PyCATSHOO

Addressing critical dependencies in the Probabilistic Performance Assessments of multi-purpose systems with PyCATSHOO

Hassane CHRAIBI, Dominique VASSEUR,
Tu Duong LE DUY, Mickaël HASSANALY

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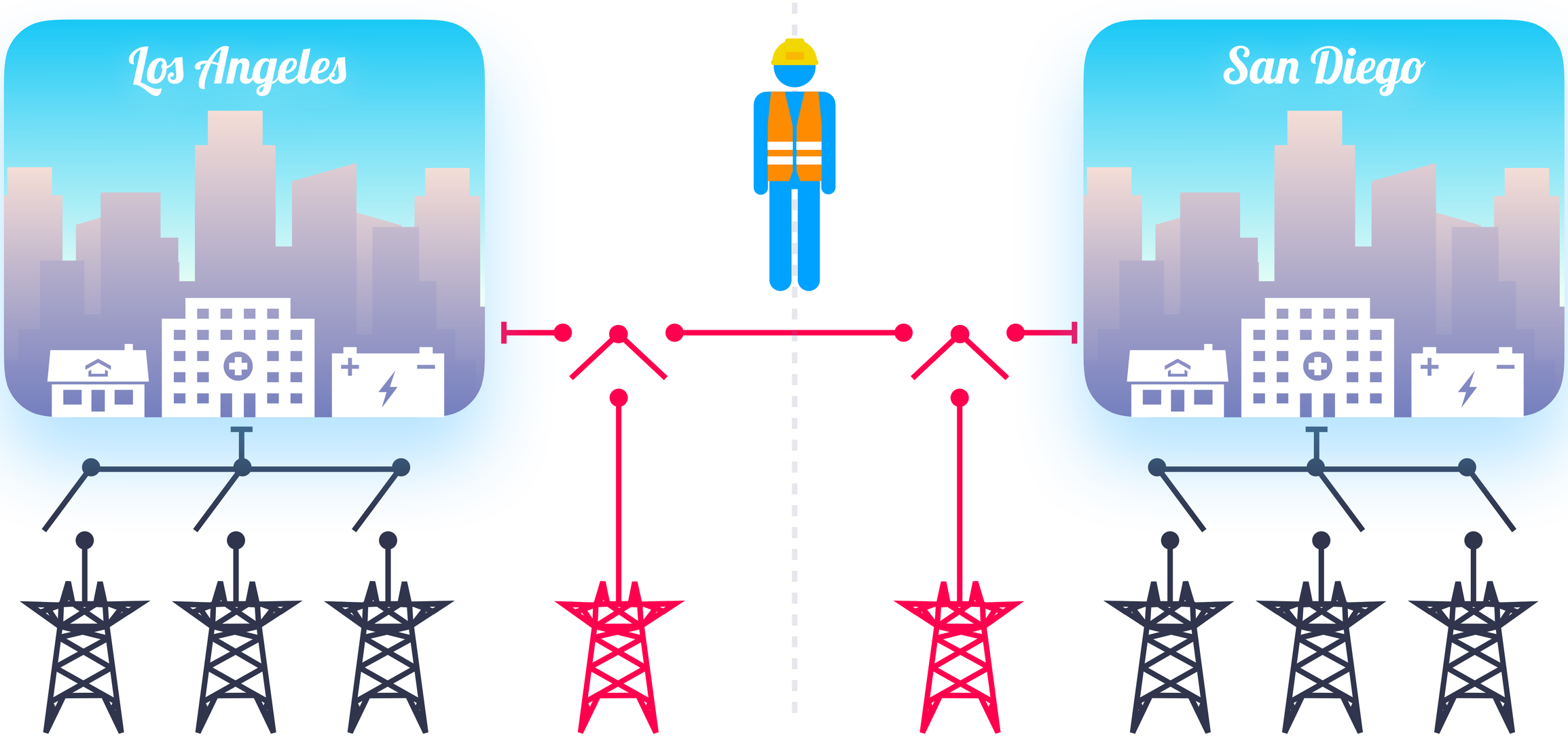
PPA OF INTER-DEPENDENT SYSTEMS

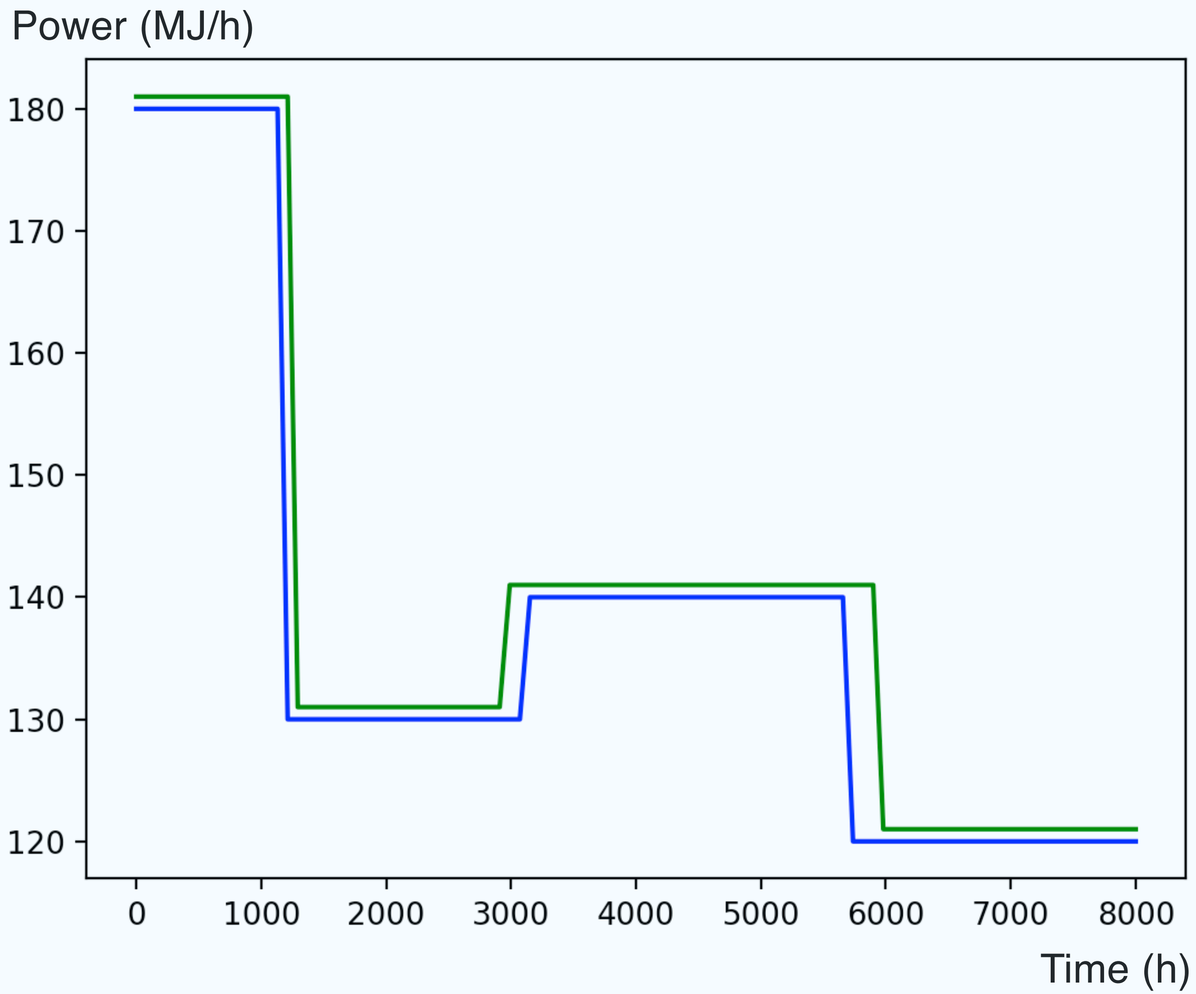
DEPENDENCY TYPES

Type 1	A device started/stopped according to the **physical state of the system**.
Type 2	A **device usage shared** between multiple areas and assigned to one of them according to a **priority criteria which evolves over time**.
Type 3	A **human action shared** between the same kind of activities in two different areas with different **priorities which evolve over time**.
Type 4	A **human action shared** between two kinds of activities with different but **predefined priorities**.
Type 5	An action which **duration** depends on a **severity measure of the operating context**.
Type 6	An action which **failure probability** depends on a **severity measure of the operating context**.

ELECTRICITY SUPPLY



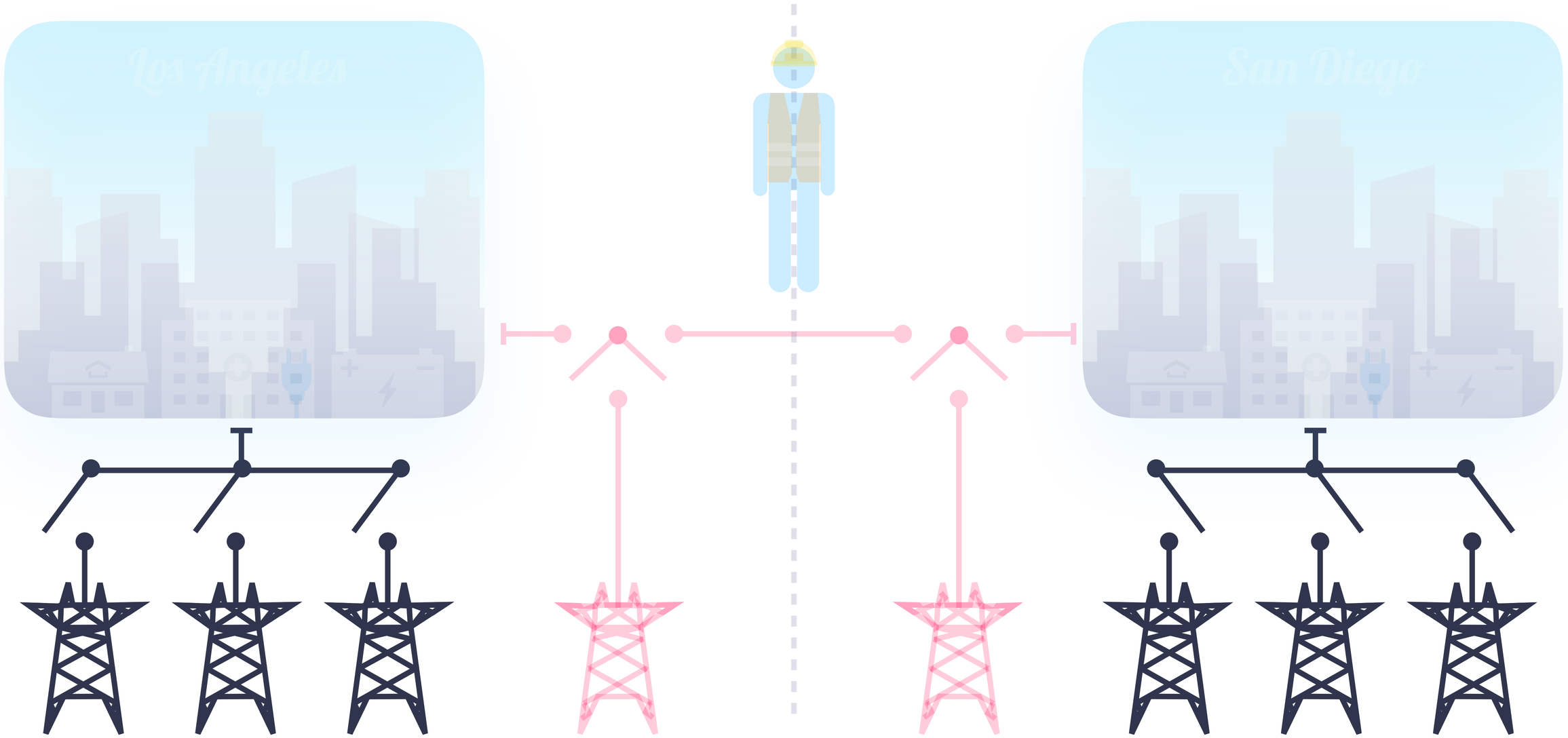
ELECTRICITY DEMAND



Los Angeles

San Diego

ELECTRICITY SUPPLY



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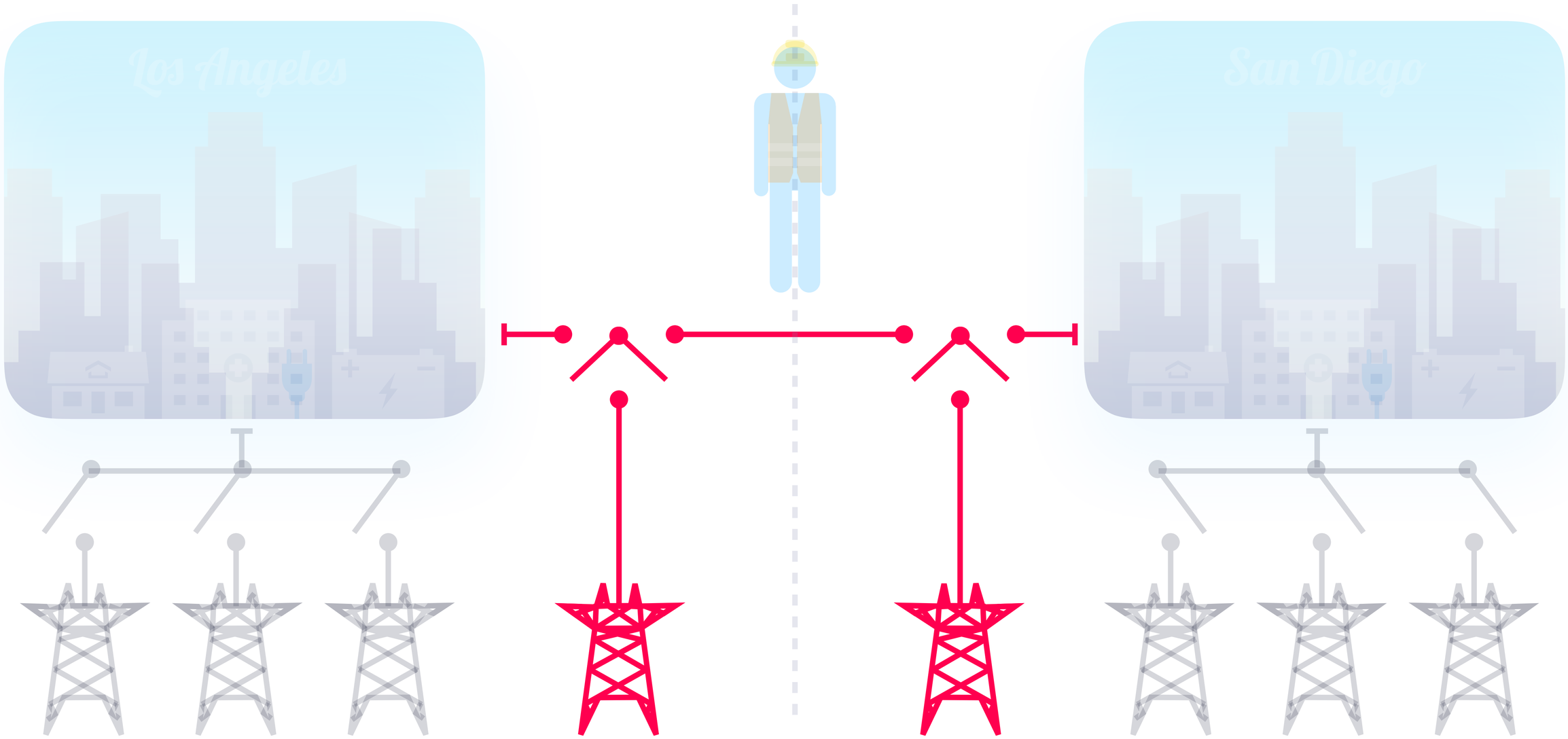

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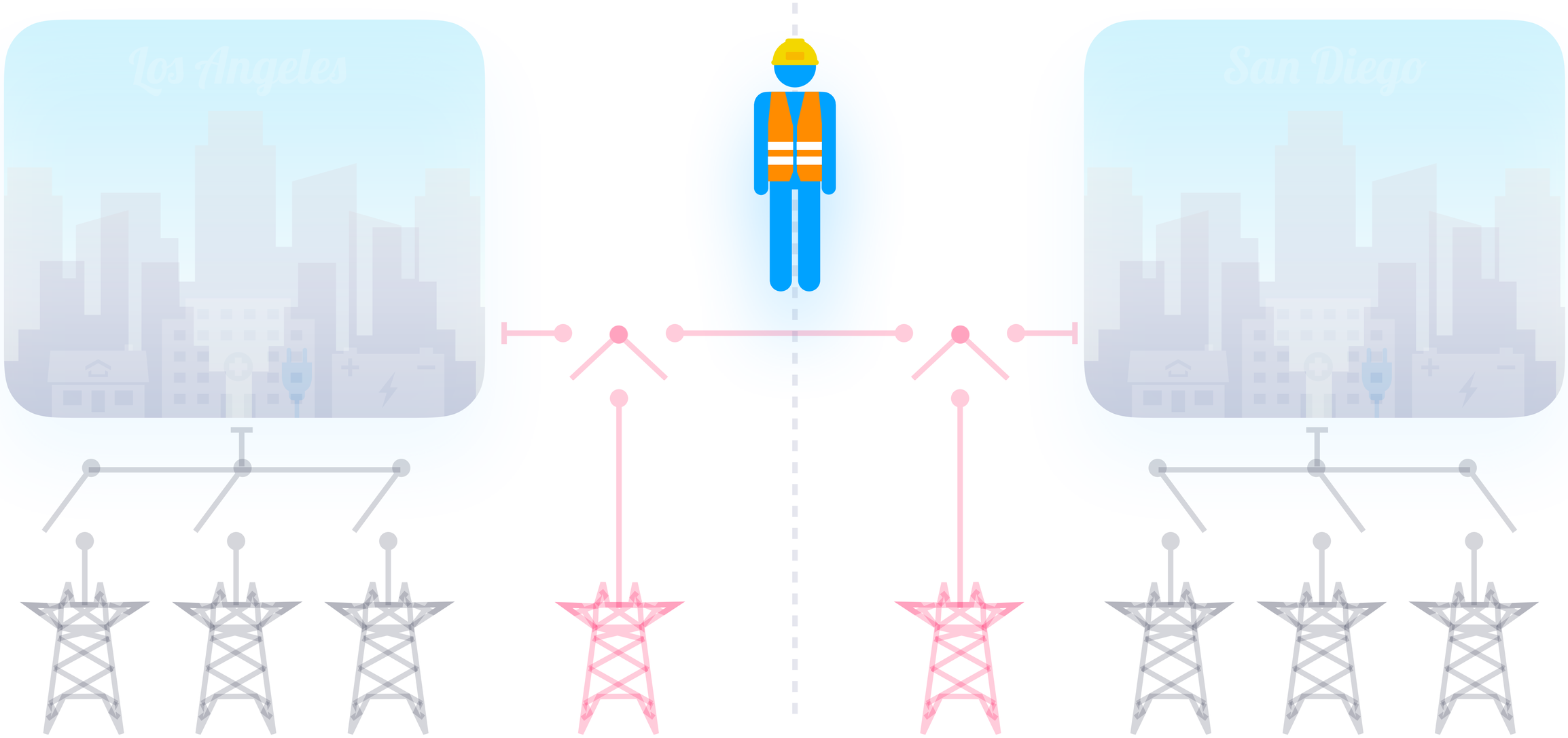


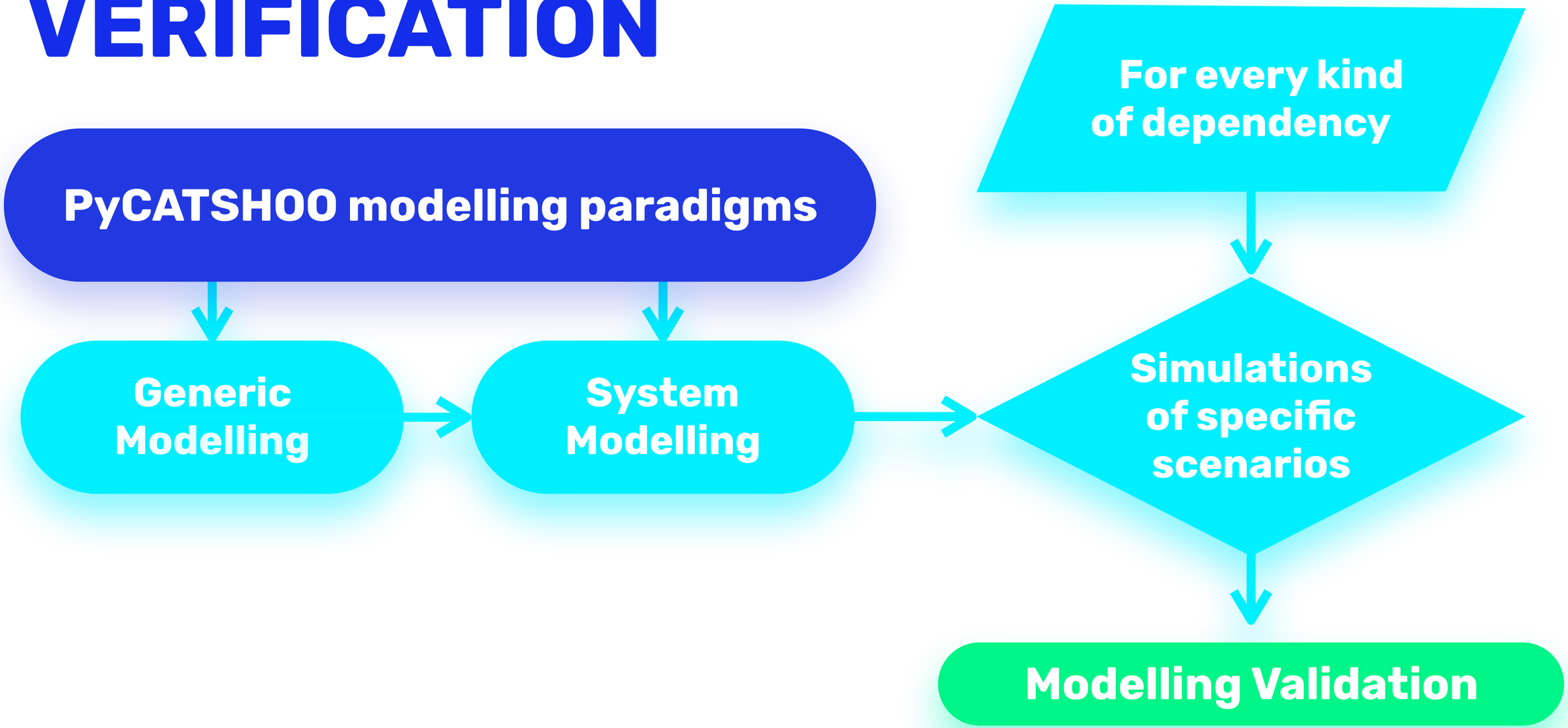
PyCATSHOO

HYBRID MODELLING

CONTINUOUS AND DETERMINISTIC PHYSICAL PHENOMENA

DISCRETE STOCHASTIC EVENTS

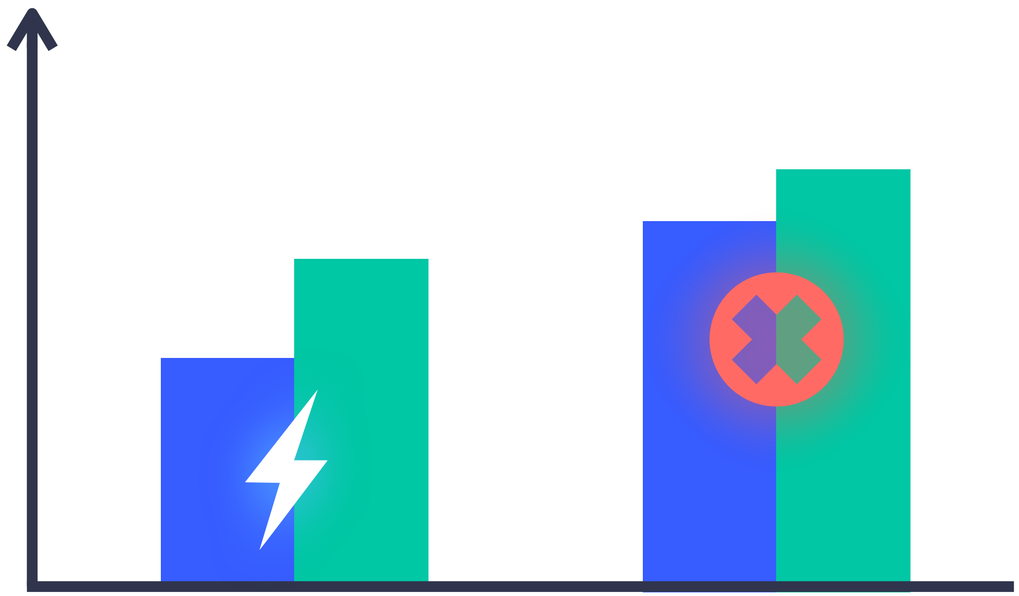
SYSTEM MODELLING
VERIFICATION



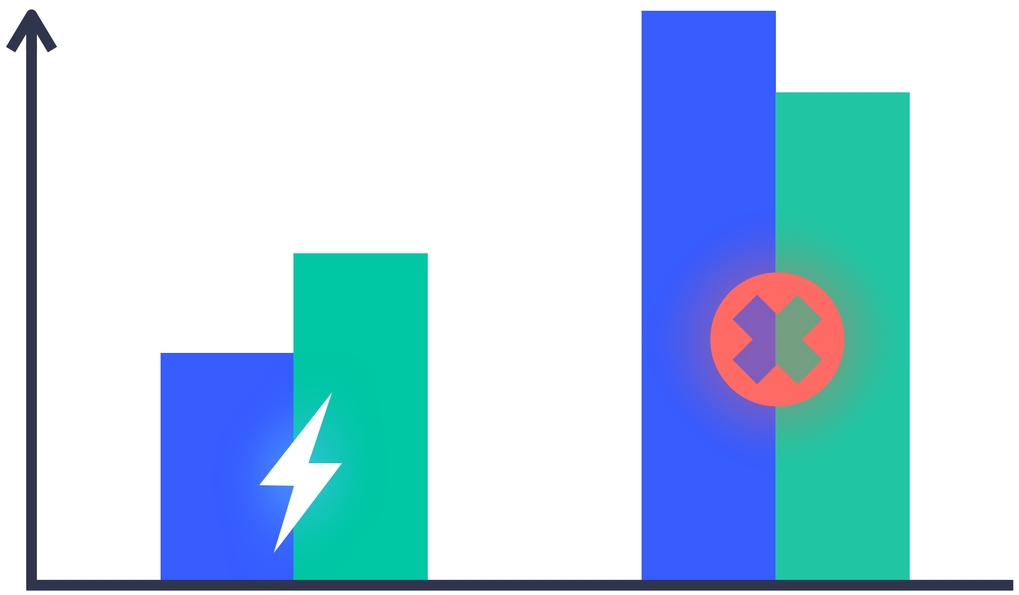
RESULTS OF THE PPA

Los Angeles
San Diego

Separated
Electricity Supply



Common
Electricity Supply



2 INTRODUCTION TO PYCATSHOO

MODELLING

BUILDING A **MODEL LIBRARY OF GENERIC COMPONENTS**

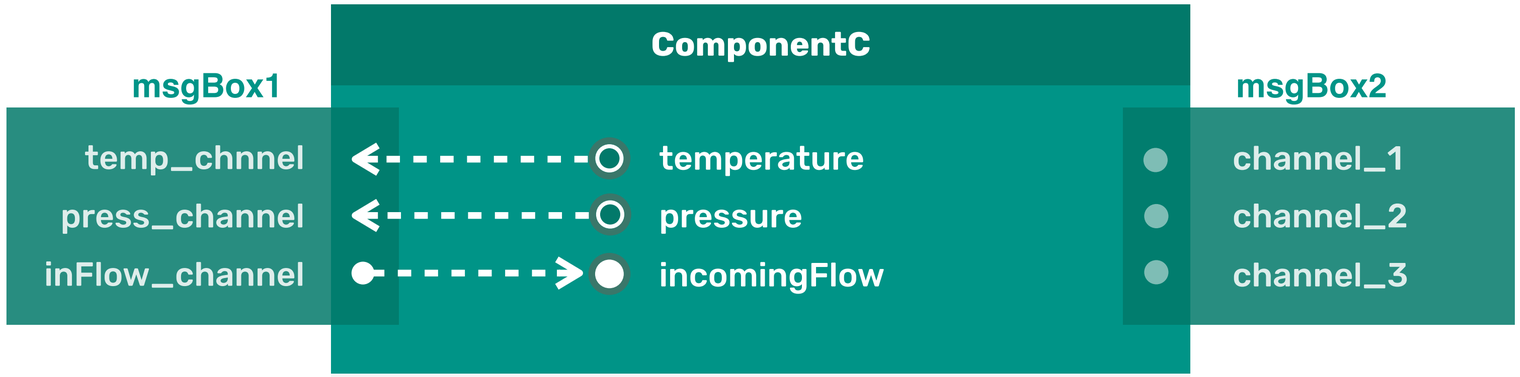
1

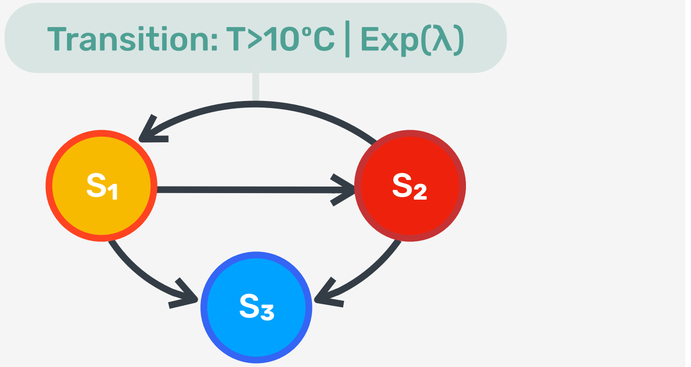
MODELLING A **SPECIFIC SYSTEMS**

2

BUILDING A MODEL LIBRARY OF GENERIC COMPONENTS

1





ODE: $\frac{dX}{dt} = f(X, t)$

SLE: $A \cdot X = B$

MILP: $maximize \quad C^T X$ $such\ that \quad A'x \leq B'$

Sensitive methods

References: new values

Continuous or discrete **intrinsic** state variables

Reference to a **Stimulus** from the external world

ODE: $\frac{dX}{dt} = f(X, t)$

SLE: $A \cdot X = B$

MILP: $\begin{array}{ll} maximize & C^T X \\ such\ that & A'x \leq B' \end{array}$

Sensitive methods

References: new values

Transitions: firing

State: in / out

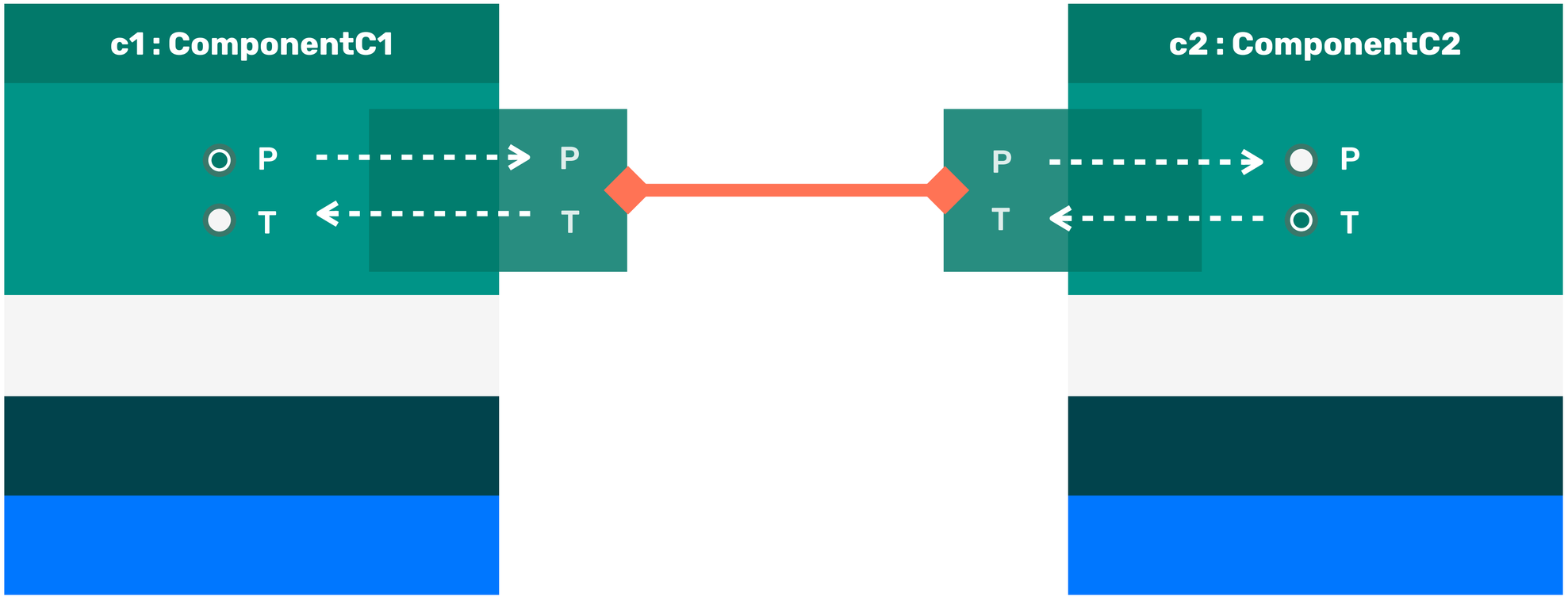
Automata: transition between states

Simulation: starting

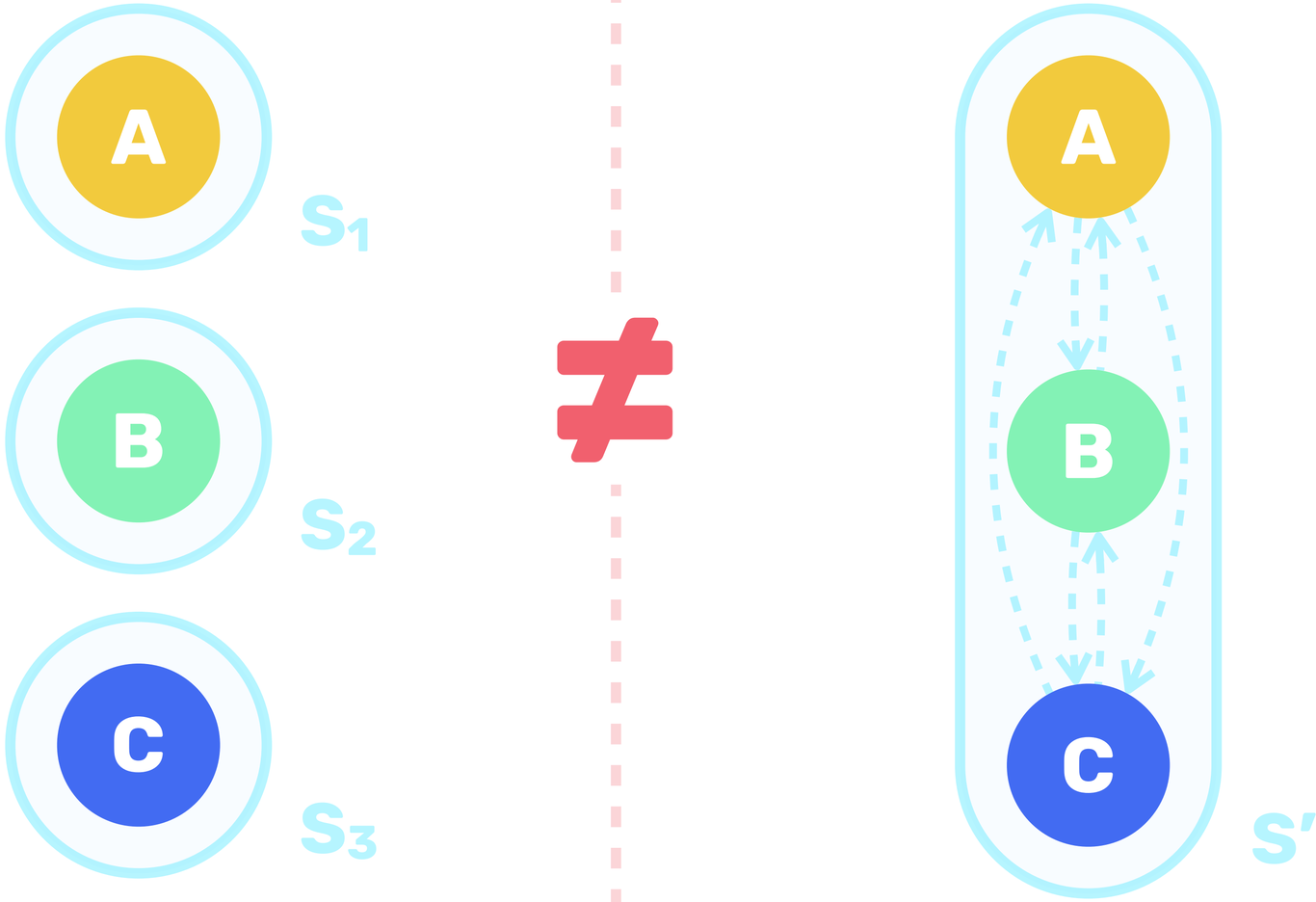
Triggers the execution of user defined actions

MODELLING A SPECIFIC SYSTEM

2


c1 : ComponentC1
P
T
P
T
P
T
P
T
c2 : ComponentC2

CONLUSION



EDF

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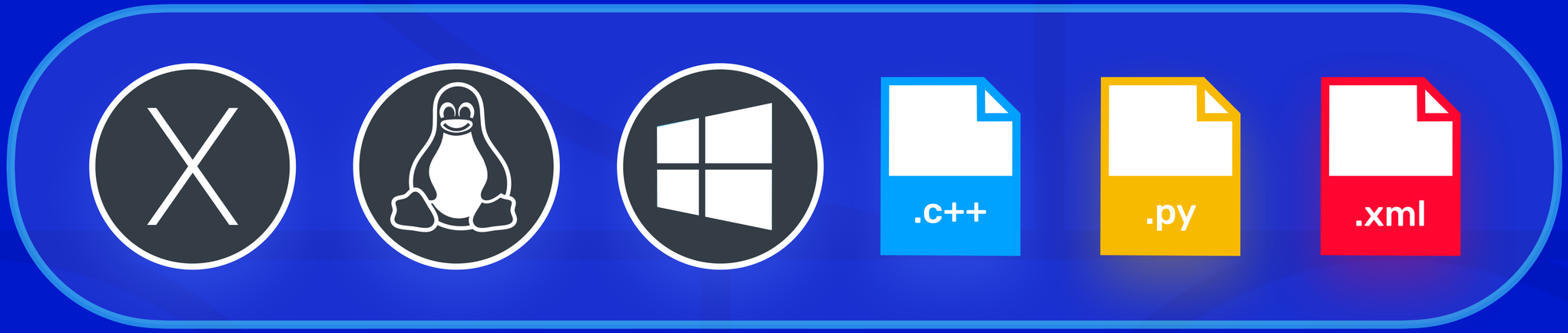

Thank you for your attention