R, Shiny and the Oasis Loss Modelling Framework

Mark Pinkerton

mark.pinkerton@oasislmf.org

1. Oasis vision
2. Oasis tech stack
3. Oasis use of R and R-Shiny,

   with a worked example

Oasis vision

- To be the main “alternative” platform for the insurance sector, and the main platform for non-insurance catastrophe model use.
- To be a focal point for community engagement and standards in the area of catastrophe modelling.
- By being open and curating open source software, to enable a wide community to innovate and scale the world of catastrophe modelling.

Oasis membership

- ClimateKIC
- Lloyd's
- SCOR
- XL Catlin
- Validus
- Ren Re
- TigerRisk Partners
- Cathedral
- Novae
- Zurich
- Liberty
- Aspen
- Aon Benfield
- Guy Carpenter
- Willis
- Partner Re
- Allianz
- Axis
- Amlin
- Tokio Millennium Re/Kiln
- Suncorp
- JLTRe
- GenRe
- Swiss Re
- Beazley
- Argo
- Ark
- Ascot
- Barbican
- Brit
- Canopius
- Chaucer
- Hardy
- Mitsui Sumitomo
- QBE
- R&Q
- W R Berkley
- XL
- Axa
- ANV
- Ace
- Markel
- Hannover Re

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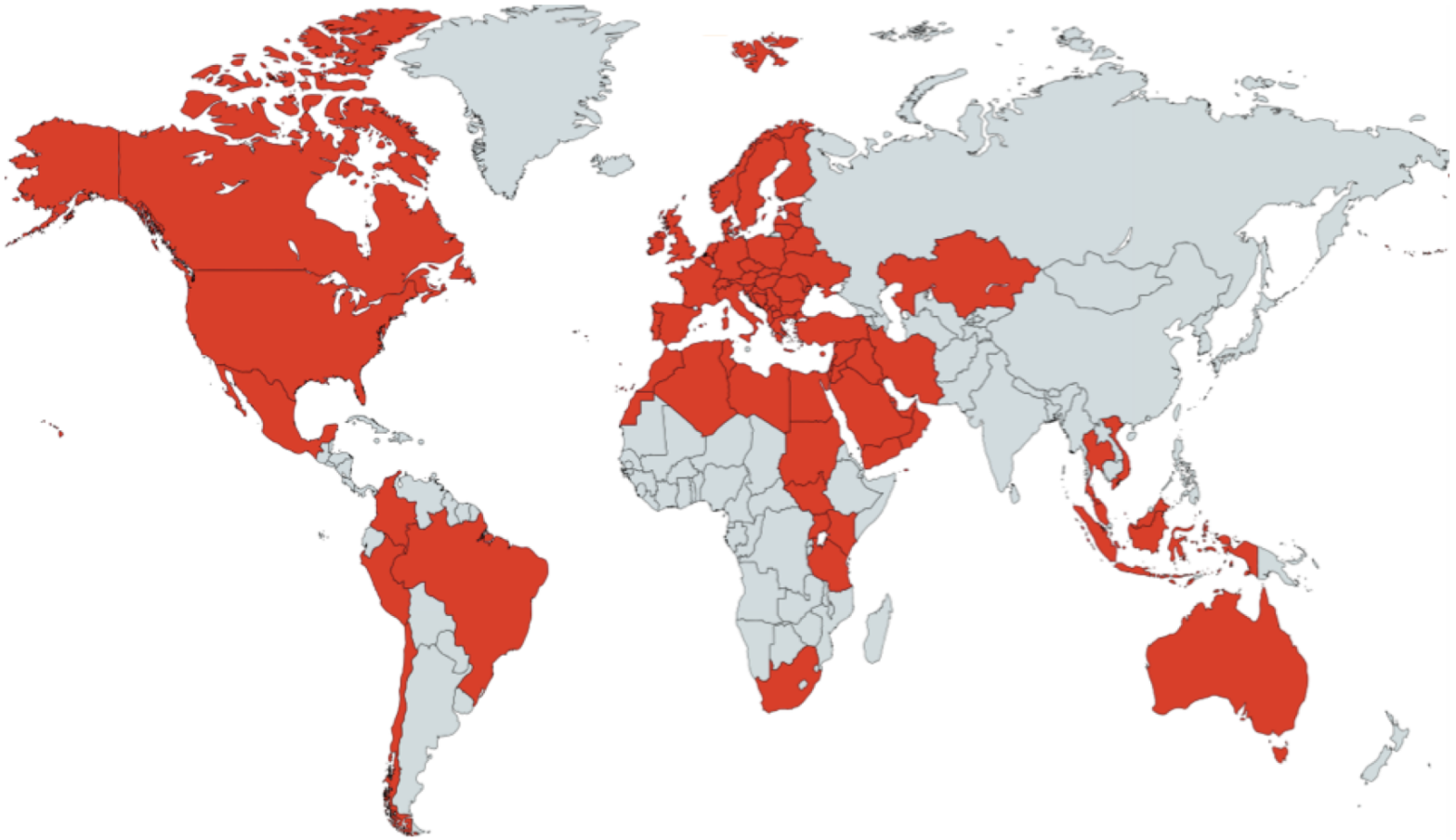
ImageCat
AIR WORLDWIDE
ARIA TECHNOLOGIES
Deltares
Enabling Delta Life
JBA
risk
management
SPA Risk LLC
SpatialKey
DHI
KatRisk
UCL
Risk Frontiers
National Centre for
Atmospheric Science
NATURAL ENVIRONMENT RESEARCH COUNCIL
NTT DATA
Global IT Innovator
ARA
Cinnober
NCAR
Earth System Laboratory
NIIT
technologies
CAT RISK
SOLUTIONS
GEOSPATIAL
INSIGHT
LTD
EQUINIX
northdoor
RPI2.0
Connecting Science and (Re)Insurance
Met Office
ambiental
predicting · preventing · protecting
ARIUM
RISK ARCHITECTURE
ssee
UNIVERSITY OF
OXFORD
PLANETARY SKIN
INSTITUTE
Sense, Predict, Act
PERILS
sequel
CATEX
GEM
pts consulting
World class. Local knowledge.
agencyport
北京師範大學
BEIJING NORMAL UNIVERSITY
ERN
IBM
ERNST & YOUNG
Quality In Everything We Do
COMBUS
COLUMBIA UNIVERSITY
IN THE CITY OF NEW YORK
STANDARD & POOR'S
RATINGS SERVICES
McGRAW HILL FINANCIAL
eit
Knowledge &
Innovation
Community
Climate-KIC
CAR
KAREN CLARK & COMPANY

Oasis projected model coverage 2016

Over 70 models from 12 providers



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   with a worked example

Architectural goals

1. Configurable and pluggable

- ability to support any model or calculation methodology

2. Range of deployment options

- insurance enterprise systems through to academic model development or consulting projects

3. High performance

- can run industrial strength model in acceptable times

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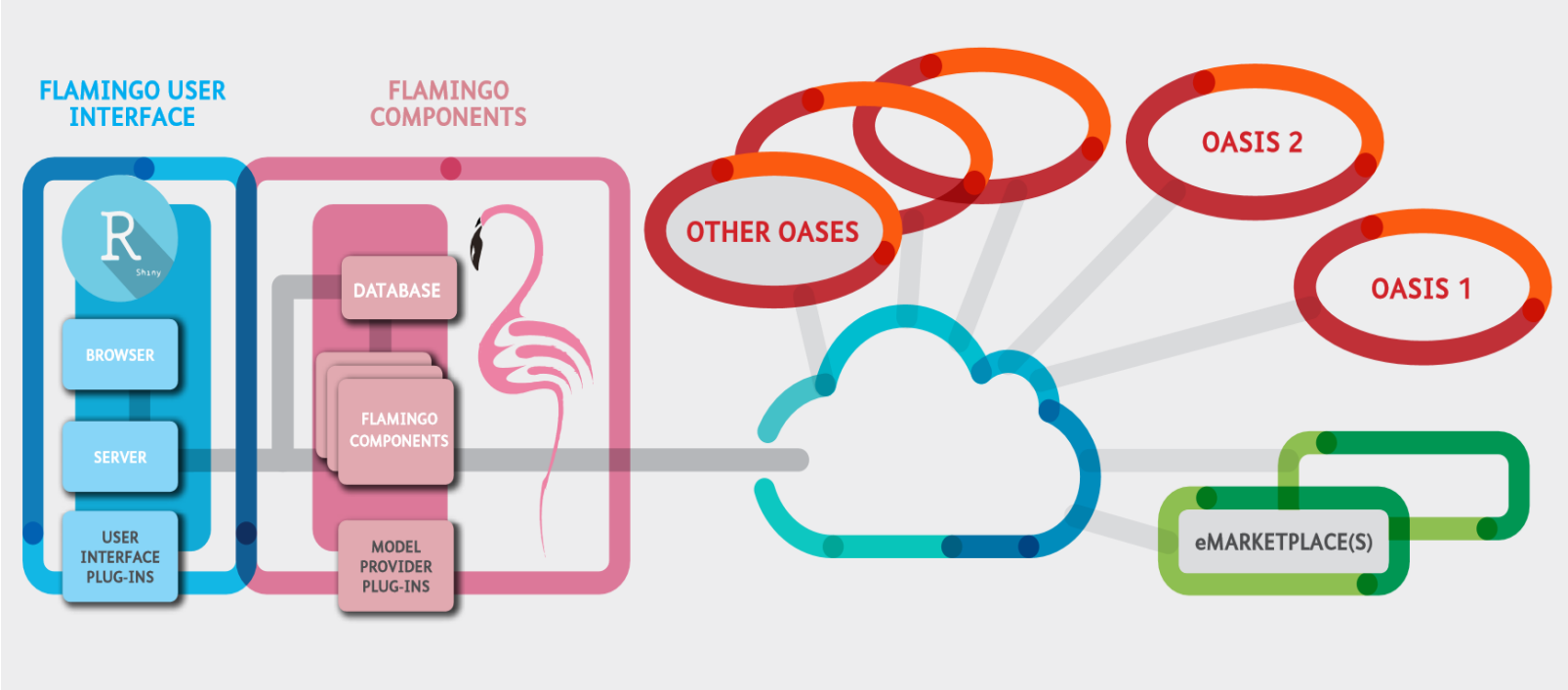
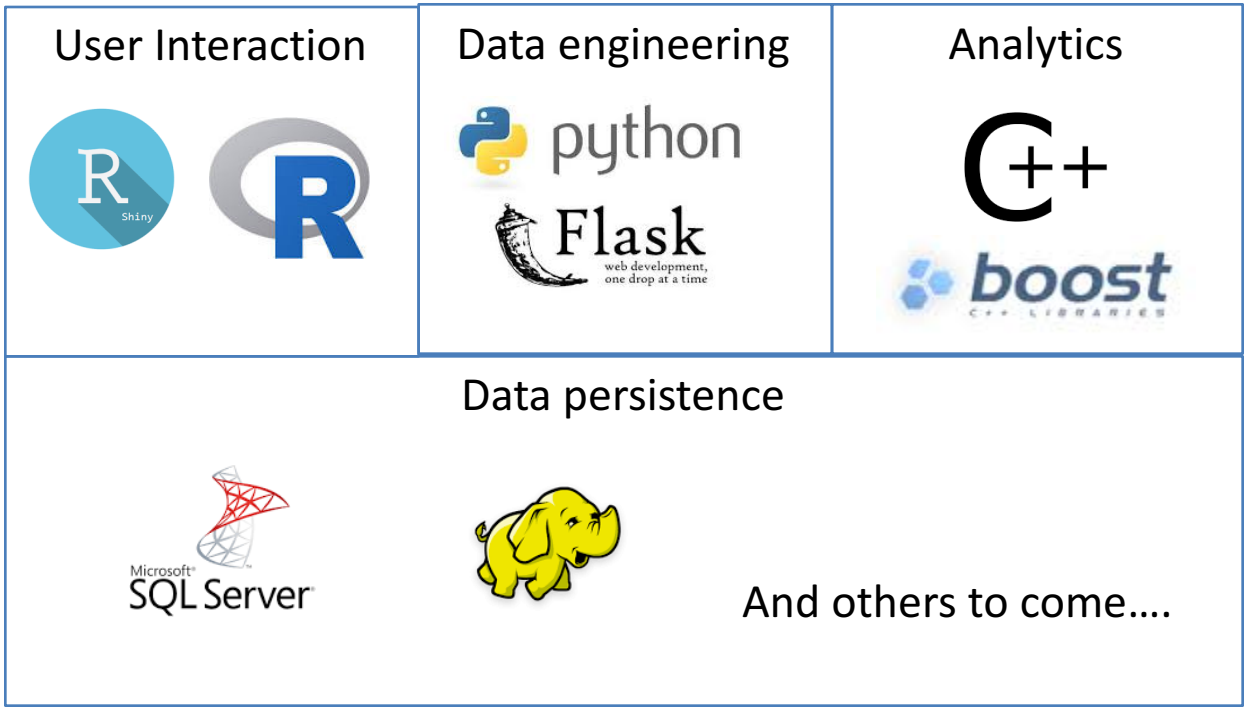
Oasis Eco-system



Oasis Technology Stack



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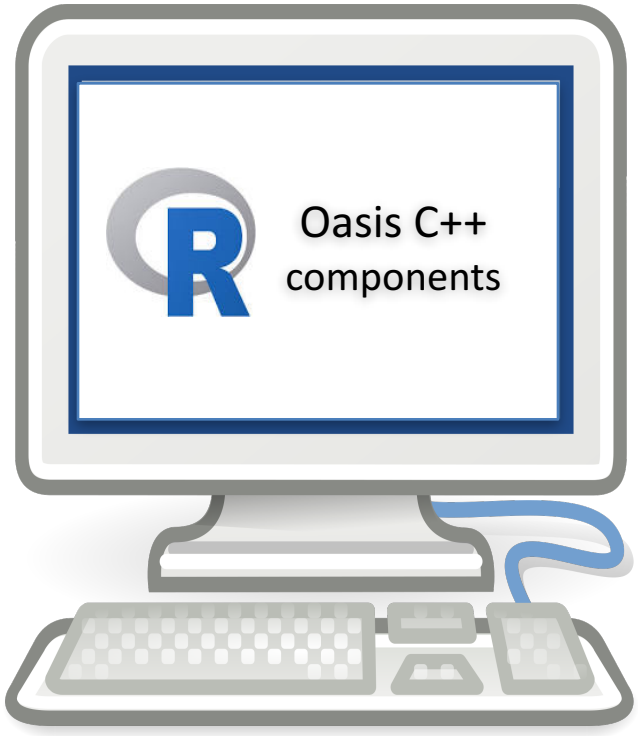
   with a worked example

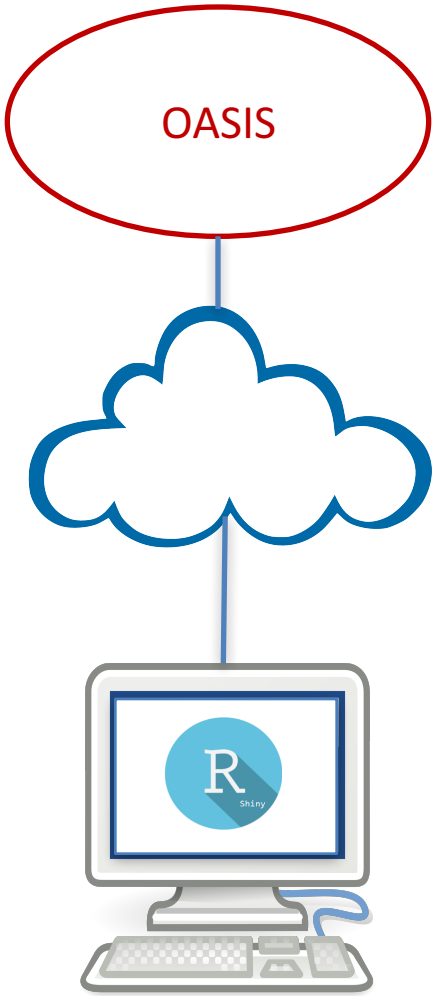
Use case 1 – analytic workstation



- Model developers, power analysts
- Direct invocation of Oasis components from R
- Combine existing R code and expertise…

  … with high performance analytics and industry standard methodologies

Use case 2 – cat modelling platform



- Cat modellers, underwriters
- Use R-Shiny web application, or interface with existing risk applications using Oasis API
- Hosted platform this summer, for use by 10+ Lloyd's managing agents, and in-house deployments at multiple (re)insurers

Login

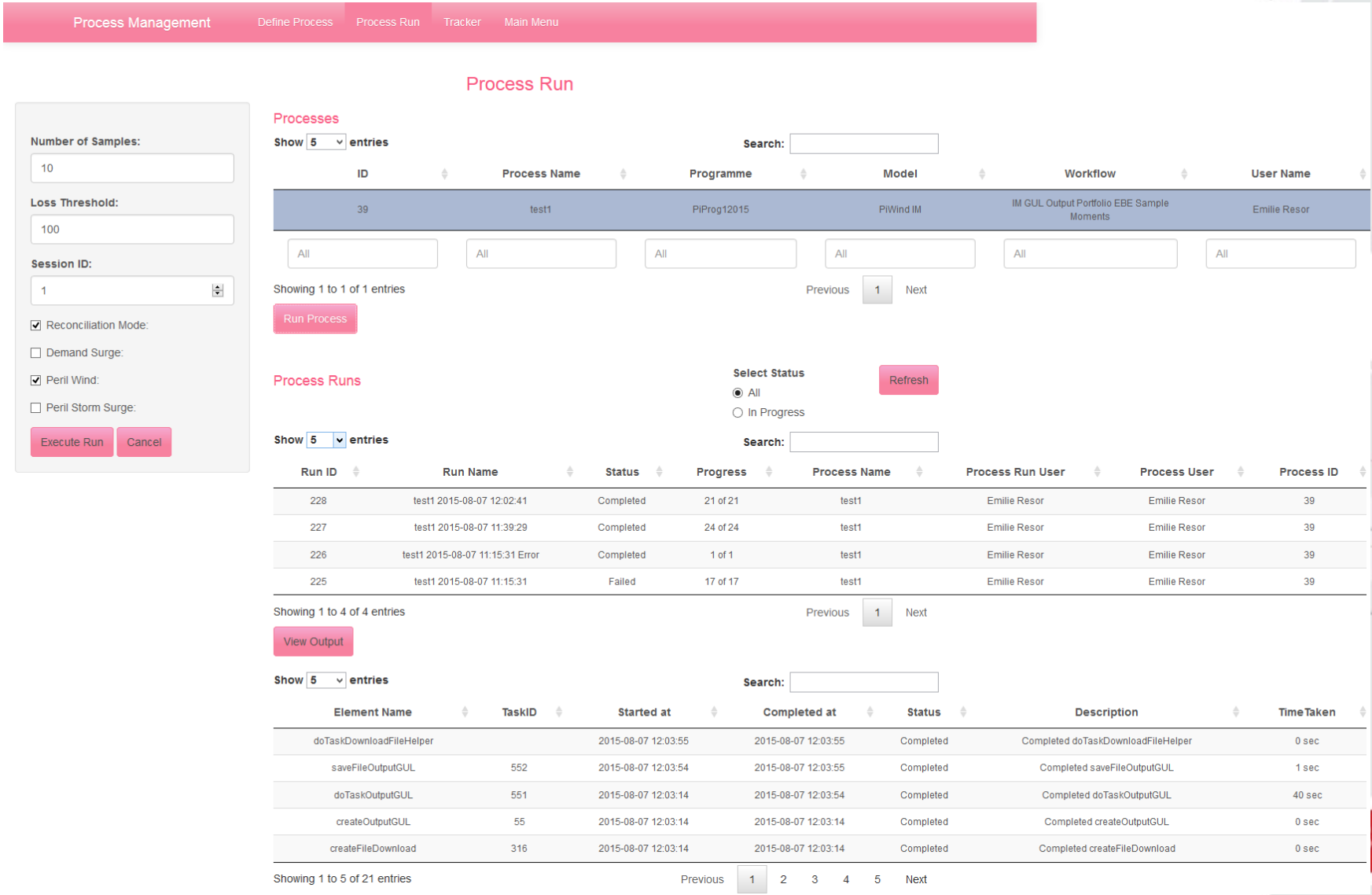
Login

username

password

Login

Execute Process Run



File Viewer - EP Curve

File Management | Output File View | File Viewer | Define Prog | Define Account | Main Menu

File Viewer

File Details

Programme: PiProg12015

Location: C:\Data

File Name: PiWindAEP_1000.csv

File Type: Output AEP

Owner: Workflow System

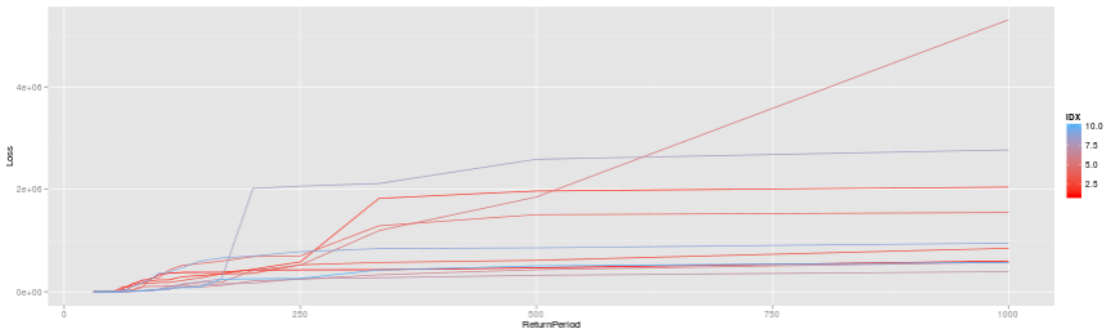
Source: AEP_1000

Resource Table: Prog

Update

Table | File | Map | AEP Curve | Geocode

AEP Curve



AEP Curve Data

Show 10 entries Search:

SUMMARY_REF	RESULTS_REF	IDX	VALUE	RANK
1	496	1	601230.6	1
1	863	1	468402.5	2
1	910	1	430729.1	3
1	879	1	428716.2	4
1	650	1	426722.3	5
1	376	1	381957.3	6
1	103	1	380273.0	7

Output Example – map

File Viewer

File Details

ID
6

Programme
PiProg12015

Location
/home/Flamingo/FileViewer

File Name
PiWindProg12015.csv

Owner
Peter T

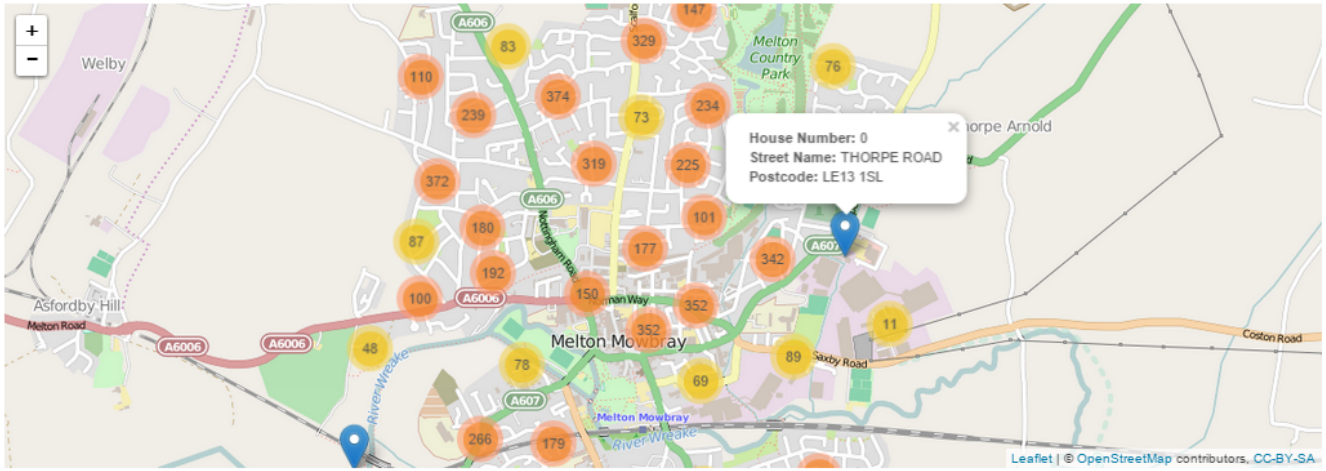
Source
PiExposure

Resource Table
PROG

Resource Key
101

Table | Exposures | Map | AEP Curve | Geocode

Map



Ordnance Survey

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Shiny demo –background

- Catastrophe models use an event catalogue to represent a particular peril
- Much of the correlation in loss is captured in an event footprint
- Uncertainty in the modelled losses can be categorized as:
  - Primary uncertainty
    - event selection and frequency
  - Secondary uncertainty
    - hazard and vulnerability uncertainty conditioned on a particular event
  - Parameter uncertainty

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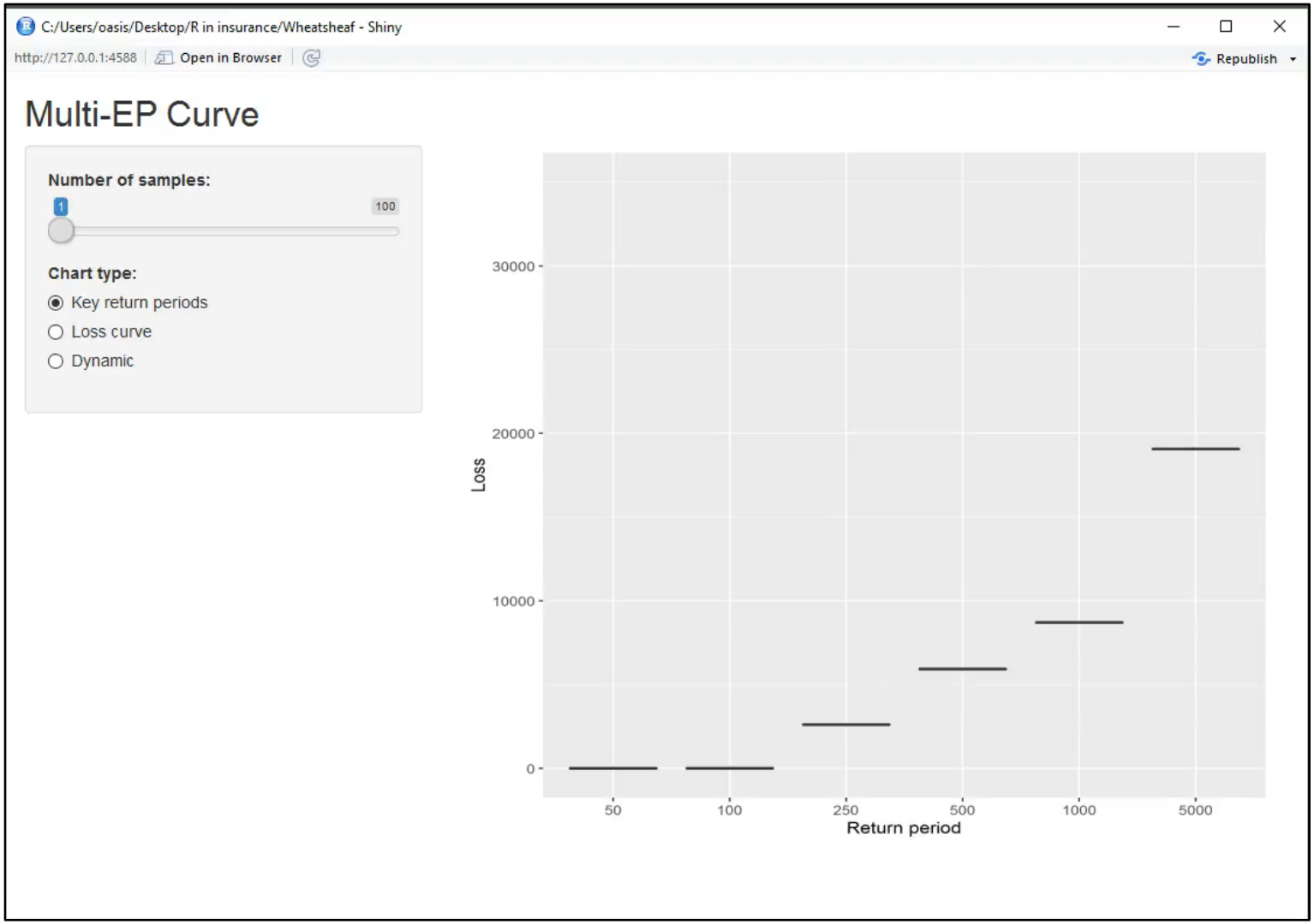
Shiny demo


C:/Users/oasis/Desktop/R in insurance/Wheatsheaf - Shiny
http://127.0.0.1:4588
Open in Browser
Republish
Multi-EP Curve
Number of samples:
1
100
Chart type:
Key return periods
Loss curve
Dynamic
30000
20000
10000
0
Loss
50
100
250
500
1000
5000
Return period

Summary

1. **Oasis vision**
   - Main “alternative” platform for insurance, and main platform for non-insurance
   - Community engagement and standards catastrophe modelling
   - Using open source software to drive innovation and scale in the world of catastrophe modelling.

2. **Oasis tech stack**
   - Based on open technologies and frameworks
   - Hosted environment for Lloyd’s MAs this summer
   - Going open source in 2016

3. **Oasis use of R and R-Shiny**
   - R/Oasis integration for power analytics
   - R-shiny application for Oasis platform
   - Strong potential for expanded use of R in the cat modelling community

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