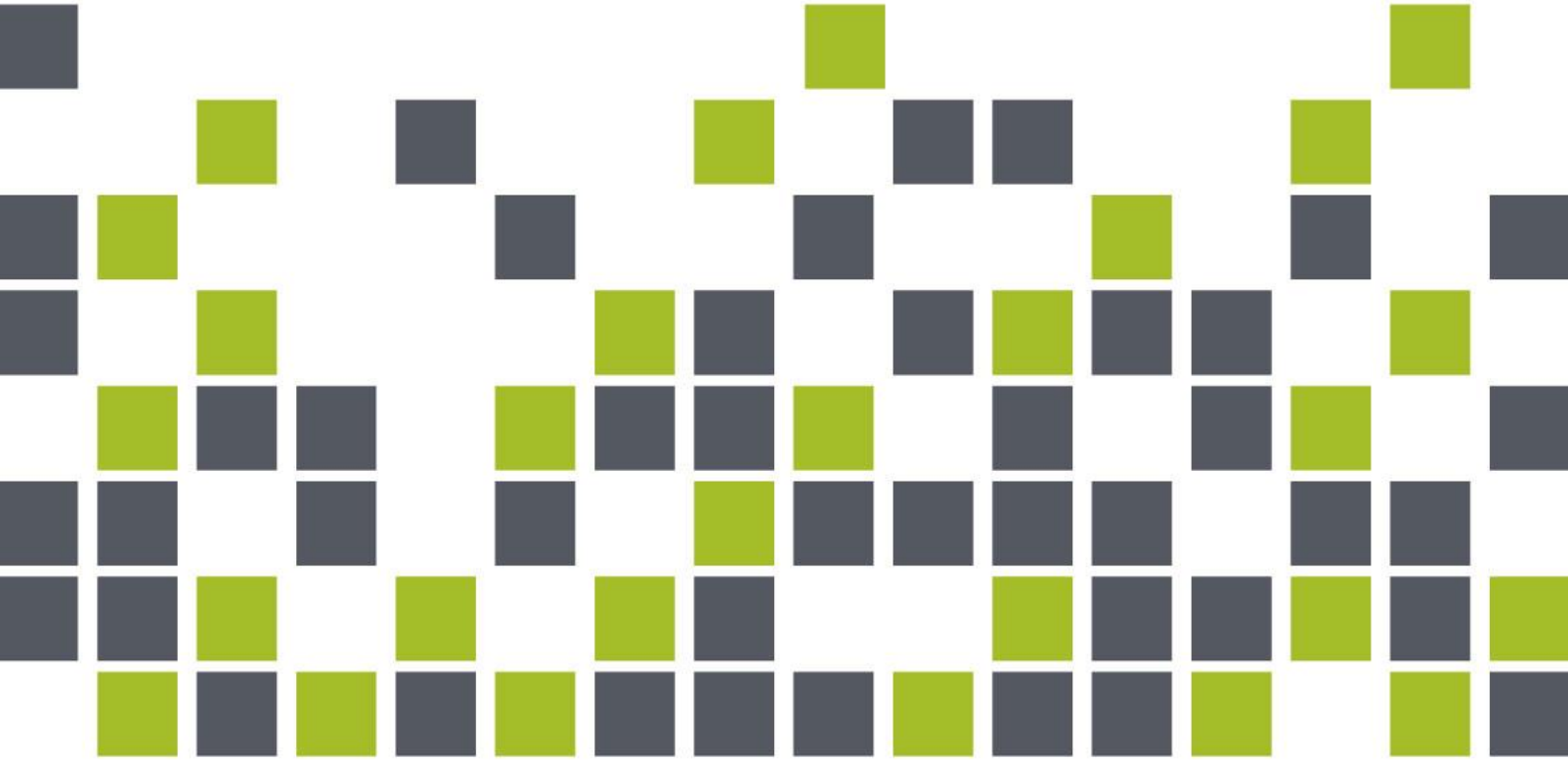
IDIOM
PURE DECISIONING

IDIOM Capability Statement

IDIOM Capability Statement with Supporting Customer Stories



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IDIOM Capability Statement

CAPABILITY STATEMENT

Core Competencies

- Leadership in the art and practice of decision analysis and design
- Experts in best practice decision design for many domains – insurance/finance (underwriting, rating, claims, credit risk, product rationalisation), health revenue and cost management, clinical pathways, logistics, central, state, and local government
- Architecture and design of decision centric systems and solutions for any domain
- Agile methodology experts for extremely rapid fabrication and delivery of light-weight, purpose specific business solutions
- Strong technical and development skills across both Microsoft and Open Source (Java) development platforms
- Web application design and delivery
- Large scale audit and remediation of application data
- Tool enabled transformation and migration services for legacy applications, including product and system rationalisation 'in-stream'
- Legacy system capability enhancement, and extension of system life, without major surgery on the target system through judicious use of IDIOM's plug'n'play technology
- AZURE [IaaS, PaaS, SaaS] development, deployment, and ongoing management of applications

Differentiators

- Author and exclusive owner of the IDIOM products: IDIOM Decision Manager™, IDIOM Forms™, IDIOM Document Generator™, IDIOM Mapper™, IDIOM Tracker™, IDIOM Decision Manager Workbench™ and the IDIOM Transaction Engine™
- The first (in 2001) to differentiate 'decisions' as a first-class business and systems requirements artefact, and to develop new analysis and development approaches, and supporting tools, based on this
- For over 16 years IDIOM has harvested the benefits of dozens of customer projects to develop, test, and refine decision centric development across many domains
- A global thought leader in development of the decisioning concept, with numerous articles published in the Business Rules Journal, The Data Administration Newsletter, and Modern Analyst, plus a strong global following on our Twitter identity, 'Intelligent Form'
- Pioneered the fusion of decision centric development with agile methodologies to derive outstanding business agility with even lower cost, risk, and time to develop

IDIOM CUSTOMER STORIES

Superannuation: Data Validation, Reporting, and Remediation

Client: [AUS] Superannuation Administrator, ~$63bn, ~1million members.

Situation: Client migrated to new administration platform 2008. Persistent data errors affected the Administrator's ability to administer the accounts. The situation became public and the Regulator was formally involved. After several years and several remediation attempts through multiple external consultants, the situation appeared to be intractable. IDIOM was approached by the Client to provide a solution. Work started Jan 2012.

Outcome: Within three months, IDIOM had developed ~200 validation rules and under separate agreement, had built a 'data validation and reporting platform', now the IDIOM Decision Manager Workbench [DMW]. The rules were developed by a single developer (Client anticipated 5 FTE on a permanent basis). The rules were run daily with outcomes captured into the DMW, which provided the feedstock for a comprehensive remediation workflow managed by Client SMEs. Within three months of going live, regulator signed off on all related issues. Entire process was completed and signed off within a single calendar year. The process now continues daily, taking approx. 2 hrs to validate the entire portfolio (including 1billion rows of GL data).

Relevance: Comprehensive data audit and remediation at scale, and as required by CPG235[1].

Products Used: IDIOM Decision Manager™, IDIOM Mapper™, IDIOM Decision Manager Workbench™.

Superannuation: Defined Benefit Scheme Recalculation

Client: [AUS] Superannuation Administrator, ~$63bn, ~1million members.

Situation: Approx. 65% of the portfolio is in a 35year old defined benefit scheme. The Trust Deed required a change to the DBS calculation. Because of previous data quality issues, the Client required an IDIOM recalculation of the fund entitlements to validate that the changes in the legacy system calculation were correct before the legacy system changes could be productionised.

Outcome: The existing platform only calculates entitlements from existing balances, which means an average calculation period of three months. The IDIOM team (of two) quickly replicated this calculation, however the IDIOM calculation was not able to reconcile the

[1] Refer http://www.apra.gov.au/CrossIndustry/Documents/Prudential-Practice-Guide-CPG-235-Managing-Data-Risk.pdf; also, IDIOM Whitepaper http://www.idiomsoftware.com/DOCS/Download/ce5e30f0-e6de-4b77-bfe3-766c28f395fc.pdf

starting balances. Eventually the team had to recalculate approx. 80% of the full 35year fund, unearthing a number of issues over the life of the fund.

The complexities involved in this project included:

- ✓ Poor source data quality, requiring management of data quality issues in the model when retrieving base source data (e.g. an employment terminated with no record of that employment ever commencing)
- ✓ A data migration from a prior system to the current legacy system had created a number of unresolved data integrity issues
- ✓ Calculations based on a Trust Deed that has been modified and added to over time, resulting in inconsistent definition of some apparently similar benefits that therefore need to be modelled differently to meet the interpretation of the exact wording of the Trust Deed
- ✓ Only 1 person with a strong (but still incomplete) level of knowledge of the calculations and supporting data required
- ✓ Working from 4 documents (combined total of approx. 600 pages) that provided only a high-level view of some of the calculations. These documents provided a small proportion of the detailed information required, and in some cases provided conflicting information
- ✓ Recalculating all member accounts "from scratch" – that is, from the commencement of their membership of the scheme, which for long standing members is in excess of 30 years.
- ✓ A long-standing member can have dozens of separate periods of employment service that need to be worked through for the "from scratch" calculation, as a new employment service period commences if the member changes role, employer, payroll, service fraction (part time work), leave without pay, temporary incapacity, permanent disability, deferral from the scheme, leaving the scheme, re-joining the scheme, etc.
- ✓ Reconciling model benefit calculations for members with the legacy system benefit calculations, and identifying potential issues with the legacy system calculations – compounded by the legacy system not adjusting for past "errors" as it always works from the last review
- ✓ Incorporating many historical changes in the scheme over the past 30 plus years – e.g. prior to a particular date a calculation is undertaken in a certain manner with a certain set of rates applicable, which is then changed a few years later (with potentially a different set of applicable rates), and changed again at a further later date. Some benefit calculations have up to 5 of these historical changes in calculation method that need to be catered for
- ✓ Incorporating regulatory changes that the scheme had to support over the past 30 plus years – e.g. changes in required or permitted employer and employee contribution rates and the flexibility of those, such as ability to voluntarily reduce contribution levels in certain circumstances
- ✓ Incorporating the acquisition and merging in of members from other schemes over the past 30 plus years – where in most cases members of those schemes have the rights to maintain the benefit structures and rules inherited from those schemes
- ✓ Special treatment for periods of employment service commencing or ending during a leap year

- ✓ Special treatment for periods of leave without pay, temporary incapacity, and permanent disability during the employment service of a member – each of these three treated differently to each other, and in some cases differently for the same item in different circumstances
- ✓ The indexation by either daily or quarterly CPI of certain calculation components and benefit calculations in some different circumstances – e.g. just for a certain period, or from the date of a certain event forward or backward in time, or for a certain event only when other specific conditions apply
- ✓ The splitting of many component calculations into "Pre-Scheme Date" and "Post Scheme Date" components based on different formulas and sub components that apply differently to all underlying factors (e.g. employment service) prior to the Scheme Date change, and post the Scheme date change
- ✓ The modification of many benefit calculations to utilise both the new "Pre-Scheme Date" and "Post Scheme Date" components, multiplied by other components that differ, based on whether they are "Pre" or 'Post"
- ✓ Projecting certain benefits forward to a member's retirement birthday as well as current or historical calculations
- ✓ In some calculations managing and dividing base data (e.g. employment service) into separate periods based on up to 4 variable dates (e.g. Scheme Date, Calculation "as at" Date, service threshold date, retirement birthday) with different calculation rules applying for employment service in each "Pre" or "Post" period for each potential date period
- ✓ Management and alignment of rounding precision that changed over time, with calculations often multiplying 6 figure components based on salary and using small percentages (~ 1%) as a part of a calculation that multiplies 5 or 6 numbers
- ✓ Several calculations having 5 or 6 high level components, with each of those components having 4 or 5 levels of sub calculations, with each of these sub calculations also having up to 5 or 6 components, giving rise to individual formulas that include more than 100 separate calculations
- ✓ Each member to be processed as above in less than 0.5 seconds, with substantial parallel processing supported

Relevance: Large scale recalculation, with significant calculation intensity. Calculation moved from a whole-of-system, multi-day batch process into a real-time transaction per member.

Products Used: IDIOM Decision Manager™, IDIOM Mapper™, IDIOM Decision Manager Workbench™.

Payroll: Termination Pay Recalculation

Client: [NZ] National Police Agency, approx. 10,000 members in scope.

Situation: Existing payroll system was reviewed to assess the correctness of termination pay and was found to have multiple systemic errors over a period of decades. Regulatory agencies required a recalculation and determination of per member adjustments for all members terminated between 1/4/2004 and 27/10/2011.

Outcome: Reprocessed all termination payments for people terminated in the relevant period to verify that they had been paid in accordance with the NZ Holidays Act 2003. Total remediation payout exceeded $40m. Per member reconciliation spreadsheets were produced to provide full transparency of the recalculation. The IDIOM solution is now used on a BAU basis to adjust each payroll calculation following initial processing by the (now replaced) HR platform.

To achieve these aims it was necessary to build a model that:

- ✓ Retrieved the required base source data from the Payroll System Database (e.g. Employment Details, Allowances, Payments Made, Leave Taken, LWOP Days etc.)
- ✓ Construct an intermediate data structure suitable for the analysis
- ✓ Calculate what the payments should have been and compare these with payments made
- ✓ Produce a report with references to the individual inputs and the intermediate calculated structures to provide a detailed audit trail to support remediation payments (or the lack thereof).

The complexities involved in this project included:

- ✓ The underlying payroll system had varying data quality, including inconsistent and irregular data (e.g. leave taken following termination)
- ✓ Data structures and database keys changing over time as systems migrated
- ✓ Running different Calendars for different parts of the country
- ✓ Data to be analysed reached as far back as 40 years
- ✓ All nuances in the Holidays Act over the full term including definitions of Base Rate, Ordinary Rate and Average Weekly Earnings
- ✓ Creating an intermediate data structure representing each day the person was employed, to be marked with the amount the employee was paid that day in aggregate, or if leave was taken
- ✓ Calculated TOIL and Special Care Cash Ups
- ✓ Calculated Annual Leave, Long Service Leave, Shift Workers Leave and Statutory Holiday pay outs
- ✓ Compared the Calculated Amount to the Amount Paid
- ✓ The Amount Paid was not uniformly found and needed to be located from different places depending on time period
- ✓ Tuning and parallel processing took this down to four hours in the final run, using data extracted from an Oracle Database and processed by six parallel run-time processes

Relevance: Complex data extraction and validation, followed by comprehensive system wide recalculation of all derived data – that is, a complete reconstruction of a complex payroll.

Products Used: IDIOM Decision Manager™, IDIOM Mapper™.

Payroll: Holiday Pay Recalculation

Client: [NZ] Multiple and ongoing, in partnership with a multi-national accounting firm.

Situation: Following the remediation described above, it became apparent that payroll systems throughout NZ were not calculating correctly according to the Holidays Act. In April 2016, the Government increased employer obligations to correct this, and penalties for failure accordingly. The labour regulator was further empowered and has issued a number of actionable enforcements.

Substantial numbers of NZ public and private agencies are affected, with audit and recalculation required to correct affected payrolls.

Outcome: Nine organisations with a total payroll of ~100,000 have been remediated using the IDIOM tools and approach to date. Many more are in the preliminary audit process with our partner. Eight different vendor payroll systems to date have been remediated.

Relevance: The approach is now being used at scale is to extract, validate, and transform data from various source payroll systems into a proprietary IDIOM format. The standard IDIOM Holiday Pay recalculation is then used to recalculate the transformed data. This demonstrates IDIOM capability to transform multiple disparate data streams into a common format for processing by standard decision models, thus providing the basis for large scale application transformation and migration.

Products Used: IDIOM Decision Manager™, IDIOM Mapper™.

Life Insurance: Underwriting and Claims Management

Client: [NZ] Tier one NZ life insurer.

Situation: The life insurer was a start-up that first registered April 2011. They had purchased and implemented a 'best in class' Policy Administration System [PAS]. The PAS did not support the Client's underwriting principles and practices, and had no claims process. Client approached IDIOM to provide underwriting support as an integrated but discrete after-market add-on to the PAS, followed by a Claims process.

Outcome: Within 8 weeks of initial contact, the IDIOM application was capturing and processing Client applications for insurance, through to and including producing Client documentation. This application is Azure cloud based [IaaS]. At first this was in stand-alone mode (i.e. manual take-up to the PAS) pending PAS integration capability. Over a period of years IDIOM assisted the PAS vendor with development of appropriate integration end-points, so that now the two systems are fully integrated. Third-party OCR is also integrated to provide digital versions of hand-written applications. All underwriting and claims currently use the IDIOM applications in collaboration with the PAS. Client was second in market by premium income by the end of their second year.

Relevance: IDIOM rules and forms manage critical life-insurance processes for this Client, including underwriting and claims. Total concurrent users (predominantly underwriters) is in the hundreds.

Products Used: IDIOM Decision Manager™, IDIOM Forms™.

P&C Insurance: Quote and Bind for High Value, Complex Risks

Client: [AUS] Australian operation of a major multi-national insurer.

Situation: The insurer has a large portfolio of tailored insurance products for high value/ complex insurance risks (for instance, industrial special risks covering up to thousands of sites, large fleets, complex industrial liability products, etc). Previously, these were managed on increasingly large and complex spreadsheets, which were proving increasingly difficult to version and manage across hundreds of active underwriters. Over a period of a decade, the Client investigated potential technical replacement strategies. As an existing IDIOM Client, IDIOM was approached to assist in resolving this seemingly intractable problem.

Outcome: IDIOM developed a bespoke container application to manage its IDIOM Forms and IDIOM Decision Models at scale. This container application is agnostic to the policy data, and to the forms and rules within it, providing significant insurance product agility going forward. This capability was described by the project sponsor as 'nimble, perpetual, and continuous'. The scale of the schema, form and rules that lay at the heart of the solution is comparable with a more traditional application in its entirety. Some relevant statistics indicating this scale include:

Total 'Lines of Code' (Java) for rules generated by IDIOM Decision Manager: 13,198,150

Number of nodes in the underlying XML schema:	2669
Number of discrete Panels (tabs) viewable in the Forms:	44
Number of rules events** defined in the forms:	592

** A rules event is an exit point in the form where all rules are run to validate data, calculate new values, and to adjudicate and control workflow.

Despite its size and complexity, the form is fast to use and popular with its multi-hundred user community.

Relevance: This solution became the design model for the IDIOM Transaction Engine [ITE], which is a best-in-class generic application container. The ITE provides a secure, highly scalable, permanent execution framework for the IDIOM business products, including decision models, forms, and business documents. When populated with these components the ITE offers a complete business application.

Products Used: IDIOM Decision Manager™, IDIOM Forms™.

P&C Insurance: Central Rating Engine

Client: [AUS] Australian operation of a major multi-national insurer.

Situation: The insurer required a rules engine to underpin a central rating service for their core product platform. Multiple approaches to the market were used to identify the best available.

Outcome: IDIOM was approached for supply of its Decision Manager product in 2002. The product was purchased in competition with the top-rated candidates available at the time. The product was used successfully on a project basis until the Client went back to the market in 2012 with a third-party assisted global market search. Again, IDIOM was the preferred product. Following re-commitment by the Client, IDIOM Decision Manager became a core technology and is now used as the rating engine for all household and commercial products, with additional product lines now being converted to the 'IDIOM powered' central rating service. The product is also used by the insurer for rating domestic products for a major bank under a technology sharing arrangement.

Relevance: The IDIOM Decision Manager is the preferred solution for core rating services for a tier one Australian insurer. By virtue of the selection process, IDIOM Decision Manager has been validated as a 'best of breed' solution.

Products Used: IDIOM Decision Manager™.

Government: Application to Manage Concession Entitlements

Client: [AUS] Australian State agency responsible for paying concessions and other social allowances to its beneficiary clients.

Situation: The agency had contracted in 2009 for supply of a system to acquire and validate data, calculate concession entitlements, and make payments in accordance with State Government policy. In 2015, after 6 years and spending ~twelve times the original quoted amount, the program was abandoned and written off. IDIOM was approached to 'start again' with a contract signed 24th March 2016, unknowingly and coincidentally at the same price as the original (2009) quoted amount.

Outcome: IDIOM developed and applied its IDIOM Transaction Engine technology, supported by IDIOM Forms and Decision Models. Developed in 100 days, and in accordance with the original budget, the first tranche of beneficiaries were paid in August 2016. The system is currently undergoing staged upgrades to further automate the agency's operations.

Relevance: This example demonstrates the ability of the IDIOM approach to meet delivery objectives that could not be achieved using more traditional approaches.

Products Used: IDIOM Decision Manager™, IDIOM Forms™, IDIOM Transaction Engine™

P&C Insurance Broker: Direct to Consumer, Full-Cycle Insurance Channel

Client: [NZ] A new entrant to the NZ market now a registered broker, proposes to distribute relatively simple commercial insurance products from multiple insurers 'direct to consumer'.

Situation: Client has one carrier signed for 5 products, and others waiting for go live. Client was looking for a technology partner who would share business risk.

Outcome: IDIOM developed and applied its IDIOM Transaction Engine technology to build a 'direct to consumer' cloud based insurance sales and administration system. Includes multi-insurer quote, bind, mid-term adjustments, renewal, cancellation, first notice of loss. All

customer documentation, including emails and policy documentation, is produced by the IDIOM Document Generator. Real-time integration with multi-mode payment system and insurer systems is included. Additional reconciliation bordereaux produced monthly. System is currently pending UAT – for the sake of clarity, this system is not currently live.

IDIOM will operate the platform on a Software-as-a-Service basis.

Relevance: The IDIOM Transaction Engine is a candidate for open internet, direct to consumer use.

Products Used: IDIOM Decision Manager™, IDIOM Forms™, IDIOM Document Generator™, IDIOM Transaction Engine™.

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