness and change management program for predictive modeling implementation
- Automated data validation process for life insurer's UL AXIS conversion
- Assisted commercial insurer with process documentation, controls, SLAs, and scripts for end-to-end policyholder services

Technical skills

Predictive Modeling, Operational Process Improvement, Ratemaking and Reserving, Data Analytics, Customer Analytics, Product Development and Management, Field Operations, Managing Offshore Teams, Managing Technical Teams that use SAS, SQL, R, Python, Tableau, AXIS, ARIS

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Function and specialization
Tony advises clients on actuarial, insurance product and business process, analytics, data quality, technology, and due diligence issues.

Education, certifications & professional associations
- M.B.A., Marketing and Technology & Operation, New York University
- B.A. Mathematics and Economics, Boston College
- Fellow, Casualty Actuarial Society
- Member, American Academy of Actuaries

Background

Tony is a Director in KPMG's Actuarial practice with over fifteen years' experience in American and Australian financial services industries. He advises clients on actuarial, mathematical modeling, business process, analytics, data quality, regulatory change, credit risk, technology, financial reporting, controls, and due diligence issues leveraging actuarial, operations, finance, and IT teams.

Professional and industry experience

Tony has served numerous personal and commercial lines insurers, banks, and government agencies to improve actuarial and underwriting analytics.

Of particular relevance to this engagement, Tony has:

- Assessed a major New Jersey personal auto writer's readiness to convert to analytics-based pricing, and defined the fields to collect in a new policy administration system to facilitate model development
- Formulated a non-renewal strategy for a long-haul trucking specialty insurer, leveraging GLM models; management's original plan was to exit the class
- Following adverse auto reserve experience, led a gap assessment reviewing a Tier 1 US insurer's reserving and financial planning actuarial processes covering actuarial execution, data sourcing, supporting technology, and up/ downstream interactions. Subsequent analysis led to a new reference data architecture for the carrier.
- Investigated 3rd party datasets for commercial value, and developed related tools, including procurement, analytics testing, and tool use promotion. Led the development of personal auto quote-bind, claims identification, and management tools.
- Redesigned a major workers' compensation insurer's class code system to better align with emerging economic activity, including mapping policyholders to new classes, home office ratemaking, and transition rules to manage rate dislocation and other target segment management objectives
- Led actuarial pricing for a monopolistic workers' compensation carrier
- Developed Analytics Data Mart requirements for a major insurer's workers' compensation business to improve underwriting efficiency, speed, and consistency across lines.
- Evaluated TPA payment, case reserve, and closure data for a major workers' compensation insurer using a multi-state Markov Chain model to assess TPA performance, determined annual remuneration, and redistribute market share from poor performing to high performing agents
- Developed workers' compensation major claims models, leveraging specialized factors for brain, spinal cord, and burn injuries
- Assessed a major bank's cross-brand underwriting for consistency with strategy and Basel III requirements
- Tony began his career as a personal auto and umbrella underwriter and pricing actuary for Liberty Mutual

Jonathan Wong, Director

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Function and specialization
Jonathan is a member of the Actuarial and Insurance Risk Advisory practice specializing in insurance and reinsurance operations

Education, licenses and certifications
- MBA, Rutgers Business School
- BA, Temple University
- Associate in Reinsurance (ARe)

Professional and industry experience

Jonathan is a Director in KPMG's Actuarial and Insurance Risk Advisory practice with more than 14 years of business experience in the insurance industry. Over his career Jonathan has advised his clients to develop and execute transformation across the insurance value chain, and has recently focused on intelligent automation strategy and deployment. Prior to joining KPMG, Jonathan was a treaty reinsurance broker with Guy Carpenter.

Representative Experience

- Managed the US FP&A work stream of a $100m+ finance transformation project for a global life insurance company and identified opportunities for ~35% cost takeout through the implementation of new infrastructure, process optimization, and automation.
- Lead a global strategic planning project to develop a multi-year intelligent automation investment strategy which would result in an estimated $200m in operational efficiency, including the coordination of a global team in the Latin America, Europe, and Asia at an international P&C carrier.
- Managed a US team to establish and implement policy servicing standards and workflow for the Small Commercial division of a Global Insurer, including the on-boarding of a third-party who provided call center and triage services to policyholders and agents
- Developed performance analytic framework and implementation strategy to manage global salvage and subrogation efforts at an large P&C carrier
- Developed structural, resource, and process improvement strategies for an international insurer to guide a multimillion dollar investment in predictive analytic capabilities
- Lead an international project within a major global insurance carrier to transform internal reinsurance reporting processes, including the proof-of-concept build-out and testing of a proprietary reporting platform to replace legacy systems
- Assisted global insurance carrier to draft and implement underwriting, sales and marketing, and product development policies across multiple lines of business

Sophia Song, Sr. Associate

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Function and specialization

Sophia is a member of the Actuarial and Insurance Risk practice specializing in reserve analysis of loss and loss adjustment expense for personal and commercial insurance lines of business.

Languages

- English
- Mandarin

Education, certifications & professional associations

- BSBA in Actuarial Science, Insurance, Drake University
- CAS Exams 1, 2, 3F, 3L, 4C, CAS Course 1, CAS Course 2, 5, VEE credit

Background

Sophia is a Senior Associate in KPMG's Actuarial and Insurance Risk practice. She is trained professionally as a casualty actuary and has six years of experience in the insurance industry. She has strong technical and analytical skills with extensive education background in actuarial science, data analytics, and insurance. Prior to joining KPMG, Sophia interned for Iowa Insurance Division in Des Moines, IA – A state regulatory authority for the insurance industry in Iowa.

Professional and industry experience

Sophia has experience in financial reporting, data analytics, pricing and reserving for various property and casualty insurers. She has actively assisted in projects focused on financial risk management, actuarial modeling and model validation. She has also worked in cross-functional project teams involving internal audit strategic sourcing and investigation.

Actuarial Experience

- Performed loss and loss adjustment expense reserve analyses for personal and commercial insurance lines of business including primary insurers, re-insurers, and self-insured entities.
- Prepared Statement of Actuarial Opinion and supporting reports under supervision of managers.
- Assisted on Audit Engagements to review financial statements and assess reserve adequacy levels for a variety of entities including insurance companies.

Statistical Experience

- Performed extensive data quality reviews, data manipulation, and data integration for a variety of analyses.
- Retrieved data from various sources and performed statistical analysis and modelling to solve complex business problems.
- Performed peer-group benchmarking analytics.
- Modelled sensitivity tests to analyse the impact of favorable and adverse scenarios.
- Reviewed models to assess and further understand the data and give insight.
- Researched competitor information and analysed the impact on the business.

Technical Skills

- Microsoft Office, VBA, C++, R, SAS

Frankie T. Logan, Associate

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Associate Advisory

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Function and specialization

Frankie is a member of Financial Risk Management Risk Consulting specializing in Actuarial Data Analytics and Insurance.

Languages

- English
- Cantonese
- Mandarin

Education, certifications & professional associations

- Bachelor of Science – Risk Management – Actuarial Science Option, Pennsylvania State University
- Bachelor of Science – Economics, Pennsylvania State University

Background

Frankie is an associate in the Advisory Services practice with a focus in data governance, actuarial data analytics and insurance.

Professional and industry experience

Frankie has experience in data management, data mining, process mining and predictive analytic. With his background, Frankie has worked with companies to improve their data governance process, controls, business analytics, loyalty programs, and actuarial assumptions for insurance products. He has deployed different analytic techniques (e.g. random forests, gradient boosting machines, Generalized Linear Models, k-means clustering, and Markov modeling) to enhance the valuation assumptions for one of the largest Universal Life insurance blocks in the industry and future redemption assumptions for loyalty programs. He interacted directly with (and trained) client team members. Frankie's professional experiences include performing various data analysis and models development, such as:

Data Analysis and Visualization

- Perform exploratory analysis using R and SQL queries to provide insightful information such as trends to improve business decision making and predictive modeling
- Build visualization tools using R and Microsoft Excel to present findings
- Build quarterly reporting tools using Alteryx and Microsoft Excel VBA

Data Management

- Utilize SQL and R to clean and verify raw data containing financial and insurance data for modelling and predictive analytic use
- Build and validate data models utilizing SQL queries and R for further analytic uses
- Use Alteryx to develop key controls for SQL database to improve data integrity for business use

Technical skills

Microsoft Office, VBA, R, SQL, Alteryx

Thank you

Some or all of the services described herein may not be permissible for KPMG audit clients and their affiliates.

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