hybrid GEOTABS

Controlling the power of the ground by integration

THE HYBRIDGEOTABS PROJECT

Introduction to the H2020 funded project

CLIMA 2019 Workshop, 28/05/2019

dr. Eline Himpe, Ghent University

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WHAT IS HYBRIDGEOTABS?

hybrid

GEOTABS

CONTROLLING THE POWER OF THE GROUND BY INTEGRATION

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“EVERY BUILDING DESERVES A SHARE OF GEOTABS”

TABS

- Radiant heating/cooling
  - ➢ High thermal comfort
- High thermal inertia
  - ➢ Load buffering, peak shaving

GEO

- Low-grade RES
  - ➢ Sustainable energy use
- Small ΔT
  - ➢ High energy efficiency

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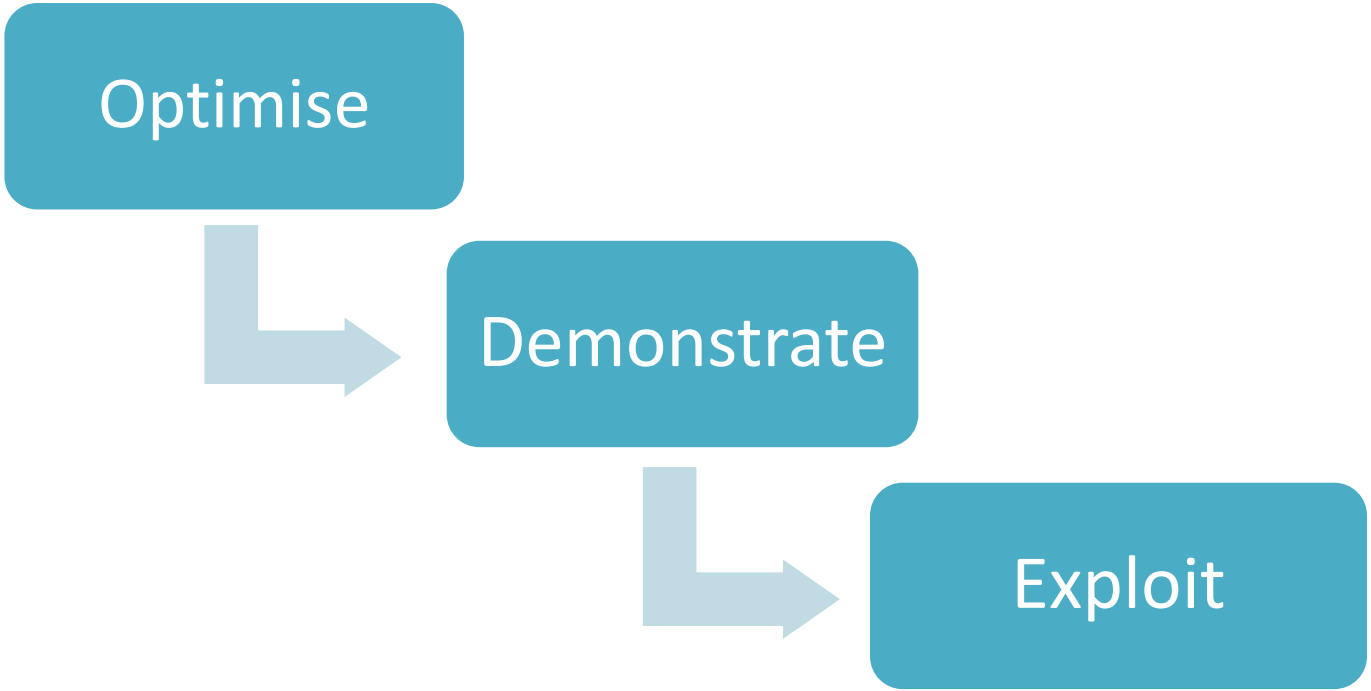

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CONSORTIUM

GHENT UNIVERSITY

boydens engineering

KU LEUVEN

DTU

uponor

ENERGOKLASTR

Maastricht University

climate futures

REHVA
Federation of European Heating, Ventilation and Air-conditioning Associations

Geoter
GEOTHERMAL ENERGY

VIESSMANN
climate of innovation

LEMON • CONSULT •
• ENERGY • EFFICIENCY • ENGINEERING •

The project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 723649. The original project acronym is "MPC-.GT".

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HYBRIDGEOTABS PROJECT

Model Predictive Control and Innovative System Integration of GEOTABS in Hybrid Low Grade Thermal Energy Systems

Sept 2016 – Sept 2020

Horizon 2020 Research and Innovation Action 723649

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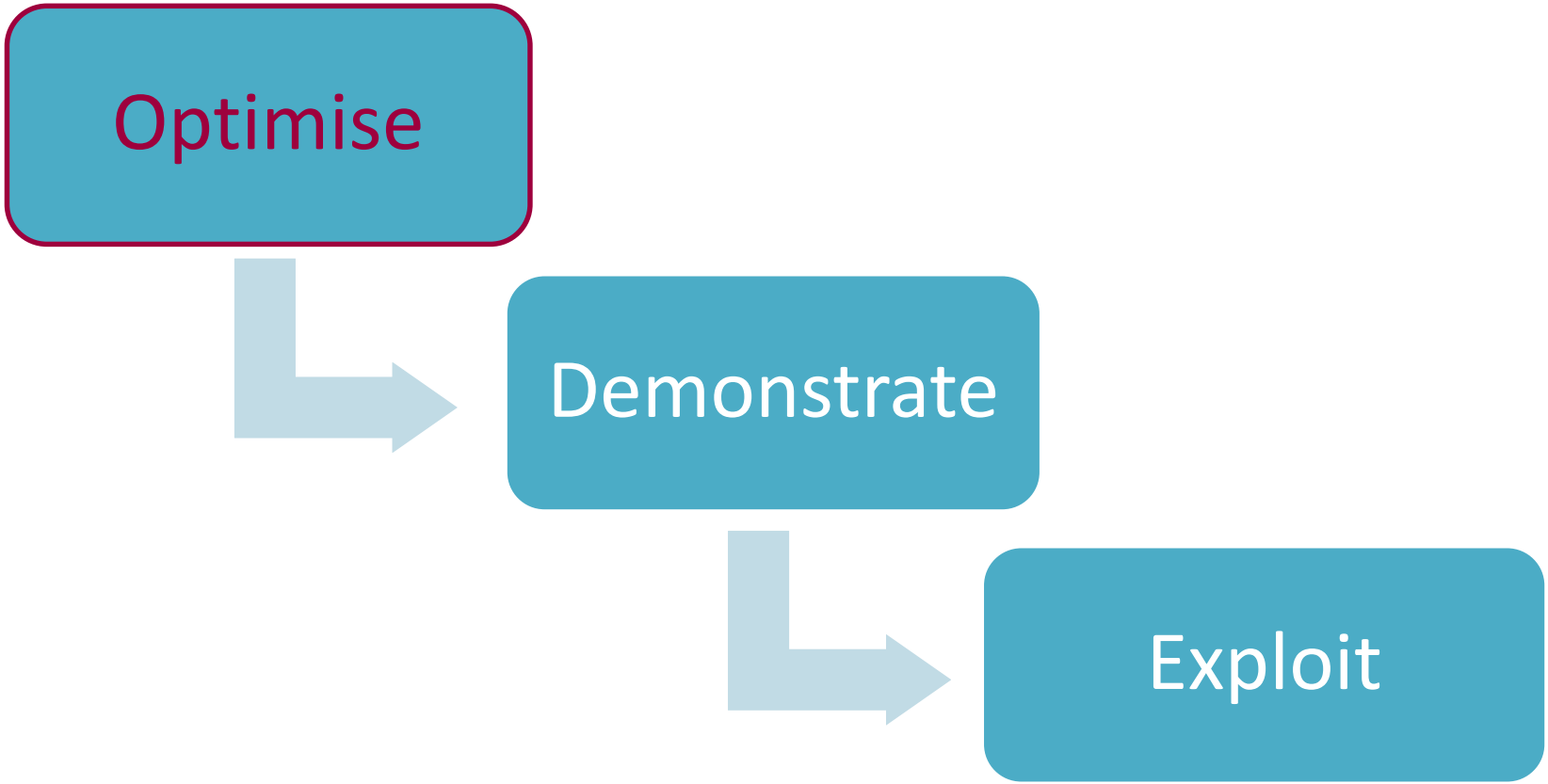


OPTIMISE HYBRIDGEOTABS DESIGN

- Optimal **sizing and integration** of the system components,
  - ➢ optimising energy efficiency, comfort and costs

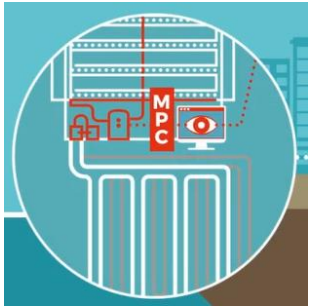
- Short and **straightforward design** phase
  - ➢ reducing design costs and efforts

➢ **hybridGEOTABS handbook and tools**
for feasibility and predesign

OPTIMISE HYBRIDGEOTABS CONTROL

- Use **Model Predictive Controls** (MPC)
  - optimising energy efficiency / CO2-emissions, costs, comfort…
  - Energy use reductions estimated 10-25%, compared to RBC

- Developing MPC toolchain
  - **(semi-)automate control development**
  - Develop start-up strategy, adaptive and robust control
  - Reduce develop and commissioning efforts



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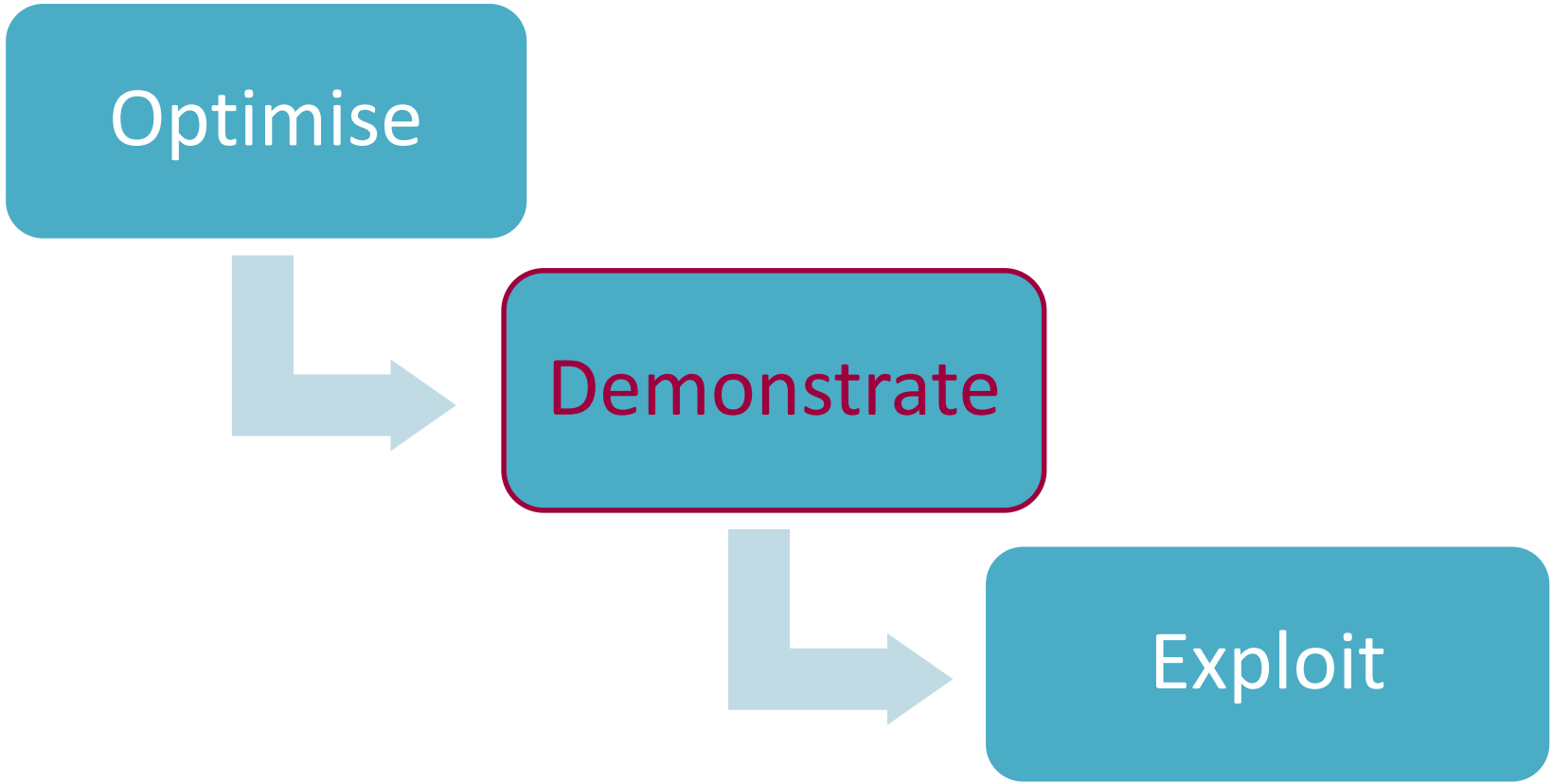

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DEMONSTRATION AND CASE-STUDY BUILDINGS

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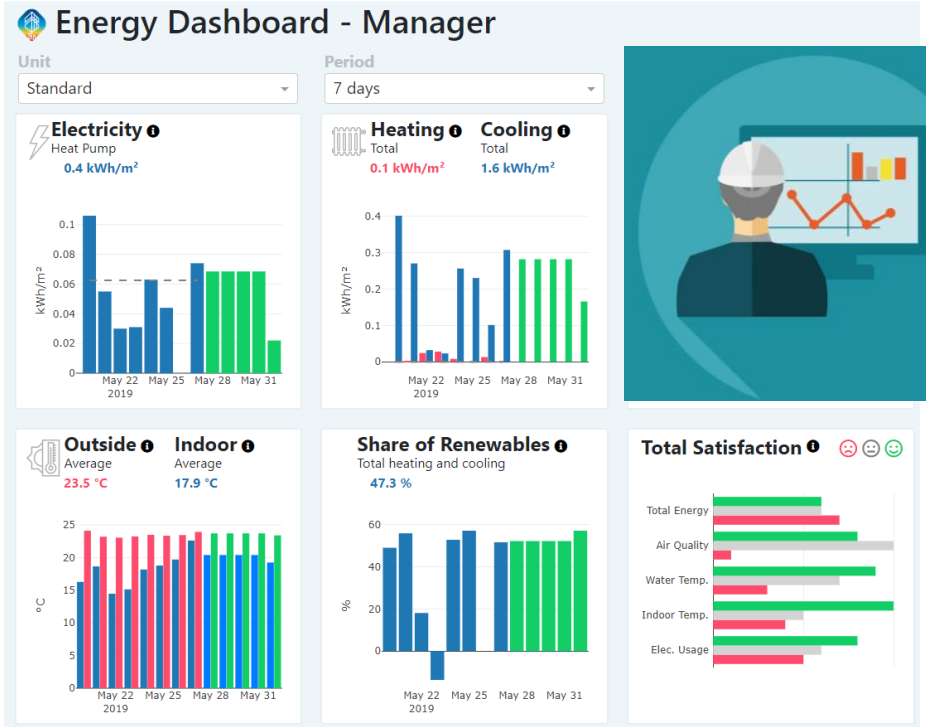
DEMONSTRATION AND CASE-STUDY BUILDINGS

- **Demonstrate** hybridGEOTABS
- **Implement** MPC
- **Test** design method



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DEMONSTRATION AND CASE-STUDY BUILDINGS

- **Performance assessment!**
  - Real-life measurements
  - Virtal test-bed: BES-models
- KPI:
  - ➢ Energy & Environment
  - ➢ IEQ, health & productivity
  - ➢ Financial cost

PEOPLE PLANET PROFIT VALIDATION

Assess **feasibility and performance** of hybridGEOTABS

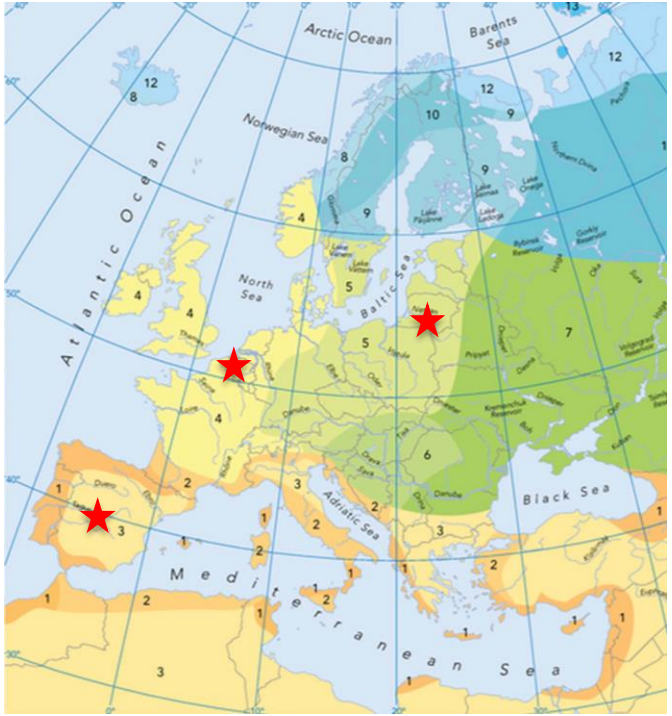
- European climates
- European building stock

  schools, multi-family,

  office, elderly home

  > 1000 m² GFA

➢ **Cost-Benefit Analysis**



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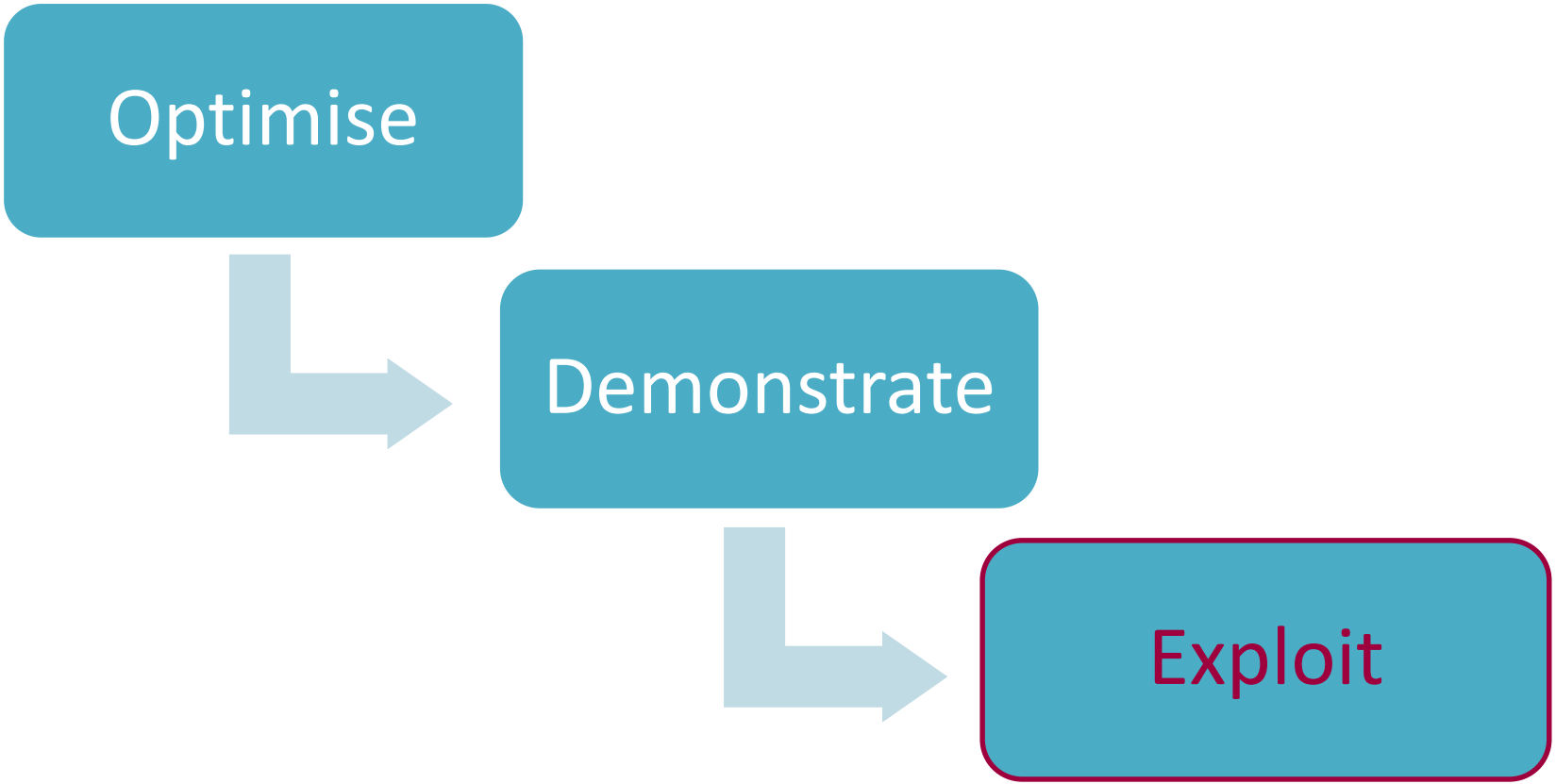

IMPROVE COMMERCIAL ATTRACTIVENESS

- Cost-Benefit Analysis & Market analysis
  - ➢ **Business plan**
- Industrialisation: pre-engineering and prefabrication
  - ➢ **Efficient design and integration of components**

    e.g. EGRT for optimized borehole sizing
- Integration of hybridGEOTABS in the building process
  - ➢ Fast and efficient design, tendering, assembly and commissioning
- Develop PCM-integrated heat/cool panels (R&D)
  - ➢ **Broaden application**: TABS in renovation

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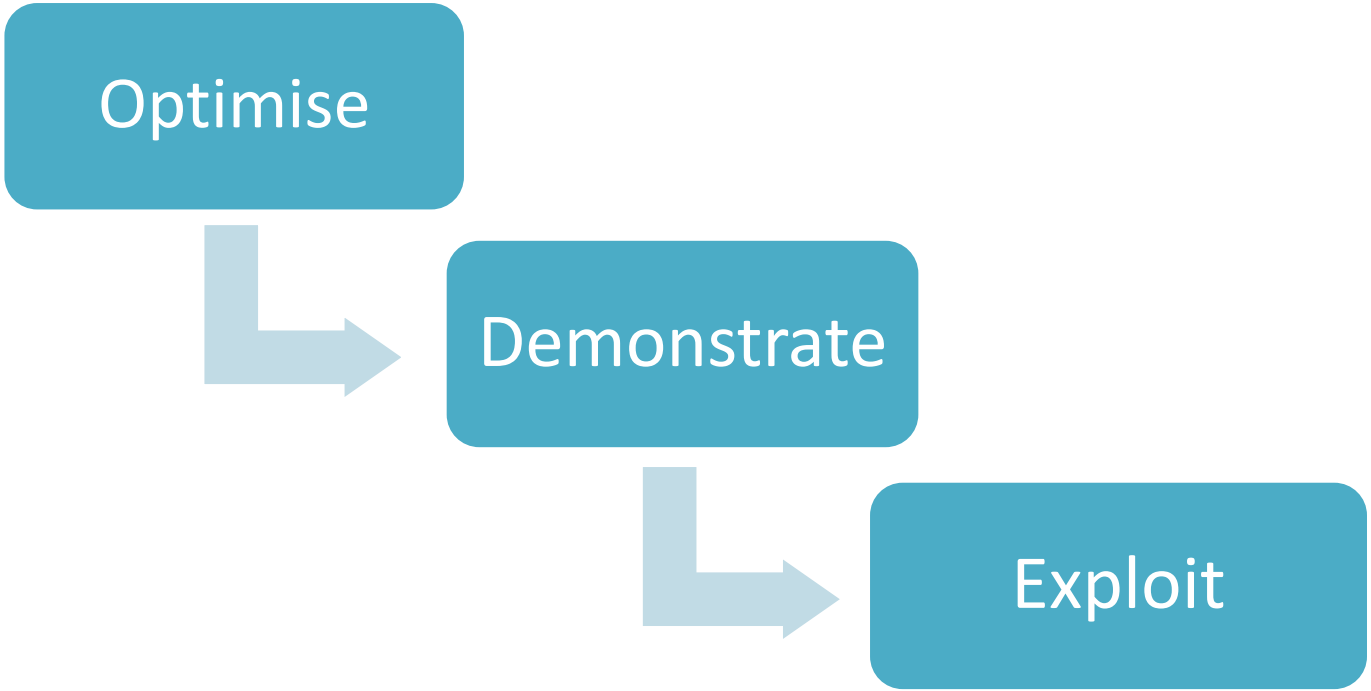

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