



From Algorithms to Business Autonomics

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Motivation

We developed an algorithm.

A fine algorithm it was too.

We took it to its new home, it settled down to work well.

It did great things and everybody loved it.

It looked happy, so we left it...

The problems with static algorithms

May no longer be fit for purpose

- > Data may have changed
- > Environment may have changed
- > Priorities may have changed

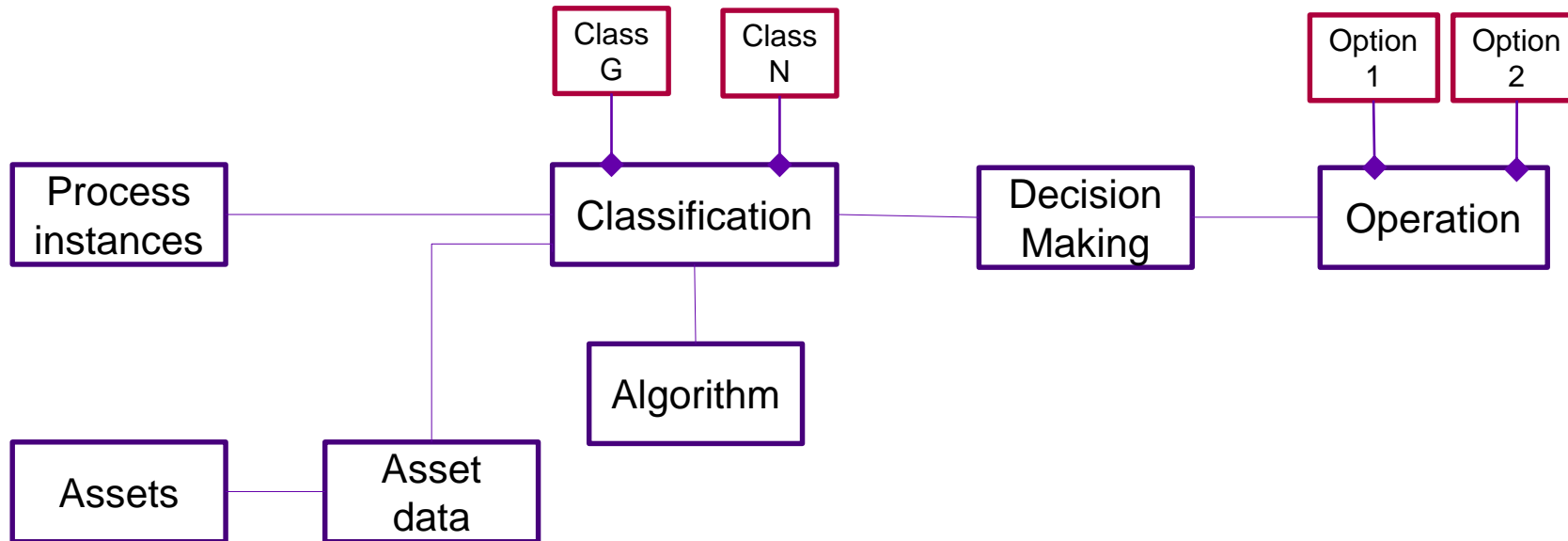
Can easily be forgotten, no ownership, no understanding

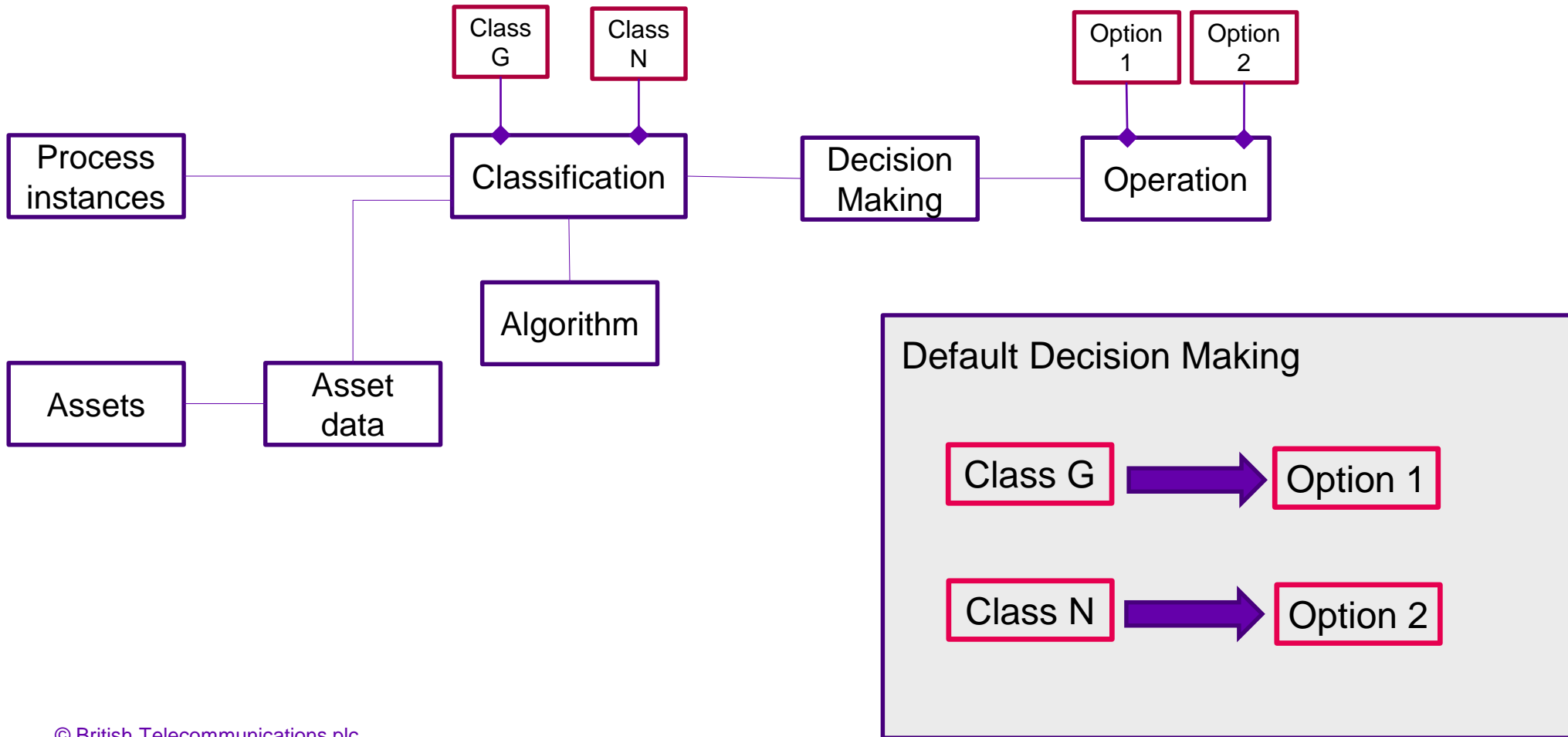
Complexity grows around it

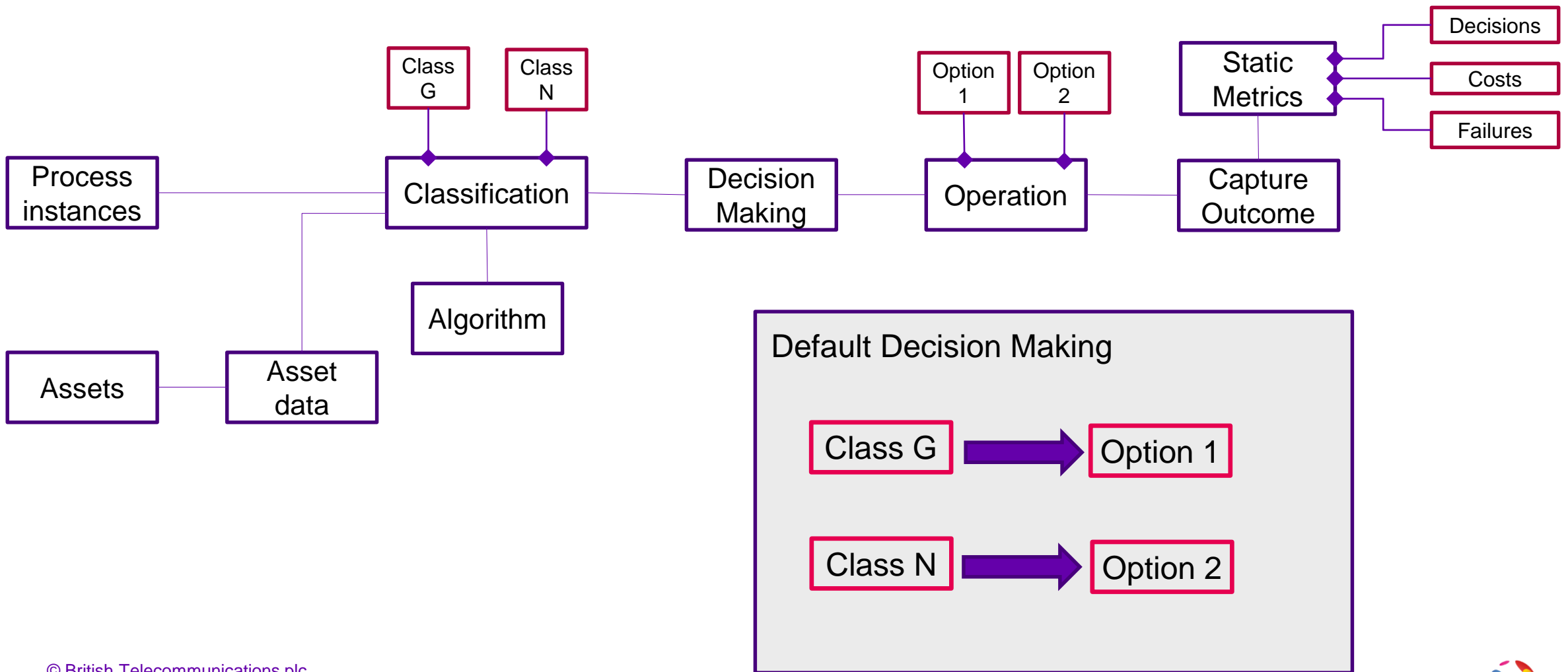
Can be costly to review

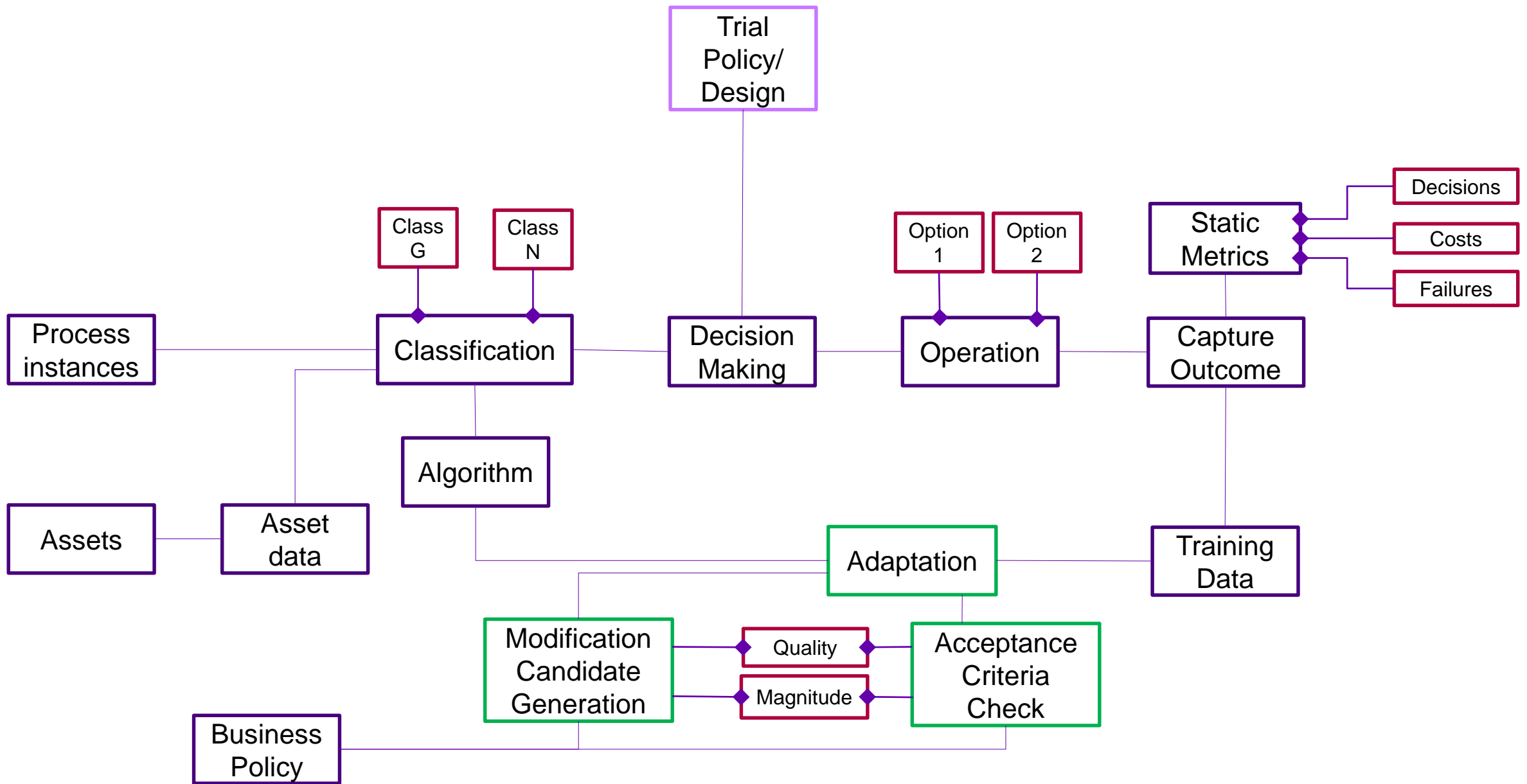
Can be costly to change

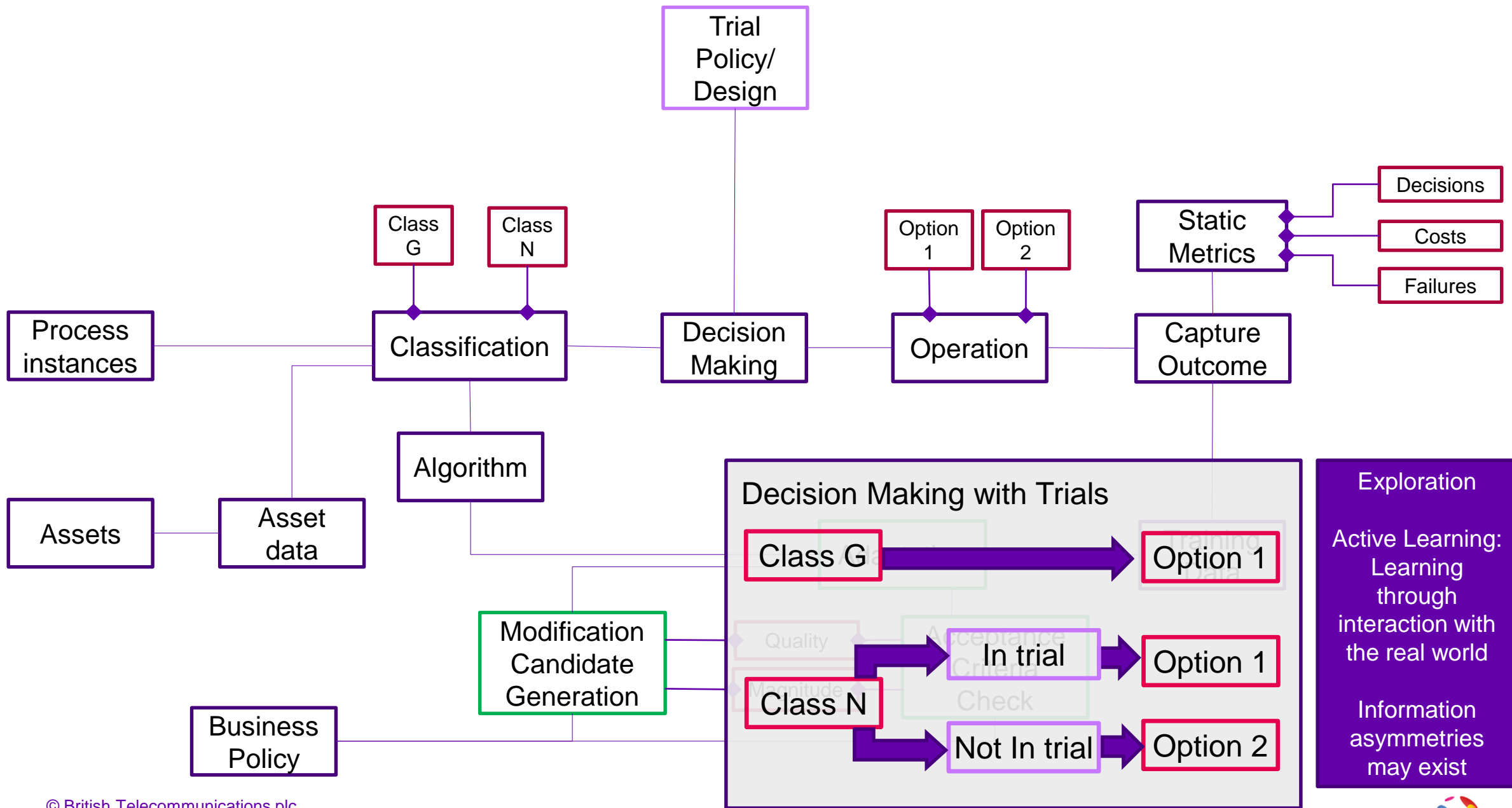
Move from algorithms towards autonomies



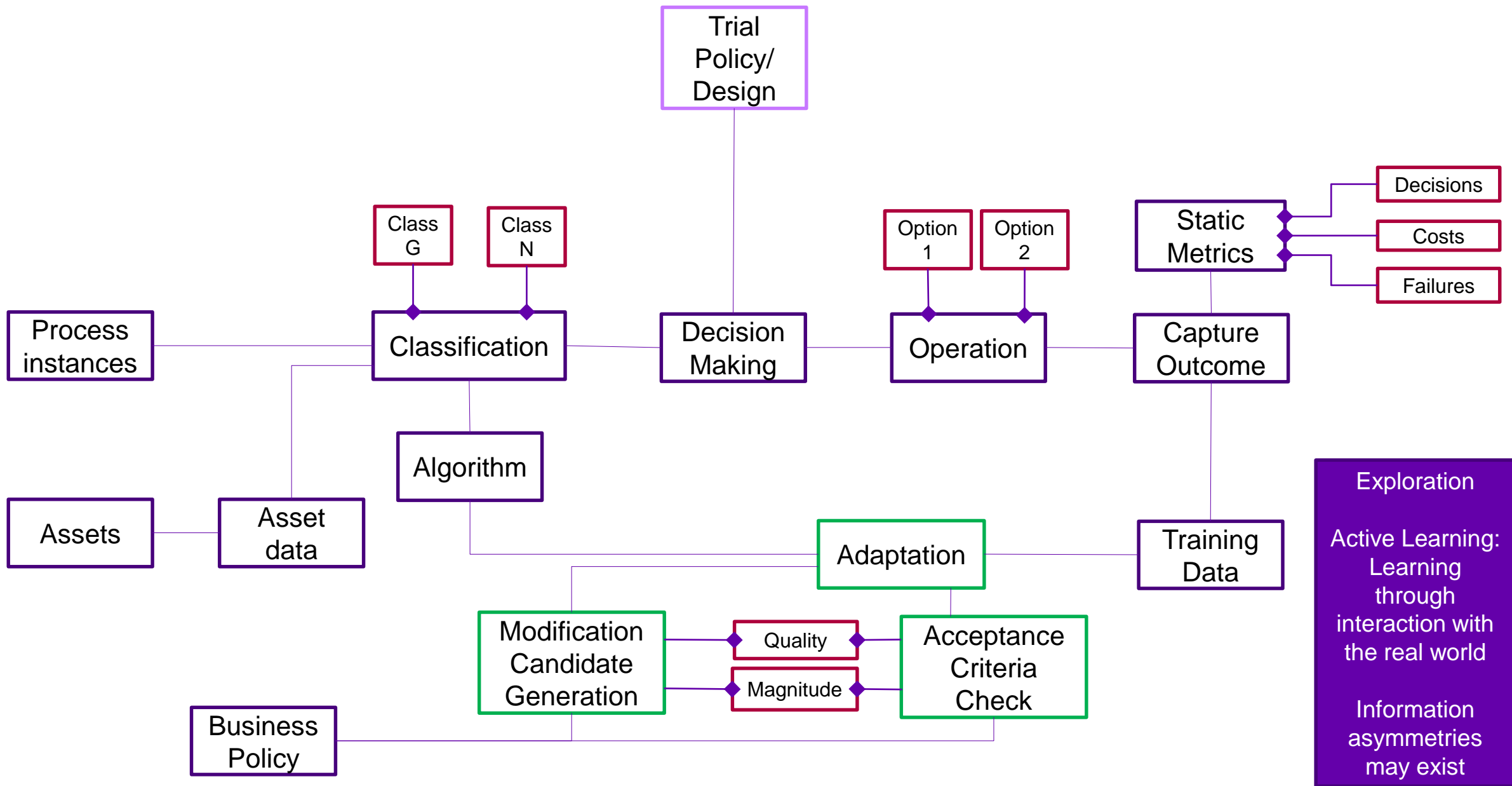








Exploration
 Active Learning: Learning through interaction with the real world
 Information asymmetries may exist

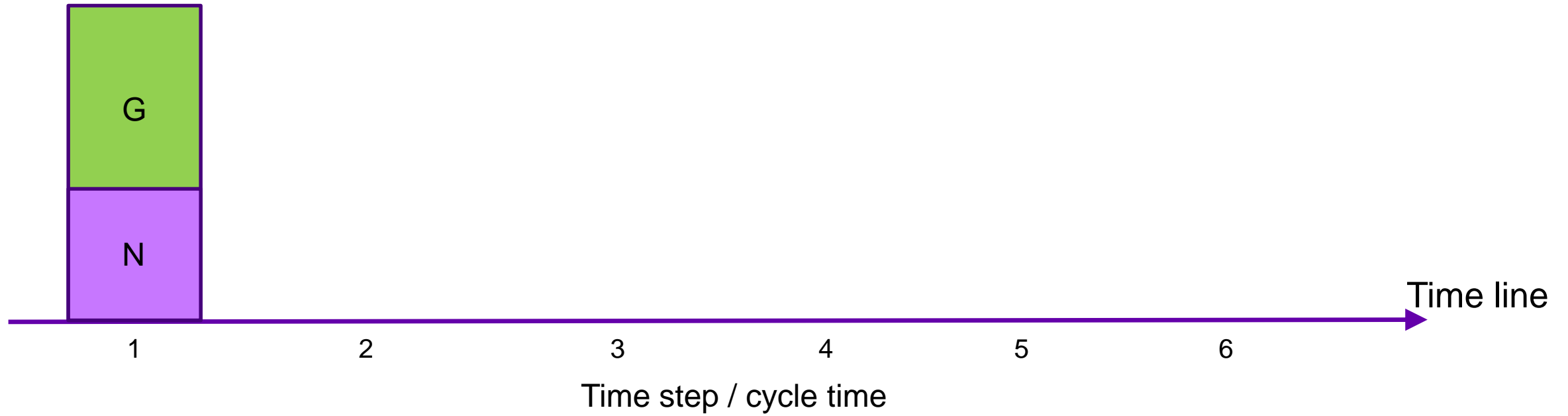


Exploration

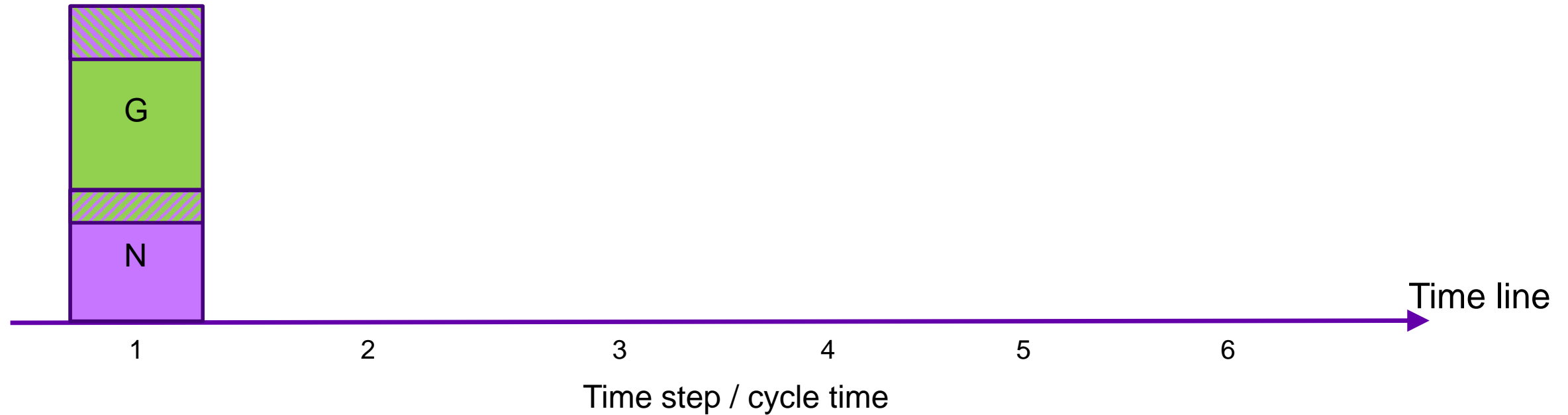
Active Learning: Learning through interaction with the real world

Information asymmetries may exist

Adapting the algorithm



Adapting the algorithm



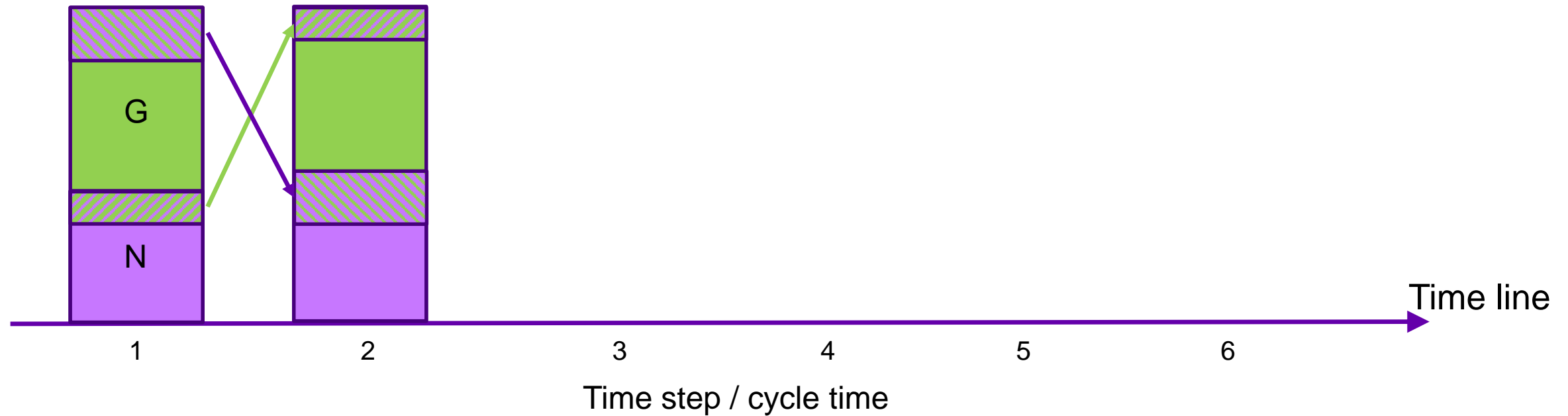
Search for candidate modifications – Trade-off

- Quality/accuracy – business policy rules
- Size threshold – accept only significant changes

The search applied an adaptive tuning of parameters

If there is an acceptable modification, it will be found

Adapting the algorithm



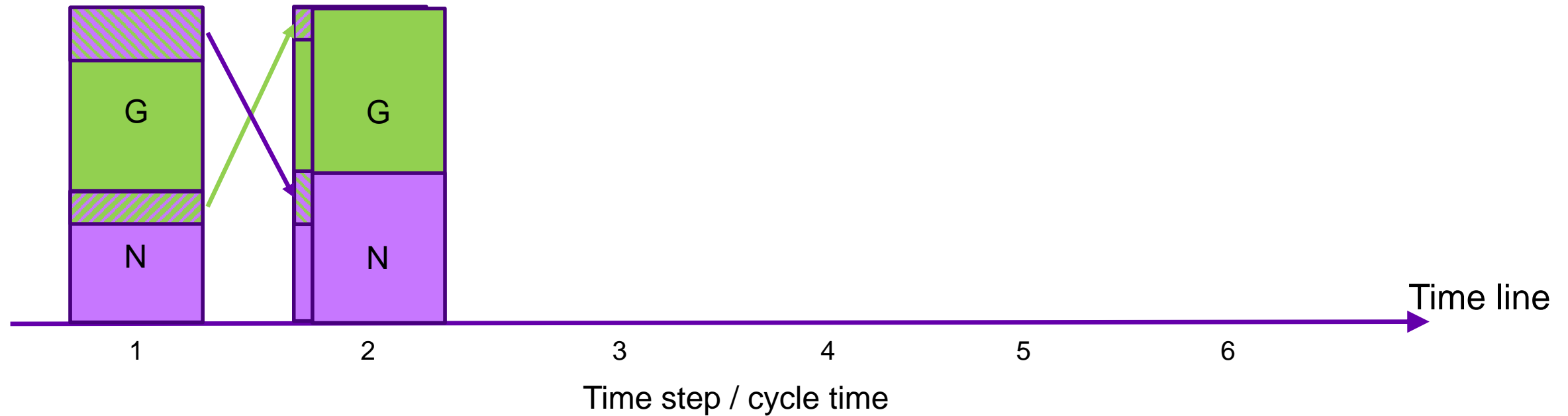
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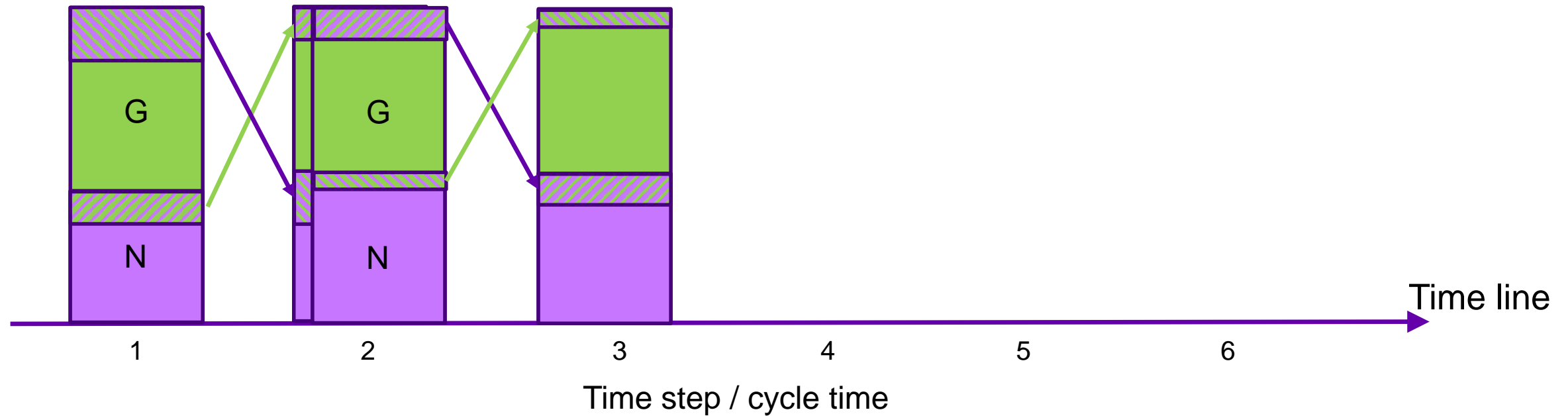
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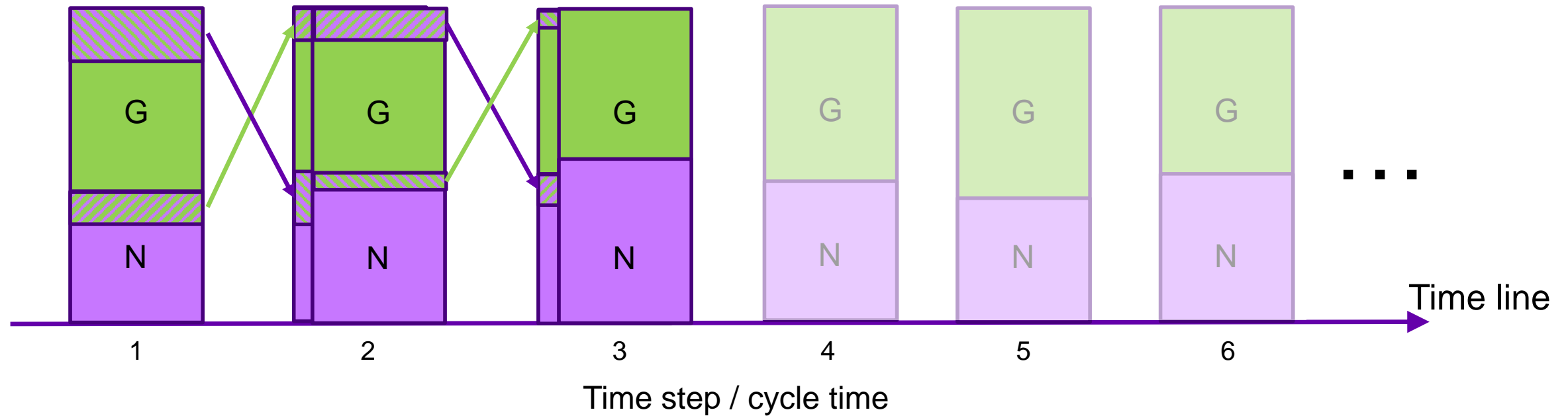
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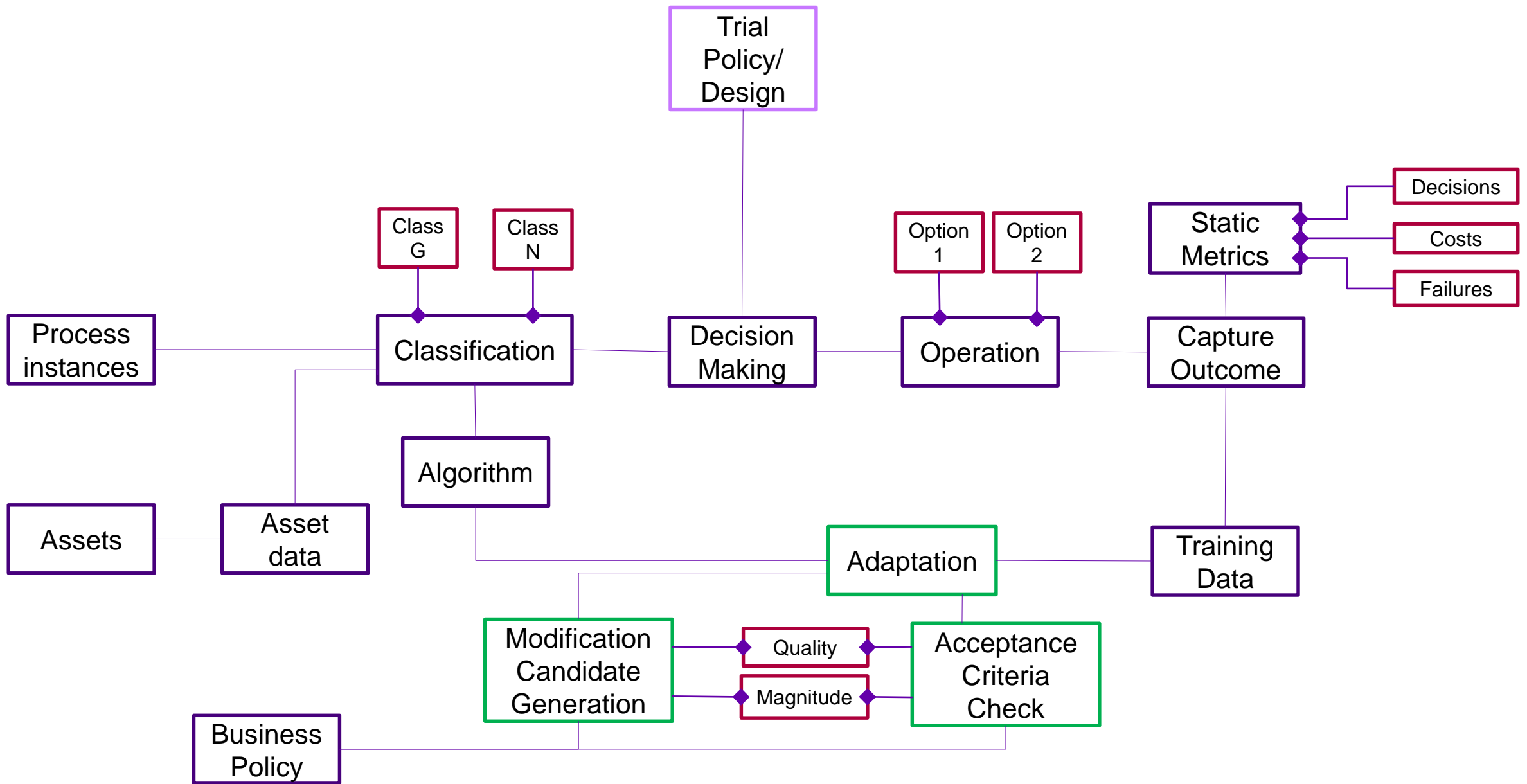


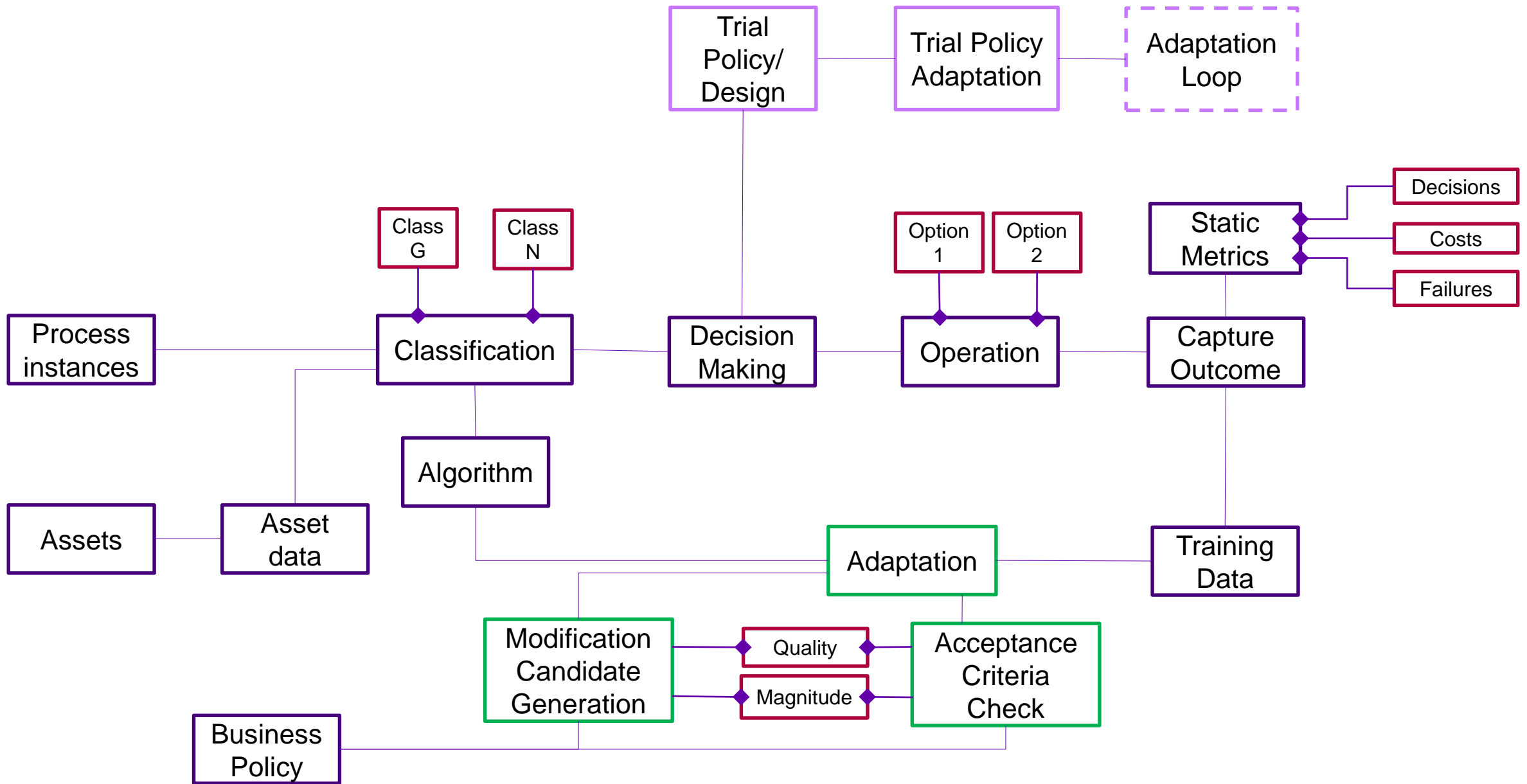
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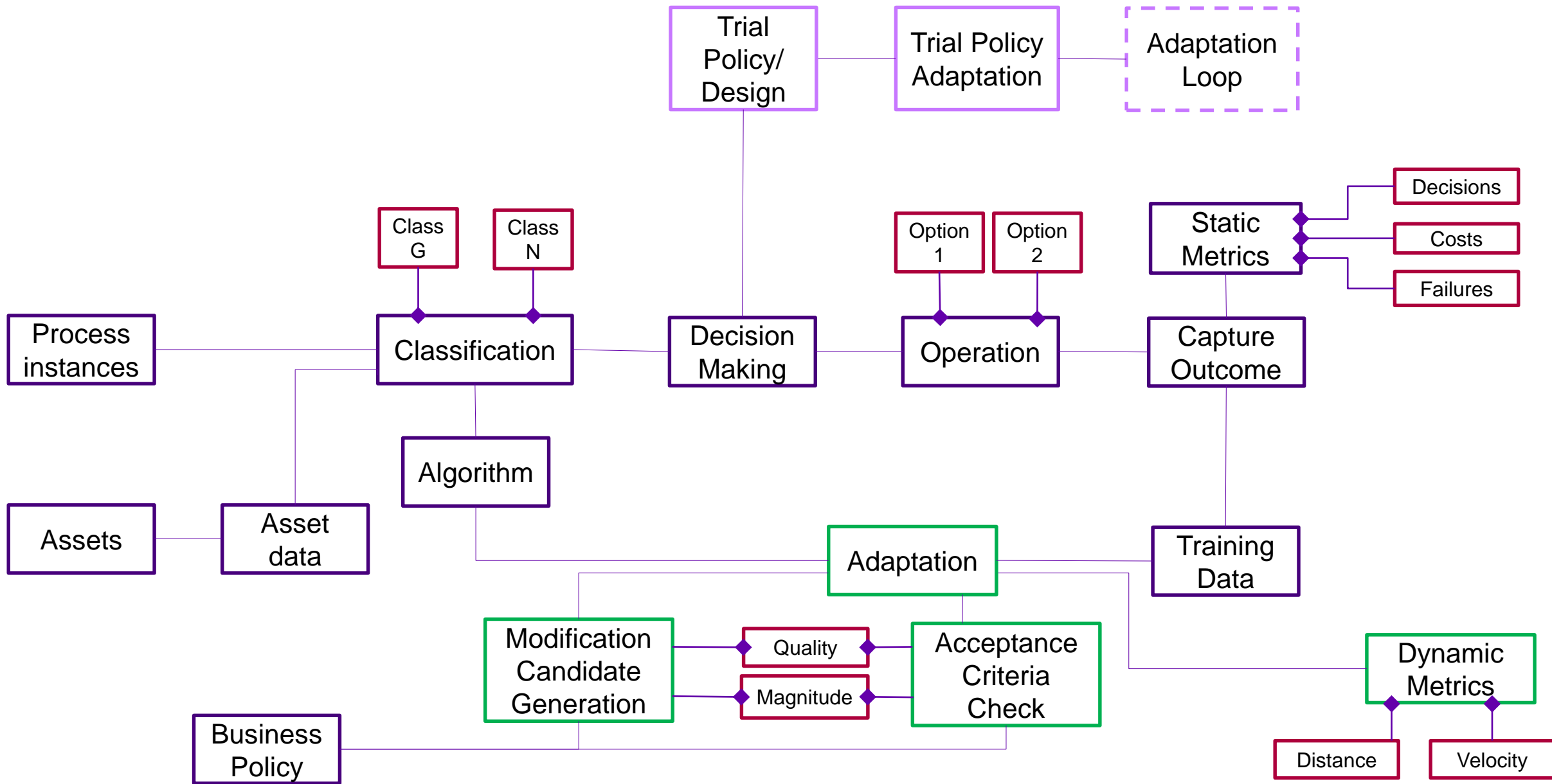
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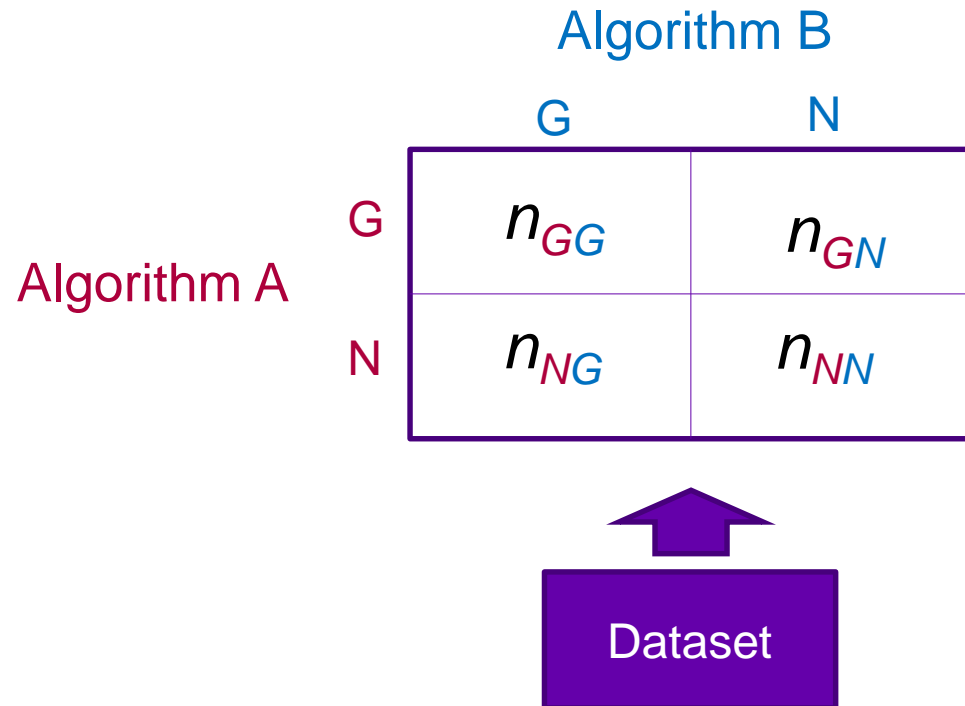
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Dynamic Metrics

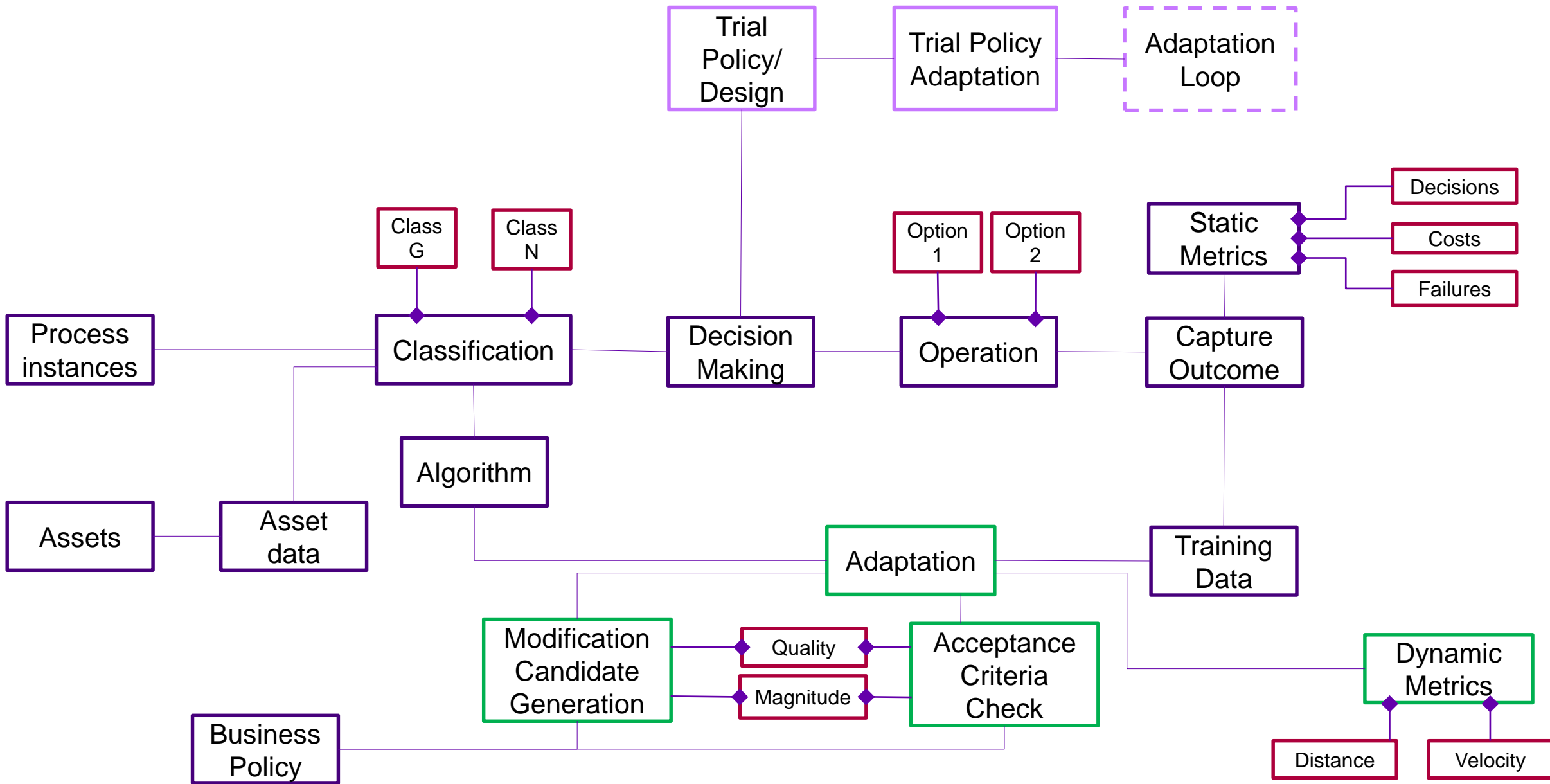


Distance between the two algorithms

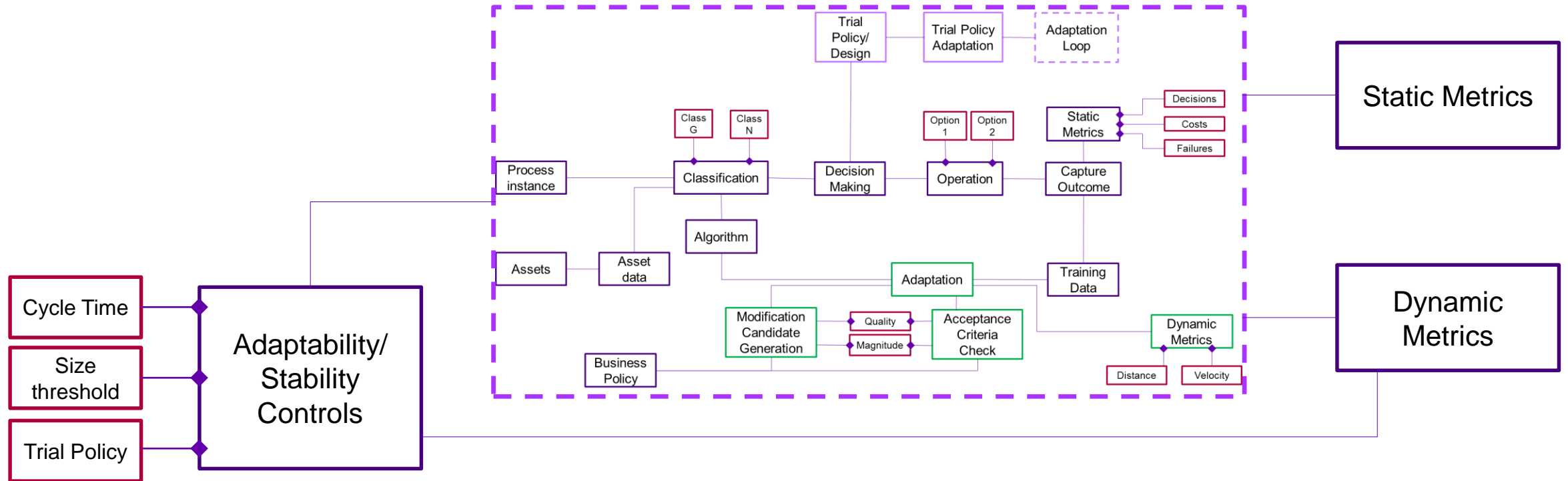
$$d = \frac{n_{GN} + n_{NG}}{n_{GG} + n_{NN} + n_{GN} + n_{NG}}$$

Velocity = Distance/time

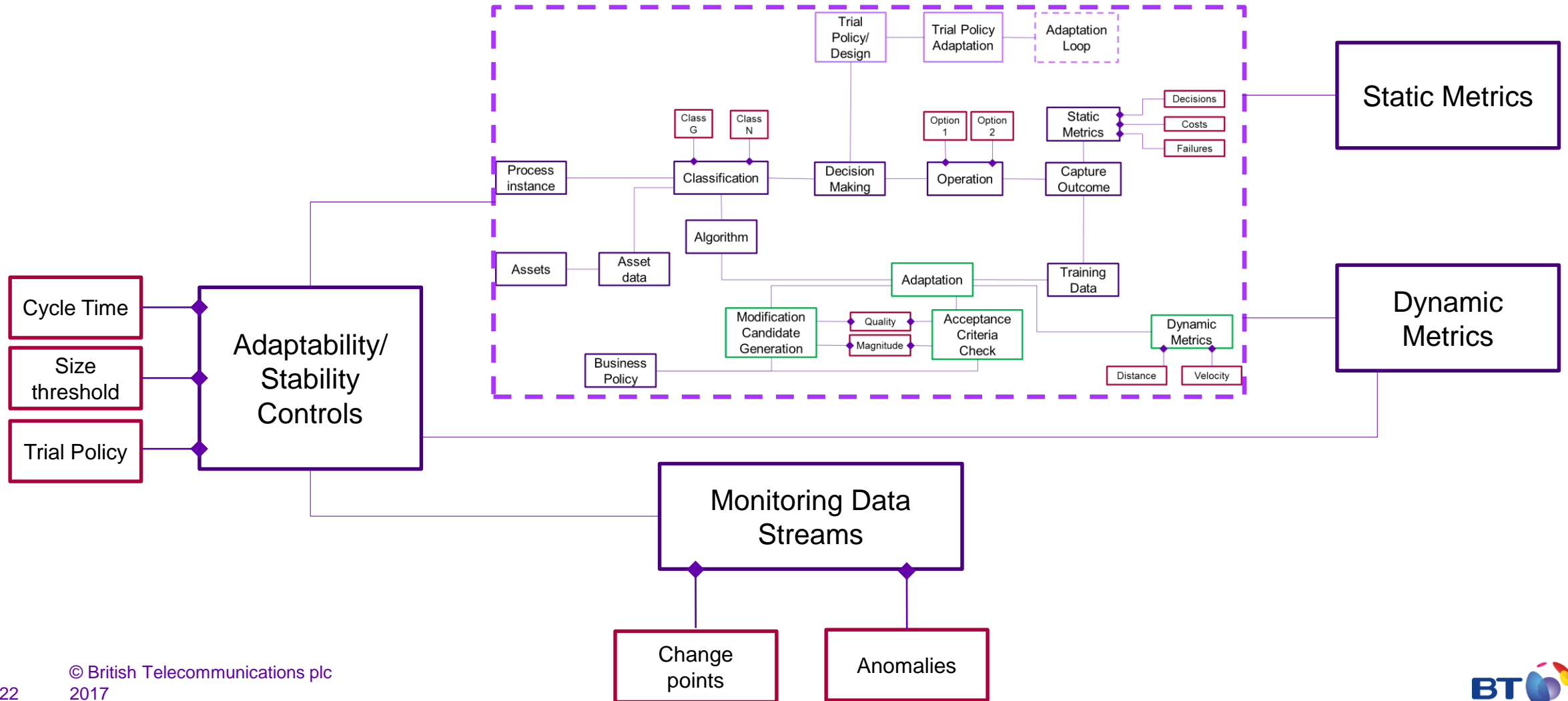
Between subsequent algorithms,
Between algorithms a fixed time span apart
etc



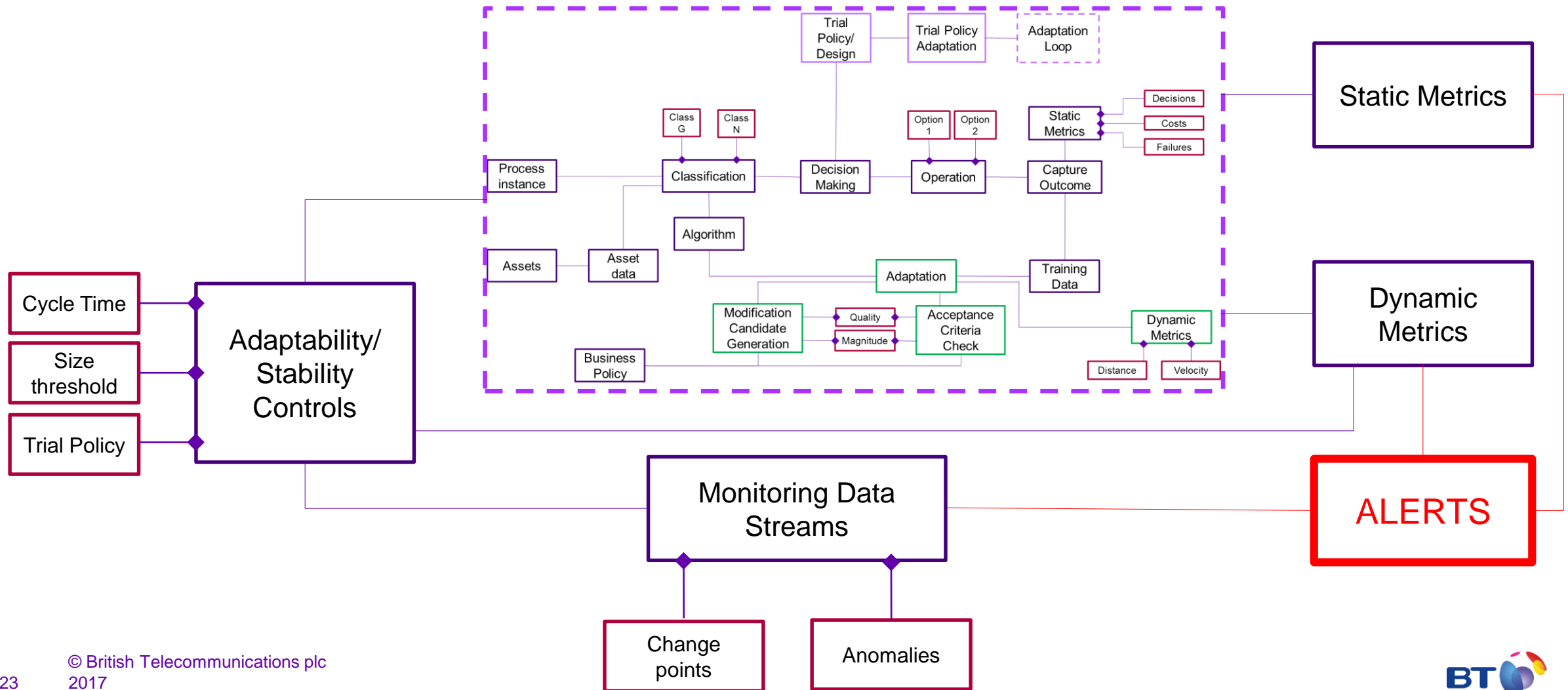
Controlling the behaviour of the system



Controlling the behaviour of the system



Controlling the behaviour of the system



Adaption and resilience

Stability in steady-state scenarios

Adaption and resilience when things change

Challenge the Process – throw things at it – see if it thrives – or at least survives

- Changing priorities
- Changing outcomes
- Changes in input data
- Missing data
- Consolidate and adapt

Development and applications

Applications

- Networks and orders – our initial playground
 - But not applied to real system
- Handling customer contacts
 - > Lift & Shift: Use exactly the same process and code
 - > With mapping of
 - Data
 - Decision
 - Outcome – costs and trade-off
 - > Currently at simulation stage – but looking to actual deployment
- Customer behaviour and customer management

Methodology

- Measurement of adaptability and stability
- Control levers
- Trust

Conclusion – key points

Algorithms need to adapt: move towards autonomics

Design business processes that are

- >Intelligent
- >Self-adapting
- >Resilient

Active learning: trials, exploration, go against the default to learn

Control for “*static*” performance: operation points, costs, failure rates etc.

Control for “*dynamic*” performance: adaptability, stability, risk



EXTRA SLIDES

