



RAIL INDUSTRY SAFETY AND STANDARDS BOARD

Delivering the Australian Rail Risk Model (ARRM)

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IRSC

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A brief introduction to RISSB

- A non-profit company established in 2007 by the ARA.
- SDAC (formerly ABSDO) accredited to produce Australian Standards.
- 100% owned by the Rail Industry.
- Government / industry funded.
- Responsible for the Australian Codes of Practice (ACOP).
 - Standards, Codes of Practice, Safeworking Rules (ANRP) and Guidelines – developed by industry, for industry.
- RISSB Standards are free to members.

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Why do we need decision support tools?

- Our brains are HOPELESS at decision making !!!
- We're vulnerable to:
 - Several types of bias:
 - Decision making, belief, and behavioural (eg confirmation bias, illusory superiority, availability heuristic)
 - Social (eg Dunning–Kruger effect)
 - Memory (eg Hindsight bias)
 - Logical fallacies (eg Argument from personal incredulity)



An experiment

Sound 1 & 3

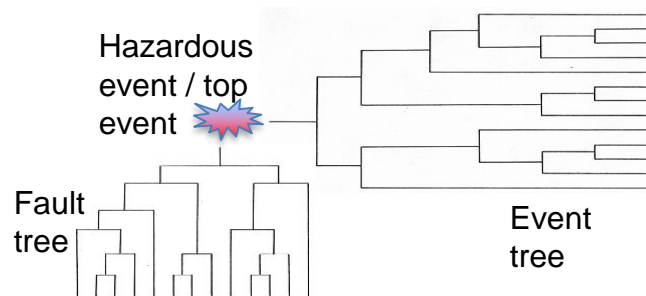


Sound 2



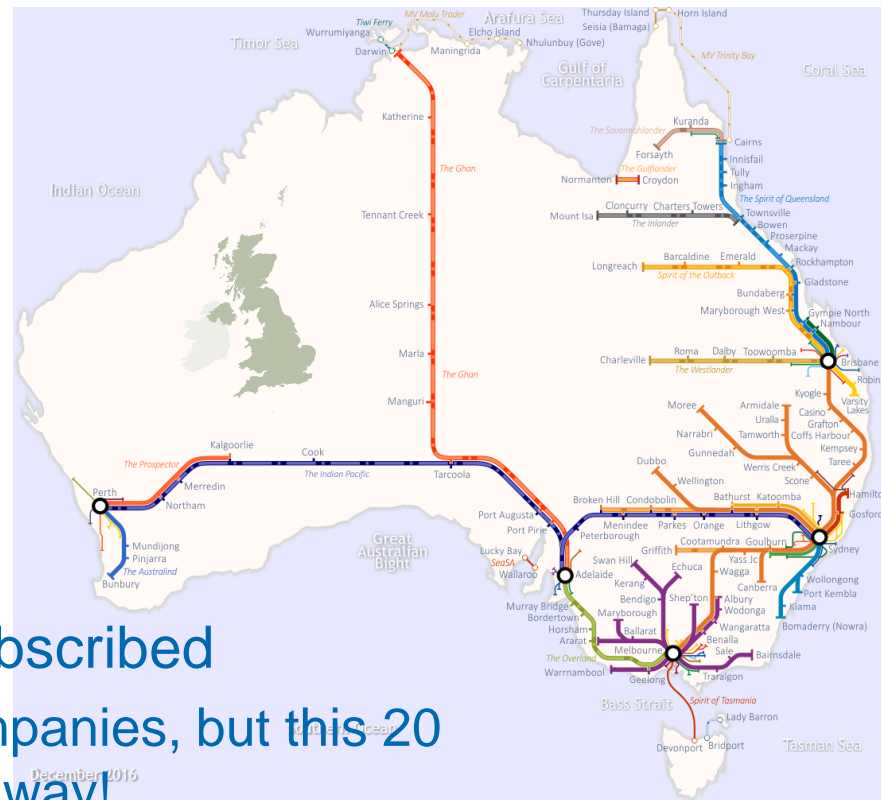
RISSB's ARRM

- An objective, quantitative tool that will soon provide industry with a deep, robust and comprehensive picture of safety risk.
- It will be primarily used by Rail Transport Operators to:
 - help understand their current safety risk, and
 - to benchmark their safety risk performance against other RTOs.
- ARRM consists of:
 - a risk model in the form of Hazardous Events, Fault Trees and Event Trees, and
 - estimates of frequency, probability and harm for events and consequences.



RISSB's ARRM

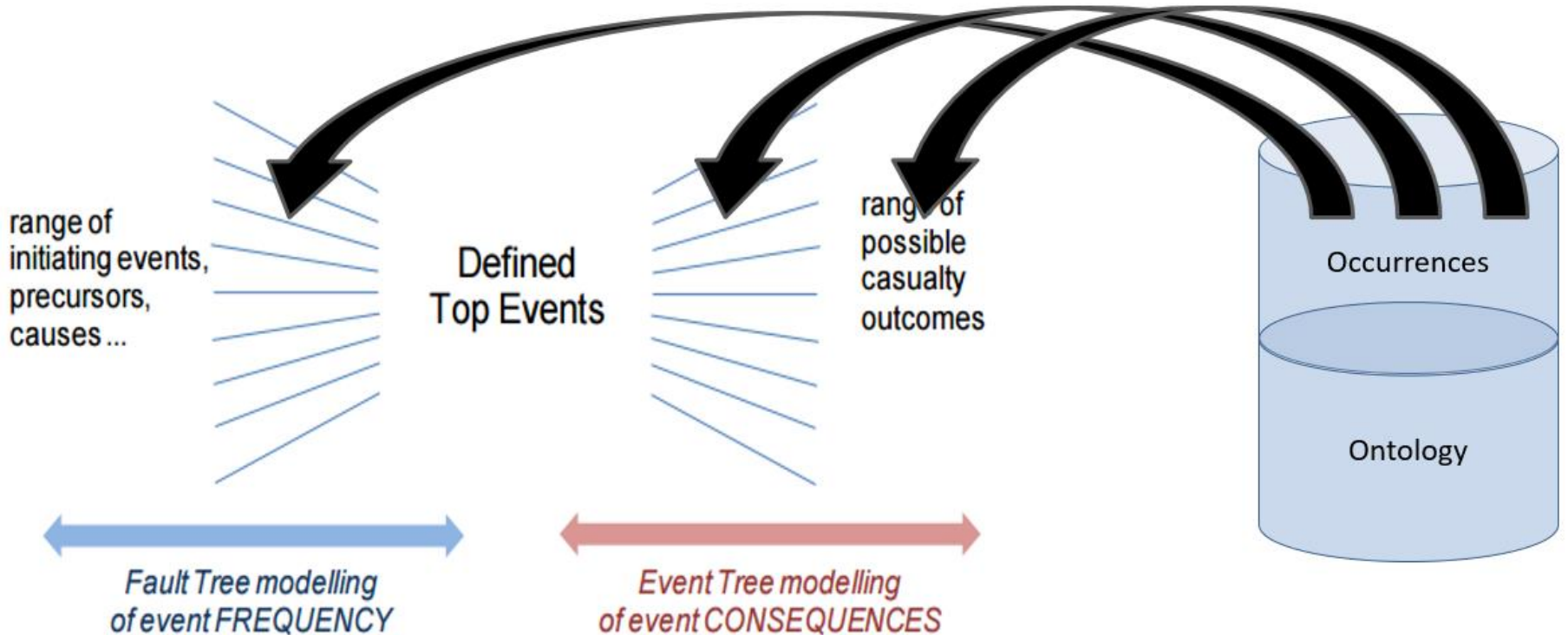
- A long time in the making
- c12 months in production
- Non-mandated
- > 20 organisations voluntarily subscribed
 - Australia has nearly 200 rail companies, but this 20 represents nearly 95% of the railway!
- Consultative (more than 100 industry experts engaged)
- Very positive feedback at UAT
- Launch at AusRAIL (Australasia's largest rail conference / exhibition) next month



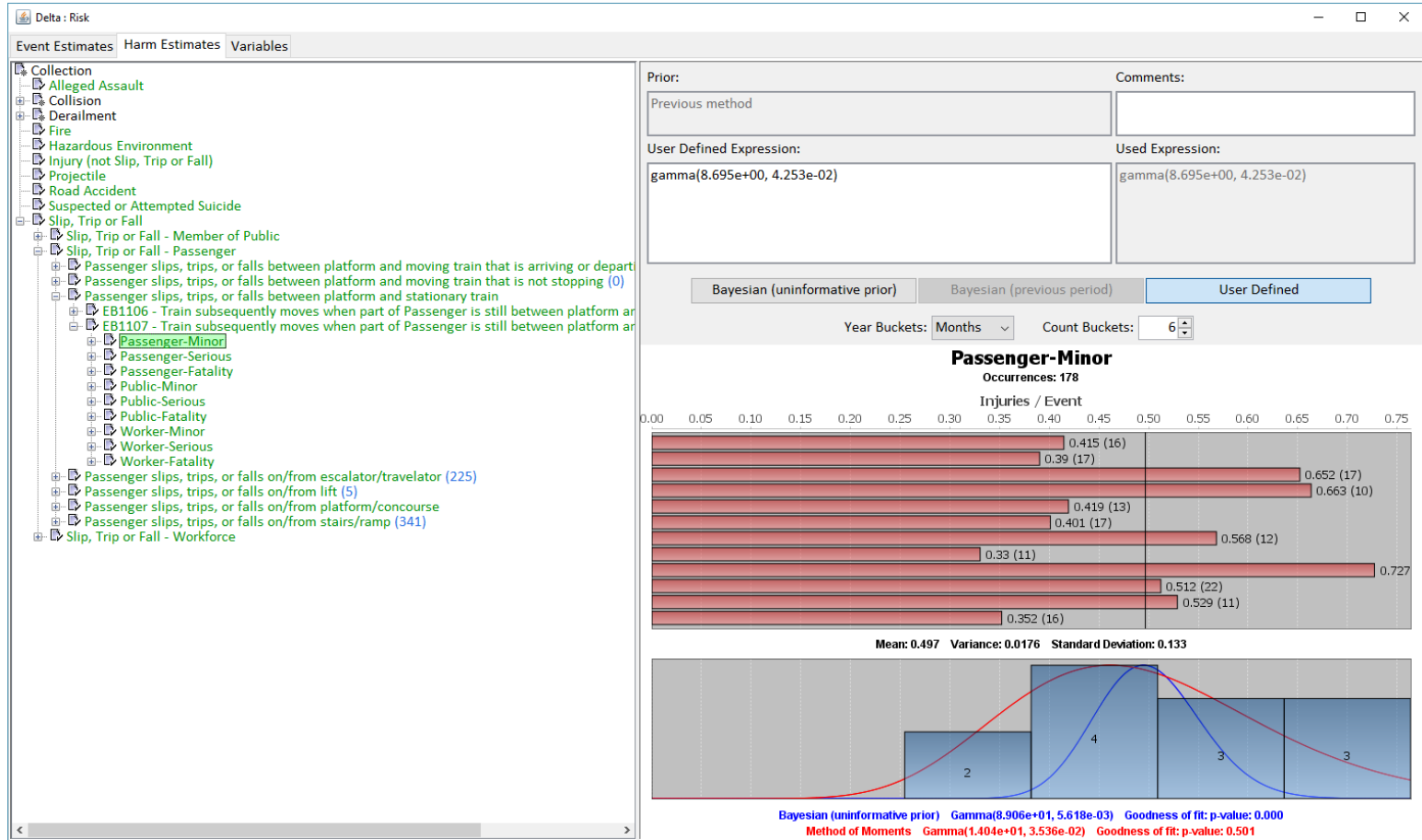
ARRM information

- ARRM risk estimates are expressed as FWI/yr, with information on uncertainty.
- ARRM risk estimates are based on actual occurrence data supplied by RTOs, including the occurrence data RTOs supply to ONRSR. As well as expert judgement where required.

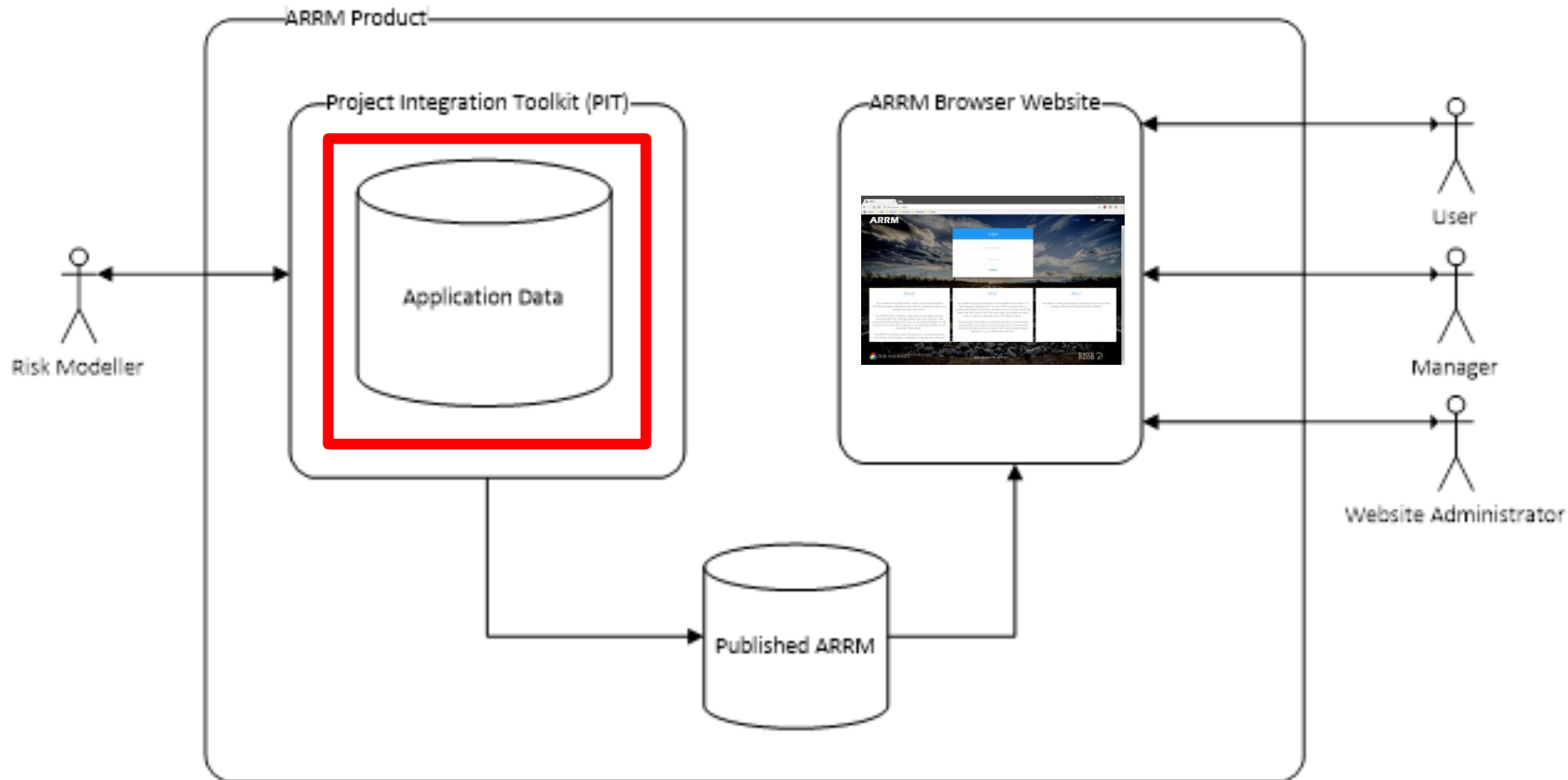
ARRM information



ARRM information (harm estimates – also frequency and probability)



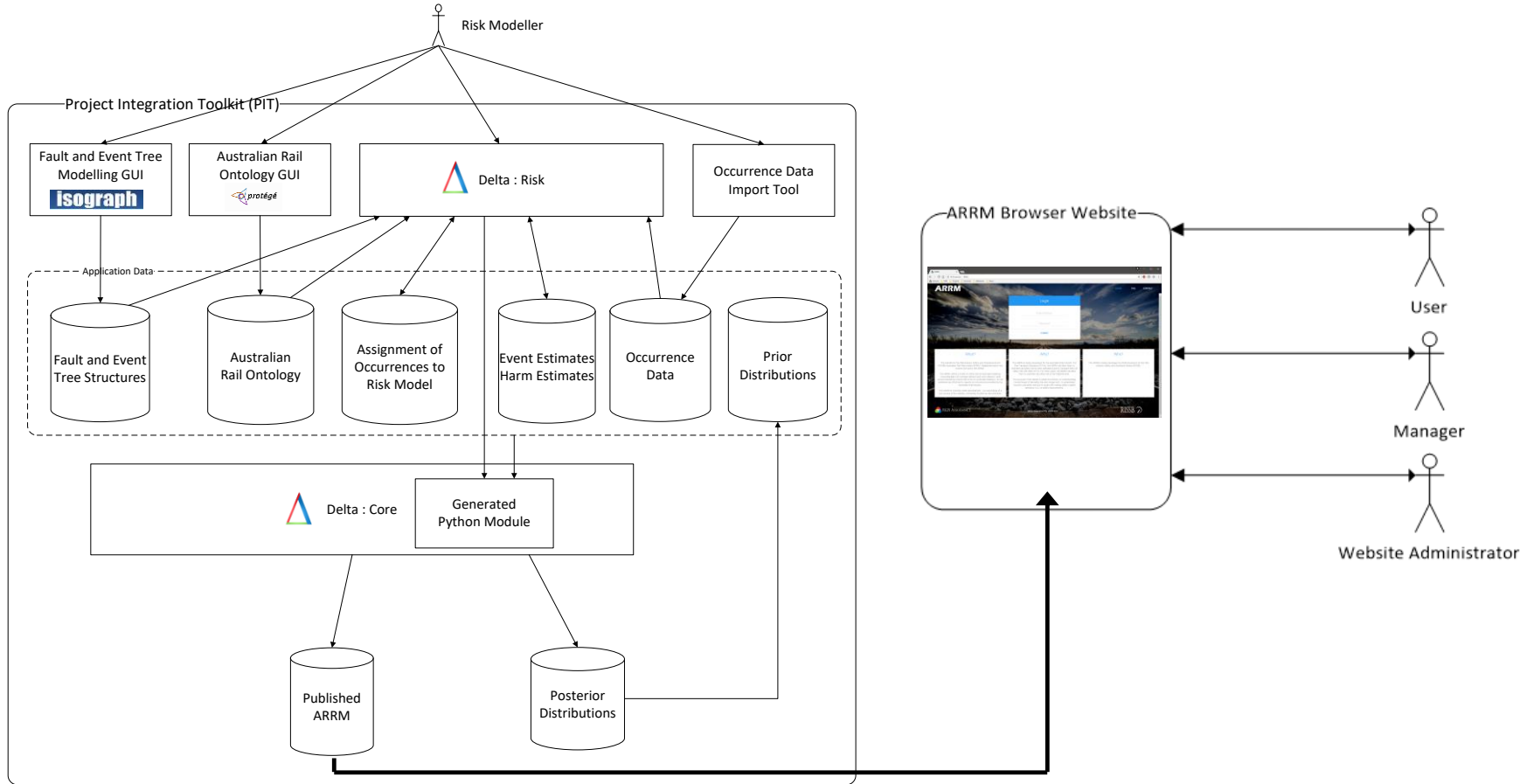
ARRM Architecture



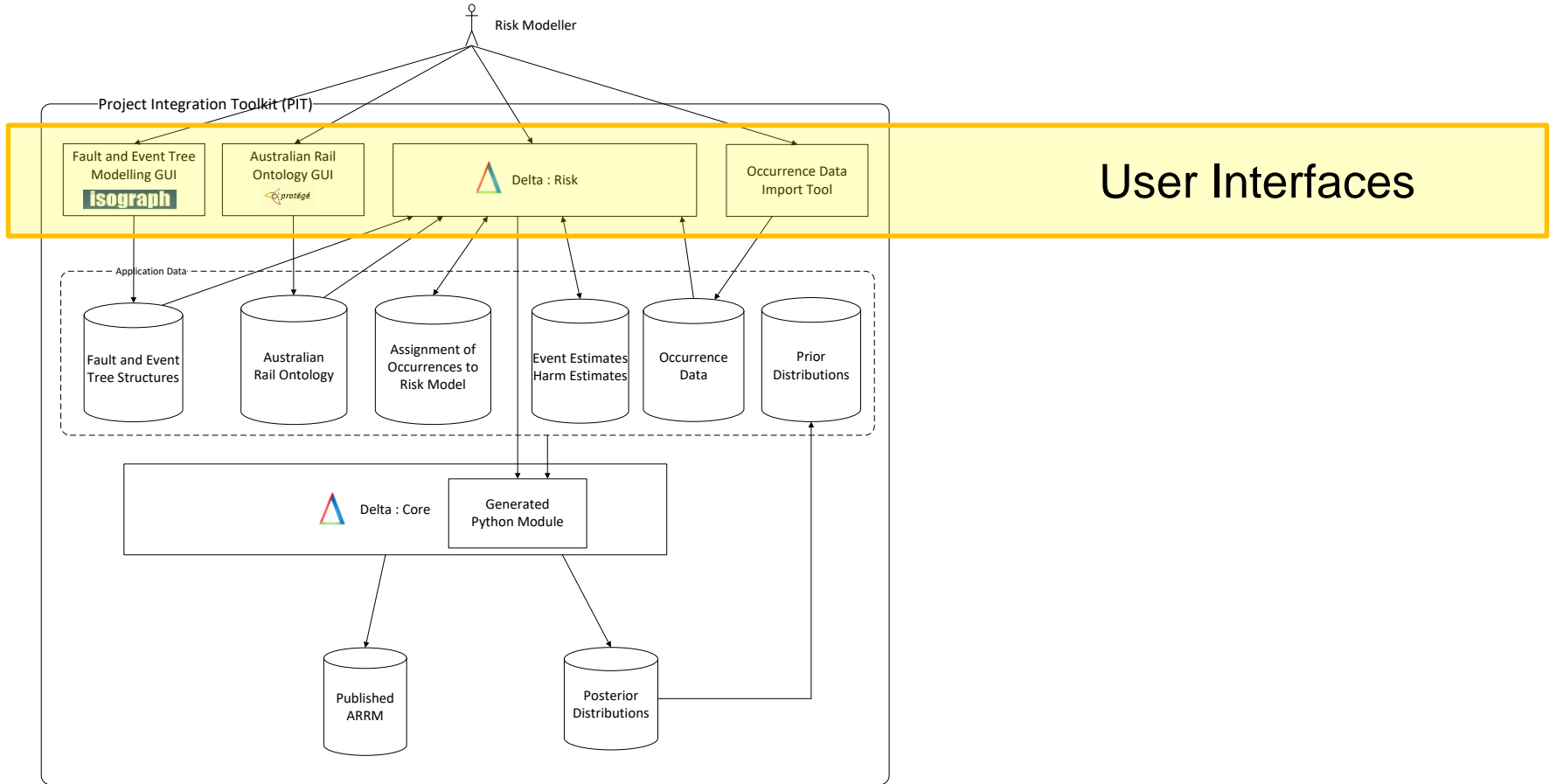
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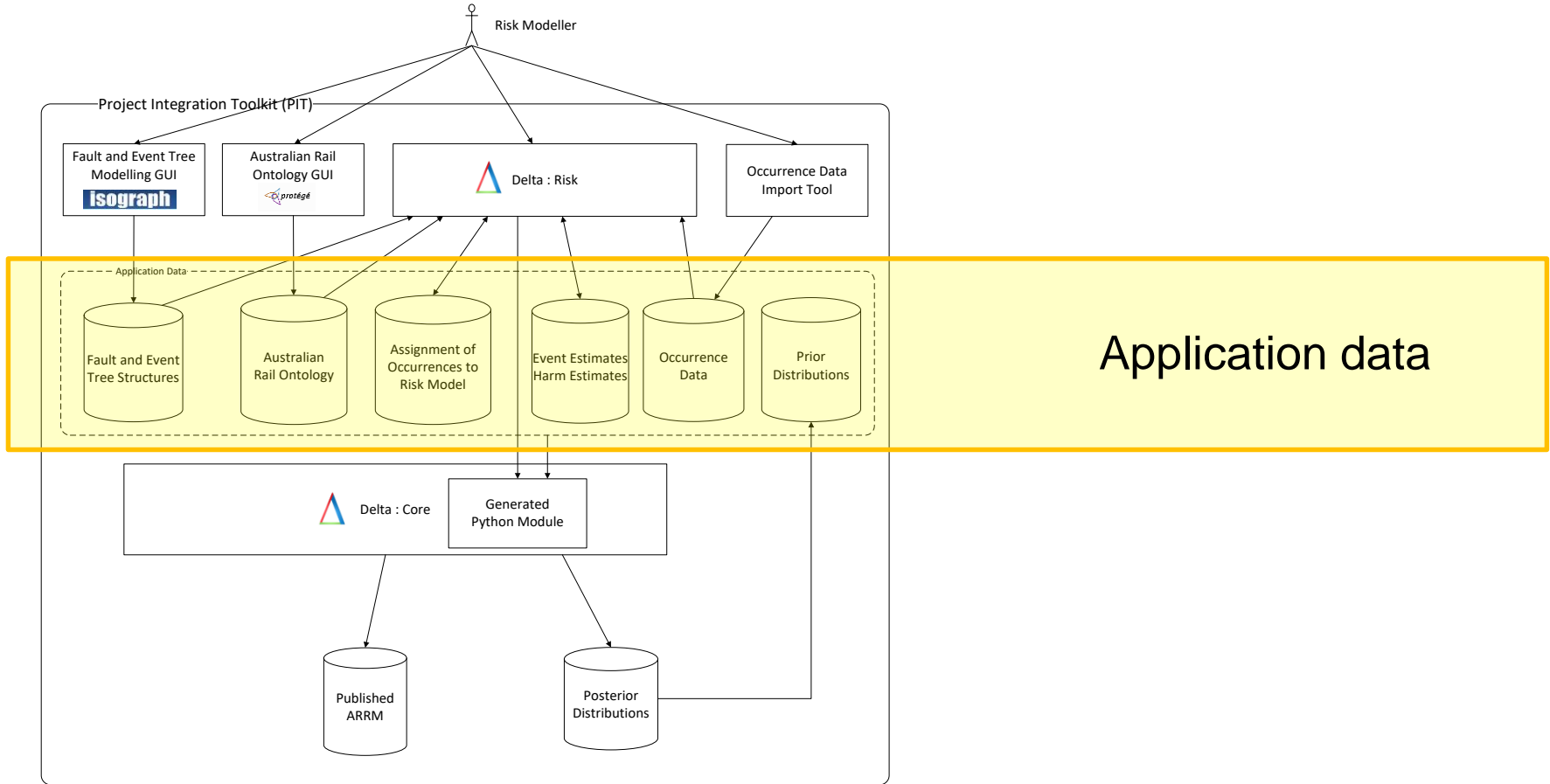
ARRM Architecture



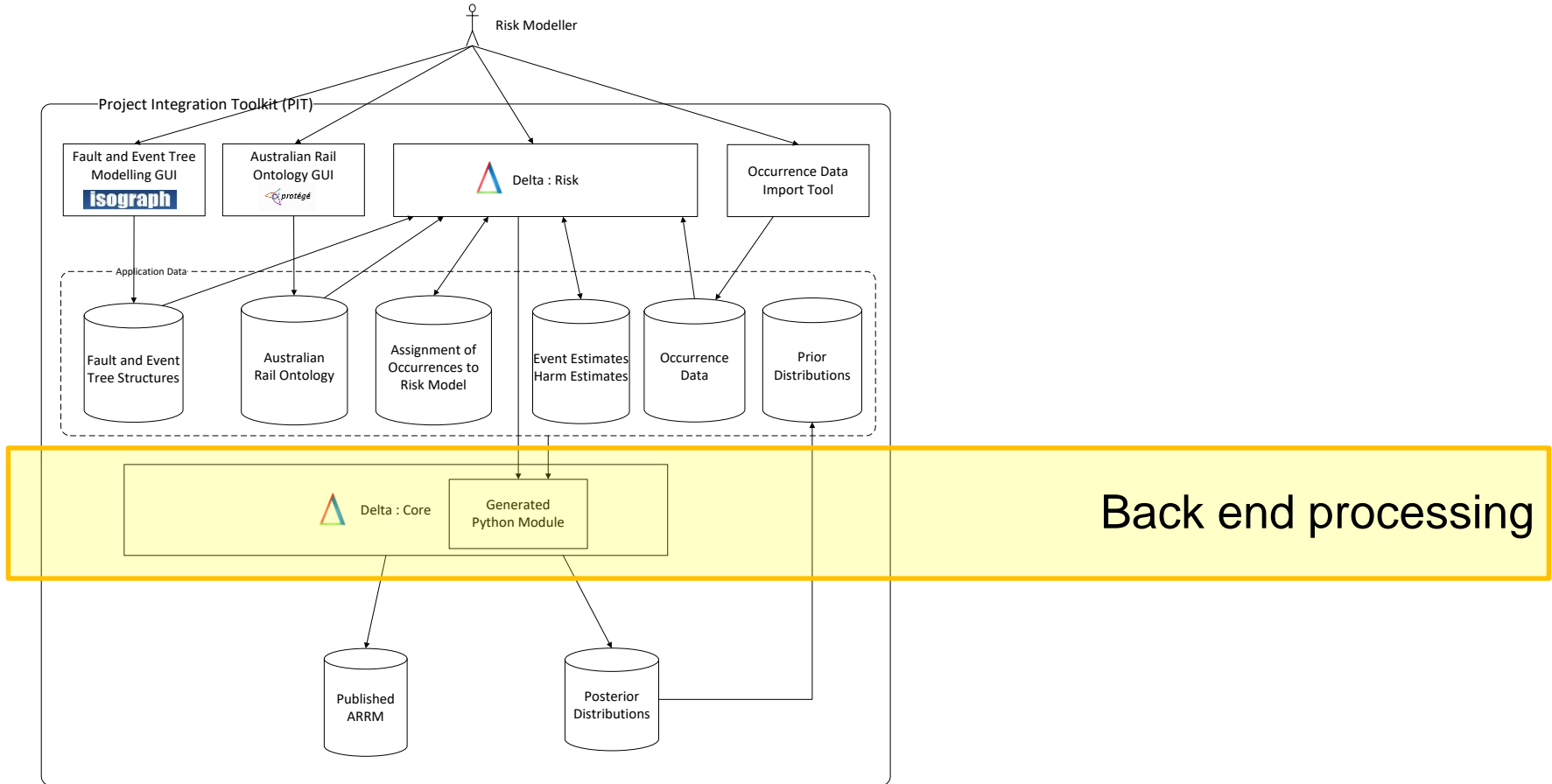
ARRM Architecture



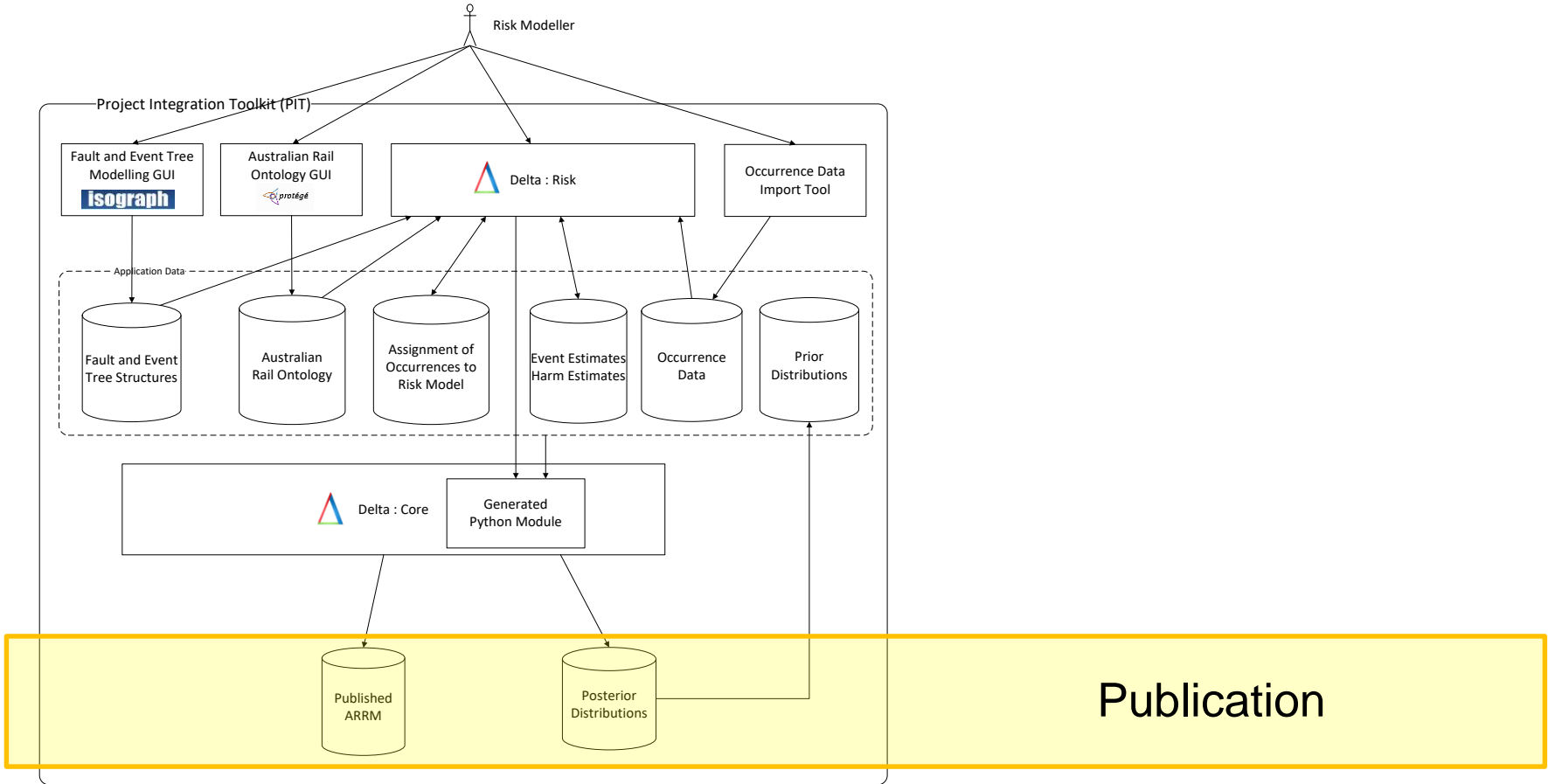
ARRM Architecture



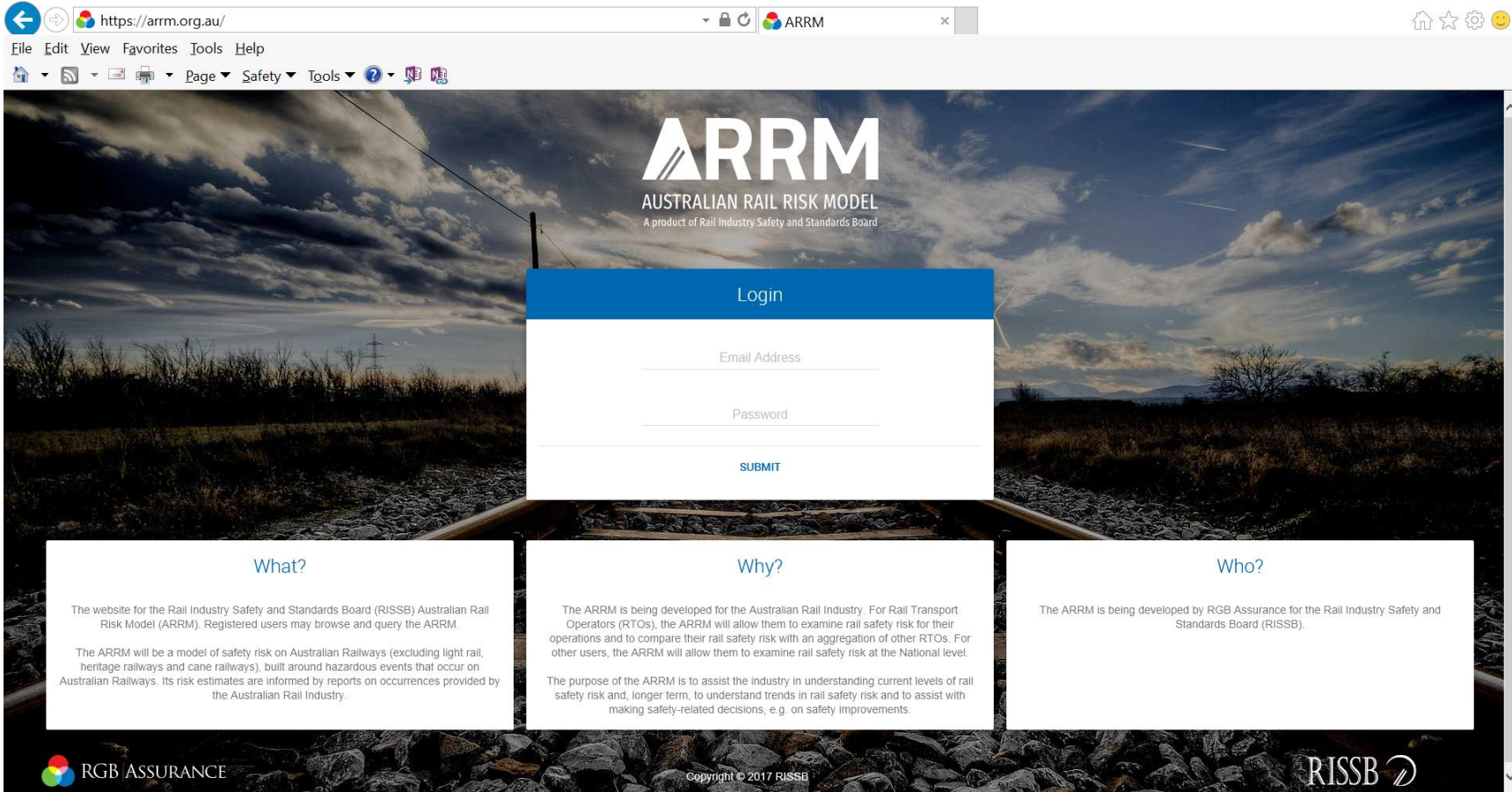
ARRM Architecture



ARRM Architecture



ARRM website

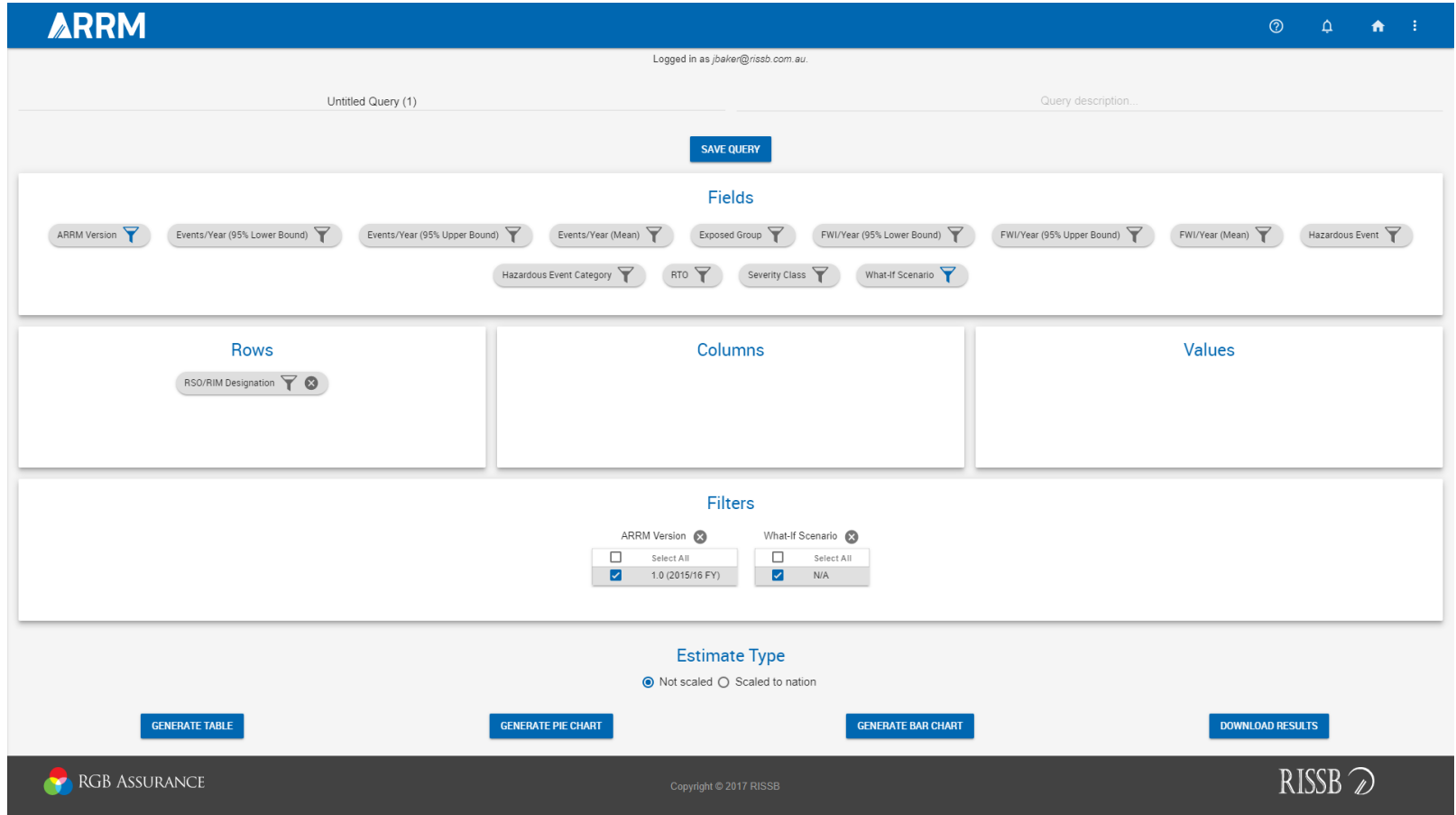


The screenshot shows a web browser window with the URL <https://armm.org.au/>. The page features a large background image of a railway track stretching into the distance under a cloudy sky. At the top center, the ARRM logo is displayed with the text "AUSTRALIAN RAIL RISK MODEL" and "A product of Rail Industry Safety and Standards Board". Below the logo is a white login form with a blue header labeled "Login". The form contains two input fields for "Email Address" and "Password", and a blue "SUBMIT" button. Below the login form are three white boxes with blue headers: "What?", "Why?", and "Who?". Each box contains text explaining the purpose and scope of the ARRM. At the bottom of the page, there are logos for RGB ASSURANCE, a copyright notice "Copyright © 2017 RISSB", and the RISSB logo.

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ARRM interface



The screenshot displays the ARRM interface with the following components:

- ARRM Header:** Includes the logo and navigation icons (help, notifications, home, menu).
- User Info:** Logged in as `jbaker@rissb.com.au`.
- Query Info:** "Untitled Query (1)" and "Query description...".
- SAVE QUERY:** A blue button to save the current query.
- Fields:** A row of dropdown menus for selecting data fields: ARRM Version, Events/Year (95% Lower Bound), Events/Year (95% Upper Bound), Events/Year (Mean), Exposed Group, FWI/Year (95% Lower Bound), FWI/Year (95% Upper Bound), FWI/Year (Mean), Hazardous Event, Hazardous Event Category, RTO, Severity Class, and What-If Scenario.
- Rows:** A section for selecting row-level data, currently showing "RSO/RIM Designation".
- Columns:** A section for selecting column-level data, currently empty.
- Values:** A section for selecting value-level data, currently empty.
- Filters:** A section for applying filters, showing "ARRM Version" (selected: 1.0 (2015/16 FY)) and "What-If Scenario" (selected: N/A).
- Estimate Type:** Radio buttons for "Not scaled" (selected) and "Scaled to nation".
- Action Buttons:** "GENERATE TABLE", "GENERATE PIE CHART", "GENERATE BAR CHART", and "DOWNLOAD RESULTS".
- Footer:** RGB ASSURANCE logo, Copyright © 2017 RISSB, and the RISSB logo.

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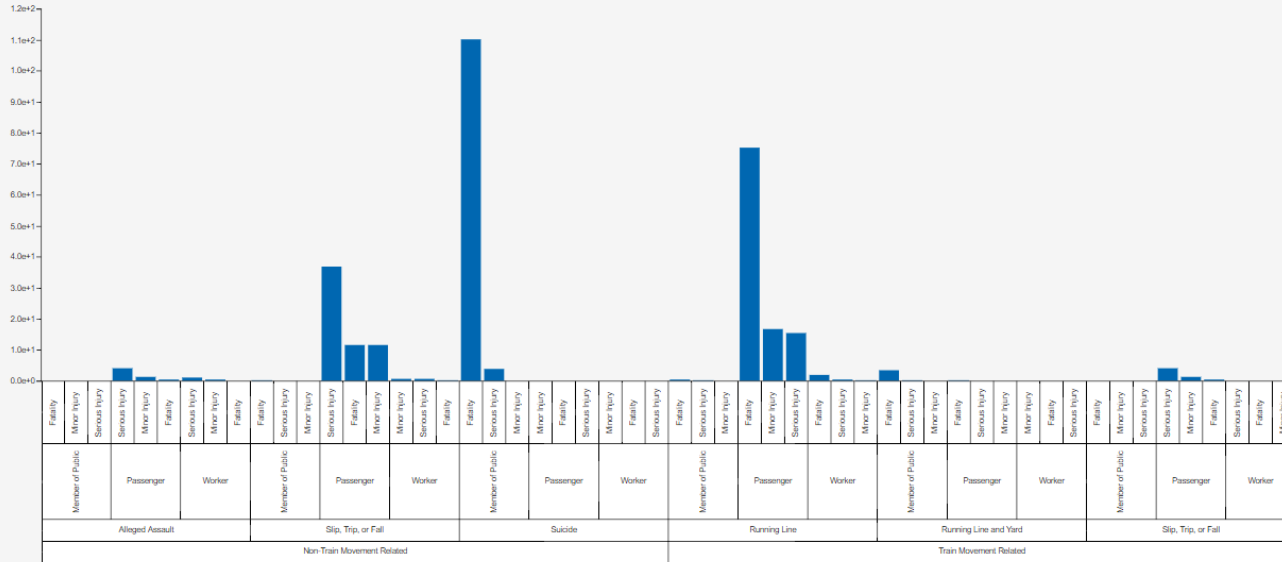
Logged in as j.baker@rissb.com.au

Summary of National RIM Harm Estimates

National Rail Infrastructure Manager (RIM) mean Fatality and Weighted Injuries (FW) estimates per year by top Hazardous Event Categories, Exposed Group, and Severity Class.

Estimate Type: Not scaled

Selected: None



DOWNLOAD DATA

GENERATE TABLE

GENERATE PIE CHART

Summary of National RIM Harm Estimates

[EDIT QUERY](#)

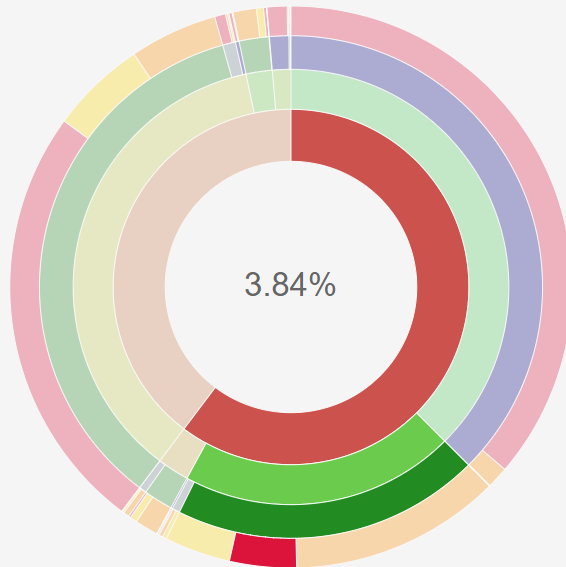
National Rail Infrastructure Manager (RIM) mean Fatality and Weighted Injuries (FWI) estimates per year by top Hazardous Event Categories, Exposed Group, and Severity Class.

[SAVE QUERY](#)

Estimate Type: Not scaled

Legend

FWI/Year (Mean) - Sum



- Non-Train Movement Related (Hazardous Event Category - L1)
- Train Movement Related (Hazardous Event Category - L1)
- Suicide (Hazardous Event Category - L2)
- Slip, Trip, or Fall (Hazardous Event Category - L2)
- Alleged Assault (Hazardous Event Category - L2)
- Running Line (Hazardous Event Category - L2)
- Running Line and Yard (Hazardous Event Category - L2)
- Member of Public (Exposed Group)
- Worker (Exposed Group)
- Passenger (Exposed Group)
- Fatality (Severity Class)
- Serious Injury (Severity Class)
- Minor Injury (Severity Class)

Non-Train Movement Related > Slip, Trip, or Fall > Passenger > Fatality > 1.17e+1

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ARRM next steps

Occurrence Classifier

At 21:44 hours driver vc73 (psg) miriam vale reported that they had struck a kangaroo and would carry out visual inspection of train. at 21:59 hours driver vc73 reported that there was no major damage just cosmetic damage and they were right to depart.

Collision With animal

SUBMIT

Modelled Incident	Confidence	Incident Description
MI-34755887	40.17%	Passenger-Train collision with animal on Running-Line Passenger-Train collision with animal on Running Line due to Kangaroo on track
MI-C38AB457	8.67%	Passenger-Train collision with projectile Collision between Passenger-Train and Projectile Projectile Thrown by Member of Public at Passenger-Train from Grade
MI-9A220409	7.91%	Passenger-Train collision with animal on Running-Line Passenger-Train collision with animal on Running Line due to other animal on track
MI-A38C94C1	6.96%	Non-Passenger-Train collision with animal on Running-Line Non-Passenger-Train collision with animal on Running Line due to cow on track
MI-8B661441	3.36%	Non-Passenger-Train collision with animal on Running-Line Non-Passenger-Train collision with animal on Running Line due to Kangaroo on track

Consequence	Confidence
No Consequence	98.74%
Multiple Consequences	0.61%
Unknown Consequence	0.14%

ARRM next steps

Occurrence Classifier

male

OCG1 category

[SUBMIT](#)

Modelled Incident	Confidence	Incident Description
MI-D6B6270	56.35%	Passenger-Train Near Miss with Pedestrian at Public Road Level Crossing
MI-8966B9D4	3.01%	Passenger assaulted on platform/station Passenger assaulted on platform/station
MI-375AA145	1.56%	Miscellaneous events that have been reported but are not associated with a hazardous event Unruly/disruptive person(s) on the platform
MI-3F873566	0.8%	Trespasser injury not resulting from a collision with a train Trespasser injury not resulting from train surfing/out riding or from a collision with a train
MI-EF8CA48A	0.79%	Suspected or attempted suicide not by jumping off a bridge or being hit by a train Suspected or attempted suicide not by jumping off a bridge or being hit by a train

Consequence	Confidence
No Consequence	83.65%
Passenger Minor	13.76%
Public Minor/Serious	0.91%

Occurrence Classifier

female

OCG1 category

[SUBMIT](#)

Modelled Incident	Confidence	Incident Description
MI-8966B9D4	10.05%	Passenger assaulted on platform/station Passenger assaulted on platform/station
MI-B029FA64	3.48%	Member of Public/Trespasser on Running Line, not at a level crossing, not at a station platform (not including a suicide attempt)
MI-D6B6270	1.96%	Passenger-Train Near Miss with Pedestrian at Public Road Level Crossing
MI-DF8D9F3B	1.6%	Passenger slips, trips, or falls to/on/from platform/concourse Passenger slips, trips, or falls to/on/from platform/concourse due to unknown cause
MI-33F90567	1.52%	Suspected or attempted suicide by jumping off a bridge Suspected or attempted suicide by jumping off a bridge

Consequence	Confidence
No Consequence	93.62%
Unknown Consequence	4.55%
Public Minor	0.6%

Thank you – questions?

jbaker@rissb.com.au