OS-C

An Introduction to OS-Climate

Physical Risk & Resilience Vision and Roadmap

Open Source Breakthrough for Climate-Aligned Investing

2024

AGENDA

1. What is the Vision?
2. What Have We Achieved?
3. What is the Business Architecture?
4. What are the Hazards?
5. What is the Output?
6. What Is the Roadmap?
7. Who is already Involved?
8. How do I get Involved?

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01 What is the Vision?

OS-C

A Comprehensive Toolkit for Climate Risk Management in Financial Services

To accelerate the end-user tool development kit for managing sustainability and climate risks across all lines of business and all group functions in financial services firms.

How do we achieve it?

By providing a set of best-in-class OS foundation building blocks that seamlessly allows the integration of both OS and Commercial componentry that achieves the following:

- an agile, secure, cloud-native architecture
- for reporting, analysis and risk
- that supports the delivery services at high speed, large scale and lower cost

Where will we start?

To do this we are building a "Physical Risk and Resilience Platform-as-a-Service", a new global capability for financial services firms built upon a foundation of open-source (OS) software, public and private data, and extensible risk models and algorithms.

We are starting with Residential Real Estate (RRE) mortgages in the UK market and will quickly extend into Commercial Real Estate, industrial assets and infrastructure for all physical asset revaluation and reporting.

We have a large and growing community of collaborators - we'd like users across the spectrum from business lines, through group functions to information & technology divisions.

02

What Have We Achieved?

01
Going Global

We have begun with RRE (Residential Real Estate) Mortgages from which all other use cases may follow. The major use case is for the Impact of Flood Risk.

02
Start with a Critical Focus

We are building a roadmap for an open-source solution for integrating Physical Risk and Resilience into the financial system as a global capability

03
Create Critical Mass of Collaborators

We have gathered key contributors: from end-users with business critical use-cases to the leading large technology and speciality fintech contributors.

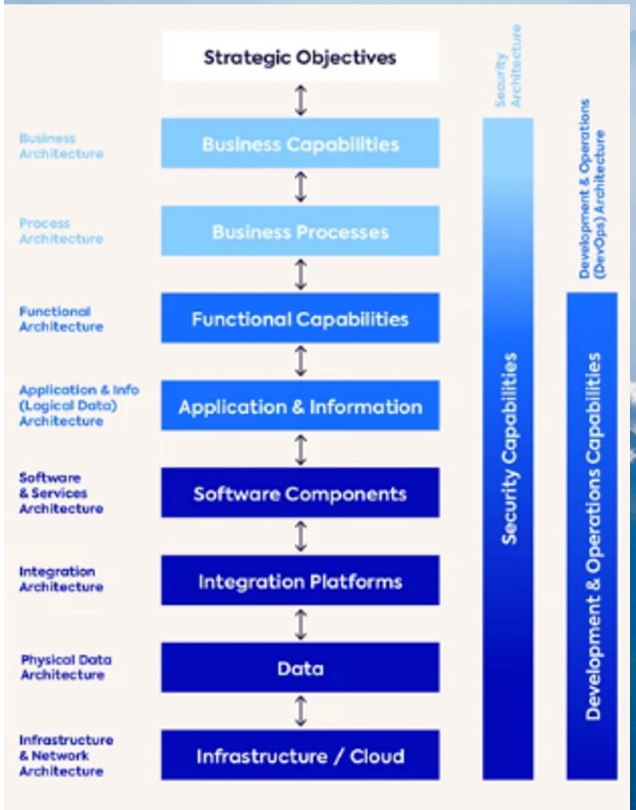
04
Built at Speed for Scale and Low Cost

We are now embarking on a large scale collaboration project for the UK residential mortgage market which can be replicated for any market in the world. The objective it to achieve a leading peril risk assessment & valuation framework for mortgage lenders, underwriters and investors.

03 What is the Business Architecture?

Physical Risk and Resilience

- Maps climate and asset data with models to ascertain asset portfolio risks
- This is complex, time-consuming and costly
- We are creating a platform that makes end-to-end climate analysis simple, uniform, flexible & transparent



"Load my assets safely, quickly, and easily"

"Use hazards for flood, wind, and fire"

"Map the exposure of my assets to hazards"

"What are the vulnerabilities for my assets"

GRI TCFD PRI
SASB CDP SBTi
UNGC CDSB IIRC

Foundation

Uniform Geospatial Mesh

Climate / Asset Data "Bazaar" (Marketplace)

Physical Risk Models & Analytics

DCF: Discount Cash Flow Model
PD: Probability of Default
LGD: Loss Given Default
VaR: Value at Risk
ES: Expected Shortfall
PEAR: Potential Exposure at Risk
NEAR: Normalized Exposure at Risk
... Many others...

Taxonomies / Standards

Standard / open geospatial grid
Standard / open asset definition
Standard / open data taxonomies
Standard / open "hooks"

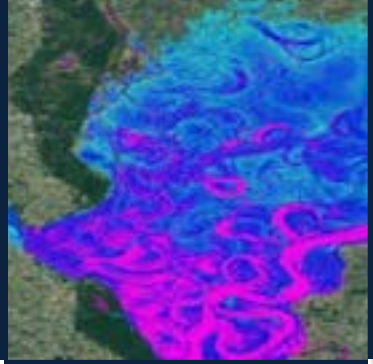
04 What are the Hazards?

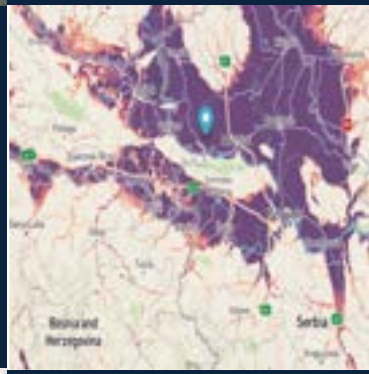
Hazard	Unit	Source	Damage function (dmf)	Scores	Time horizon	Climate scenarios
River flooding	water depth (m)	Delft University of Technology (TUD)	based on intensity & area type	based on dmf return periods: 10,30,100,300,1000	1971-2000, 2021-2050, 2071-2100	Historical, RCP 4.5 RCP 8.5
Coastal flooding	water depth (m)	Delft University of Technology (TUD)	based on intensity & area type	based on dmf return periods: 10,30,100, 300, 1000	1971-2000, 2021-2050	Historical, RCP 4.5 RCP 8.5
Windstorms	max gust speed (m/s)	Own calculations, based on Copernicus	based on intensity by NUTS3 & area type	based on dmf return periods: 10, 50, 100, 500	-	-
Wildfire	fire weather index (accounting for burnable area)	Own Calc, Copernicus	-	based on annual probability of fire event: low (up 0.01), medium (up to 0.1), high (above 0.1)	2001-2022, 2023-2050	Historical, RCP 4.5 RCP 8.5
Water stress	score based on ratio between total water withdrawals and available renewable surface water	Aqueduct WRI	-	original score from the source	1996-2010, 2030, 2040	Historical, SSP2 RCP4.5 SSP3 RCP 8.5
Landslides	predisposition to landslide (score 1-5)	JRC	-	based on original scores across return periods (10, 50, 100, 500)	-	-
Subsidence	susceptibility score based on soils' clay content	JRC	-	original score rescaled to: no risk (1), low (2), medium (3), high risk (4,5)	-	-
Consecutive Dry Days	maximum number of consecutive dry days (with precipitation < 1mm per day)	IPCC	-	based on number of days: no risk (up to 15), low (up to 20), medium (up to 40), high (above 50 days)	1986-2005, 2020-2040, 2041-2060	Historical, RCP 4.5, RCP 8.5
Standardised Precipitation Index (SPI-6)	compares cumulated precipitation for 6 months with the long-term precipitation distribution for the same location and cumulation period	IPCC	-	based on thresholds, scores from -3-extreme dry to 3-extreme wet rescaled to: no risk (0), low (-1,1), medium (-2,2), high risk (-3,3)	1986-2005, 2020-2040, 2041-2060	Historical, RCP 4.5, RCP 8.5

Source: ECB

05 What is the Output?

AN INTRODUCTION TO OS-CLIMATE PHYSICAL RISK AND RESILIENCE





From high-level to deep low-resolution detail and insight across multiple layers of perils under different scenarios

To inform:

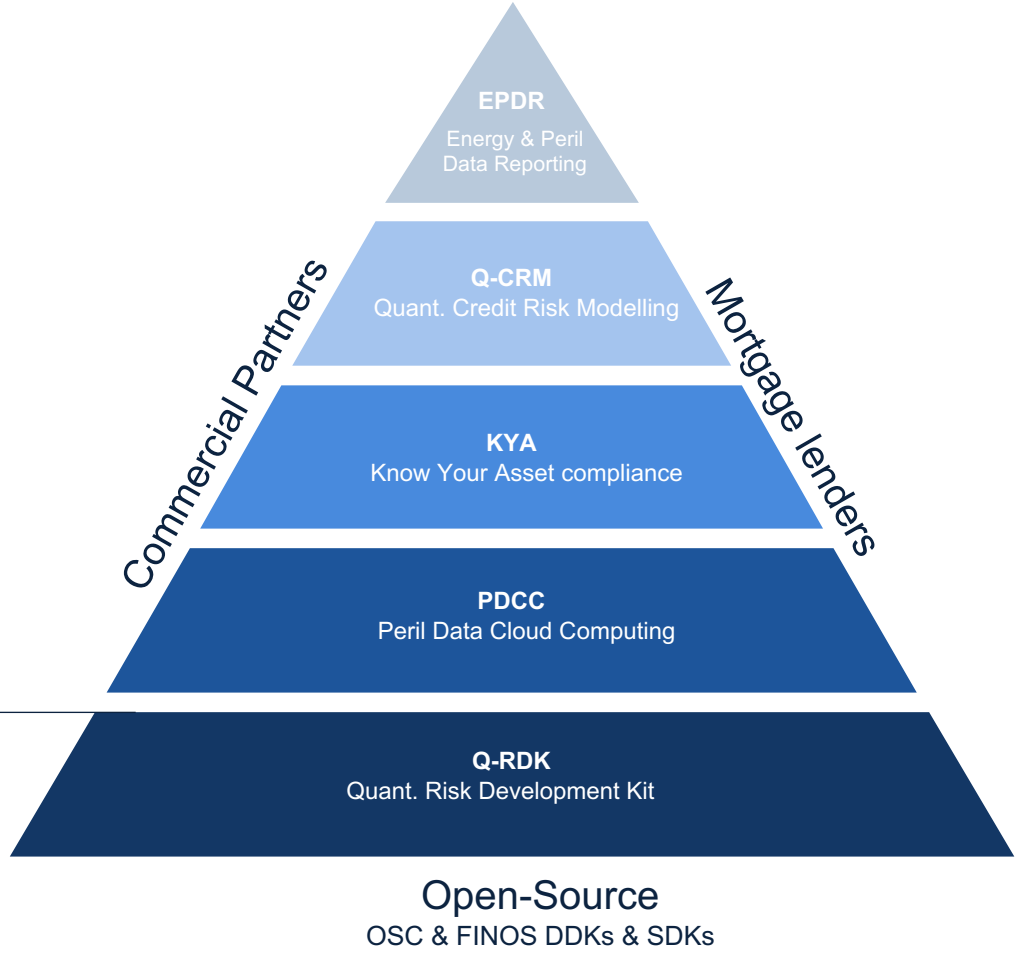
- Climate Hazards and Indicators
- Risk Exposure
- Asset Portfolio Vulnerabilities
- Loss & Damage Calcs

And to extend to cover:

- Windstorms
- Wildfire
- Extreme Weather models and assessments
- Single-event scenarios
- Multi-event scenarios
- Conditional probabilities

06 What is the Roadmap?

The Roadmap MVP Stack



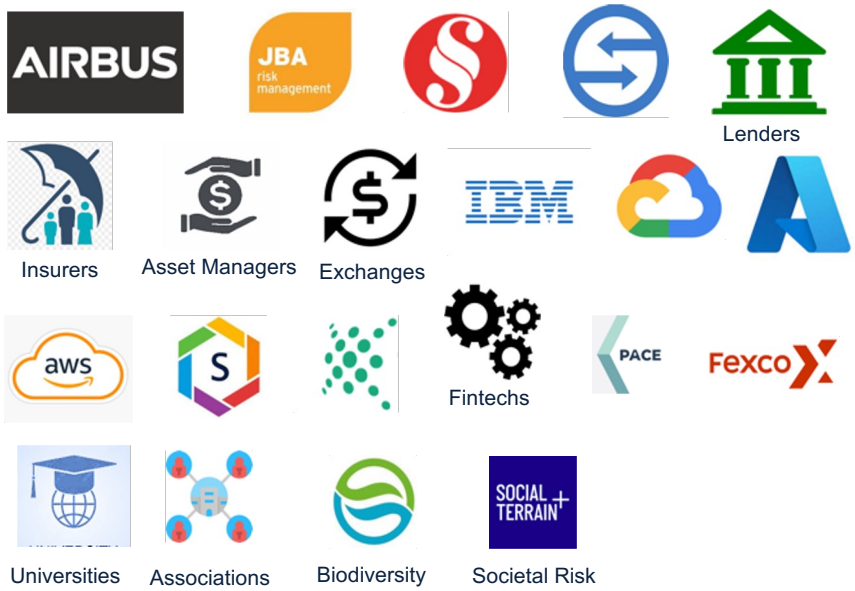
- Origination-Portfolio Link
- Flood to damage and mitigation curve
- Scenarios: bespoke and standard for combinations of discrete events
- Portfolio construction and restructuring
- Risk transfer: cap mkts and parametric insurance

07 Who is already Involved?

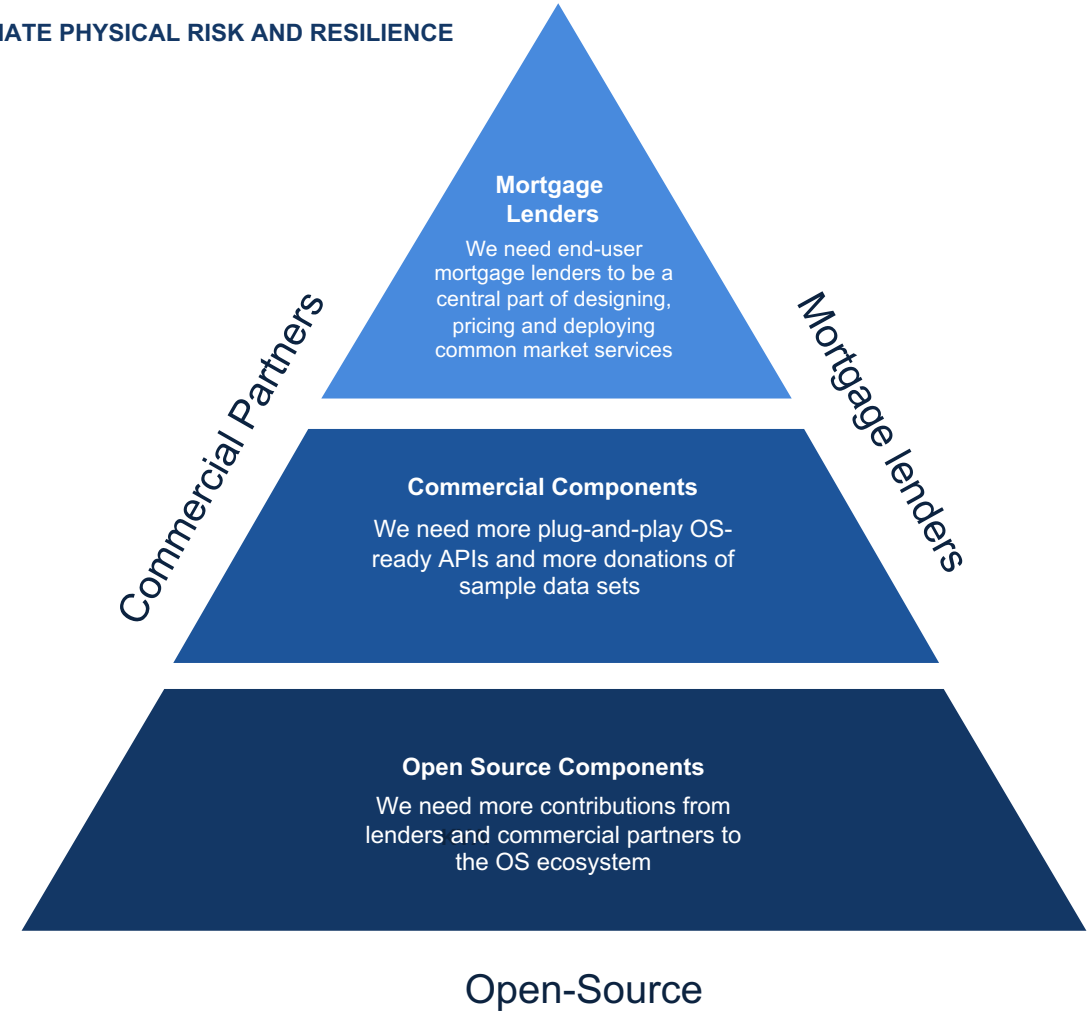
OS-Climate
Collaborators (selection)

"Backbone"
(or "spine")

Commercial
Collaborators (selection)



08 How do I get involved?


Mortgage Lenders
We need end-user mortgage lenders to be a central part of designing, pricing and deploying common market services
Commercial Components
We need more plug-and-play OS-ready APIs and more donations of sample data sets
Open Source Components
We need more contributions from lenders and commercial partners to the OS ecosystem
Commercial Partners
Mortgage lenders
Open-Source

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