Biarri
SMART TOOLS

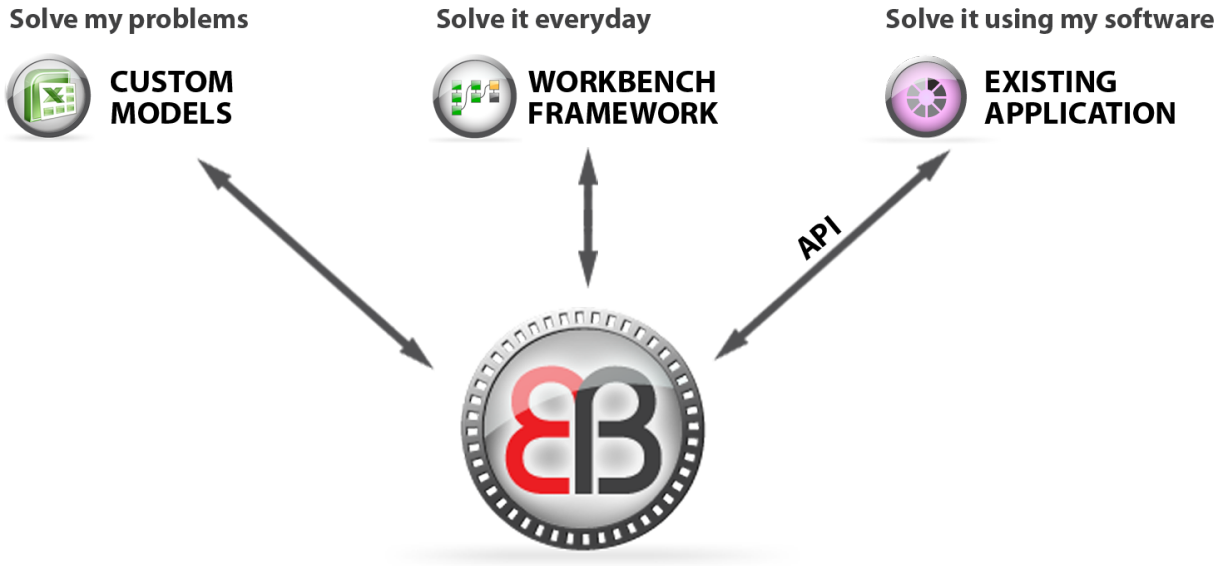
Appendix: Biarri Overview

Commercial Mathematics

Biarri is an Australian owned and operated company that was established in 2008 to help businesses operate more efficiently and profitable. We provide business analytics and optimisation tools for a variety of applications.

Biarri uses the latest operations research methods to solve complex business problems and deliver value to our clients. Operations research is a scientific basis for better decision making and includes mathematical modelling, statistics, optimisation and simulation to help you achieve your business goals.

The Biarri team has the right mix of analytical, business and technical skills and experience to develop solutions for complex real world problems. Please feel free to call our team anytime to discuss your problems and needs.



Biarri's Tools and Custom models

Custom models

We provide quantitative analytical services and develop custom models for specific business problems.


Demand Forecasting


Inventory Management


Profit portfolio


Logistics Network


Fibre Optic Network


Terminal Simulation


Profit Optimisation


Field Force Scheduling

Tools

The Workbench provides web based optimisation tools which solve a range of planning and scheduling problems. A linear workflow provides easy access to the power of the engines.


Geocoding


Travel Time Calculator


Vehicle Routing


Vessel Packing Tool

Description

Custom Model		Description	Input	Engine	Output
	**Demand Forecasting**	This spreadsheet model applies a range of techniques to forecast future demand based on historical demand.	✔ Historical demand by item and time period	✔ Objective time series forecast techniques	✔ Forecast of demand by item and time period
	**Inventory Management**	This spreadsheet model allows you to perform demand based, inventory calculations for individual stock lines to optimise inventory management across large sets of SKUs	✔ Forecast demand by item and time period ✔ Stock holding and policy parameters	✔ Fixed replenishment quantity methods	✔ Target stock holdings ✔ Replenishment plan
	**Profit portfolio**	This spreadsheet model selects the portfolio of projects for a given budget that maximises total benefit considering both financial and non-financial criteria	✔ Candidate projects ✔ Costs, benefits, criteria and weightings ✔ Budget	✔ Portfolio optimisation (stochastic knapsack)	✔ 'Best' profit portfolio Cost and benefit contribution by project
	**Logistics Network**	This spreadsheet model optimises the cost of transporting and storing product in an end-to-end logistics network	✔ Products to be moved ✔ Locations (e.g. suppliers, warehouses, customers) ✔ Transport modes and rates	✔ Network flow optimiser minimizes network costs	✔ Transport services ✔ Product flow over time ✔ Storage usage ✔ Costs
	**Fibre Optic Network**	This engine is used to design an optimised cable network for a specific geography using a given reference architecture	✔ Reference architecture (engineering standard) ✔ Target geography (GIS data for the candidate network)	✔ Network design optimiser minimizes construction cost and design effort	✔ Fibre network layout ✔ Feasible and optimised network
	**Terminal Simulation**	This SimPy model is used for evaluating operations at terminals using detailed simulations of terminal dynamics	✔ Terminal network structure ✔ Costs, rules and volumes ✔ Event distributions	✔ Discrete event simulation	✔ KPIs and log of events over time ✔ Graphical network schematic
	**Profit Optimisation**	This spreadsheet model allows transport companies to optimises profit by balancing operational costs, capital expenditure and revenue	✔ Volumes ✔ Pricing ✔ Opex and Capex costs	✔ Multi dimensional profit optimisation	✔ Calculated margin ✔ Transport usage ✔ Equipment requirements over time
	**Field Force Scheduling**	This tool is used to prepare optimised schedules for a mobile workforce to meet service level requirements given many constraints and preferences	✔ Visit times, locations and skill requirements ✔ Work rules ✔ Staff preferences ✔ Spatial data	✔ Mininum cost routes to cover all required visits	✔ Optimised visit schedules ✔ Detailed driving routes

Workbench Tools		Description	Input	Engine	Output
	**Geocoding**	Calculates latitudes and longitudes for multiple street addresses	✔ List of street addresses	✔ Calculates spatial coordinates	✔ Latitude and longitude for each address
	**Travel Time Calculator**	Bulk time and distance calculation of shortest path routes between many pairs of locations	✔ A set of locations (lat/long coordinates)	✔ Calculates shortest path based on time	✔ Travel times (in seconds) ✔ Distance (in metres) ✔ Route
	**Vehicle Routing**	Generates optimised vehicle tours to carry shipments	✔ Orders ✔ Locations ✔ Travel times ✔ Vehicle fleet	✔ Vehicle tour generation to include all loads	✔ Individual vehicle tours ✔ Shipments ✔ Routes
	**Vessel Packing**	Load planning tool for RORO vessels with an imbedded load optimisation engine	✔ Vehicles to be loaded ✔ Deck configuration	✔ Packing optimisation engine	✔ Optimised vehicle load plan

The Team

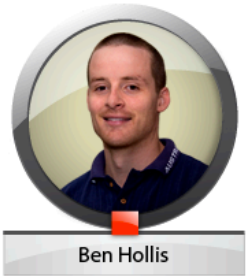
When co-founders Joe Forbes and Ashley Nelson set up Biarri, their aim was to make operations research available to more businesses. To do this they put in place a team of experts including mathematicians, computer scientists, designers, industry and commercial specialists, developers and analysts. The Team has the right mix of commercial, analytical and technical skills that are required to develop easy-to-use, affordable and powerful optimisation tools. The Biarri team includes:

Ash Nelson

FOUNDER/DIRECTOR
- Commercial and Business Consulting
- Bachelor of Commerce. ACA

Andrew Grenfell

CHIEF TECHNICAL OFFICER
- Modelling, Design and Development
- PhD



Ben Hollis

OPTIMISATION EXPERT
- Modelling, Design and Development
- PhD (in progress)

Bonnie Douglas

OPTIMISATION CONSULTANT
- Modelling and Consulting
- MBA

Joe Forbes

FOUNDER/DIRECTOR
- Sales and Business Consulting
- MBA

Loki Davison

COMPUTER SCIENTIST
- Design and Development
- Bachelor of Computer Science (Honours)

Michael Forbes

OPTIMISATION EXPERT
- Consulting
- PhD

Sebastian Bourges

ART DIRECTOR
- Design and Development
- Bachelor of Industrial Design

Chris Forbes

OPTIMISATION CONSULTANT
- Modelling and Planning
- Bachelor of Science (Mathematics)

Steven Donaldson

OPTIMISATION CONSULTANT
- Modelling and Planning
- Bachelor of Mathematics

Daryl Bruce

ANALYST
- Modelling and Planning
- Bachelor of Applied Science (Mathematics)

Eugene Wilson

ANALYST
- Modelling and Planning
- Bachelor of Applied Science (Mathematics)

Wenqi Hu

OPTIMISATION CONSULTANT
- Modelling and Consulting
- Master of Eng Sc

Nick Vaskrsic

ANALYST
- Modelling and Planning
- Bachelor of Applied Science (Mathematics)

David Petty

ANALYST
- Modelling and Planning
- Bachelor of Mathematics

Experience

Biarri's customers include Australia Post, Schweppes Australia, QR National Coal, Queensland Cotton, Primary Healthcare, KPMG, Pacific National, Boral, Tyco and Department of Defence. Some of our recent projects include:

Daily Delivery Planning

- Biarri has a long term contract to provide a managed service for daily planning and optimisation of beverage delivery in Melbourne, Sydney, Brisbane and Perth.
- Biarri receives daily delivery requirements and produces optimal vehicle routes and delivery orders to minimise vehicles required and kilometres travelled, while taking account of delivery time windows, truck type and capacity, driver shifts
- Outputs include detailed driver sequences and driving instructions, warehouse picking information and KPI reporting

Business Profit Modelling

- Biarri developed a complex business model which balances revenue, opex and capex and examines equipment usage over time
- Long term planning and yield optimisation – asset allocation and contract structuring
- What is the cost to serve and therefore what contract price should be offered? What are the implications of certain business decisions or changes in the operating environment?

National Ne twork Design - Commodities

- Biarri was engaged to develop a strategic network optimisation model to provide optimal (lowest cost) transport network structures
- Commodities produced in regional QLD and NSW and shipped to ports in Brisbane and Melbourne
- Intermediate storage of various types and harvests which vary wildly according to seasonal rainfall
- Where to site warehouses and how to size them? How to exploit "free" storage at gins? What transport modes to use (road vs. rail)?

National Network Design – Manufactured Products

- Flow of products from plant to end customers, via warehouses and local depots
- National multimodal model – road, rail, 3rd party
- Supply chain, with time dimension and transport and handling costs
- Model the baseline by using the amounts actually moved as arc capacities

Courier Routing Optimisation

- Sydney courier routing optimisation project
- Complexities driven by corporate acquisitions, product spoil and pick-up availability windows
- Identified 30% savings by redesigning territories and optimising routes using Biarri's PANDA – Pick-Up and Delivery optimisation engine.

National Transport Fleet Rationalisation

- National Fleet of Transport Equipment across many depots and usage points
- Complexities driven by competing demand, poor national demand planning and co-ordination and many local surpluses
- Biarri equipment rationalization modelling identified a pooling strategy to satisfy consistent demand with 15% less equipment holding requirement across the organization.