



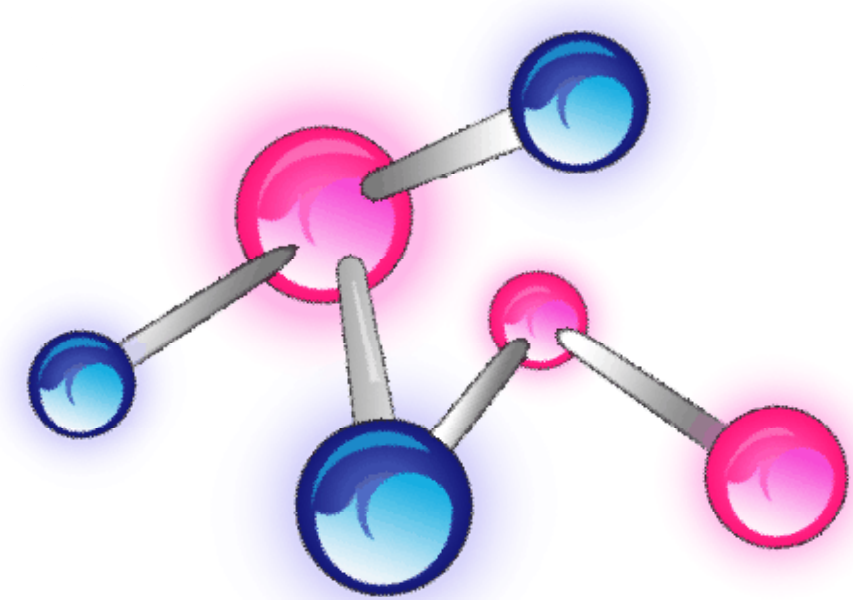
# CERIAS

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## A Review of Computer Testbeds

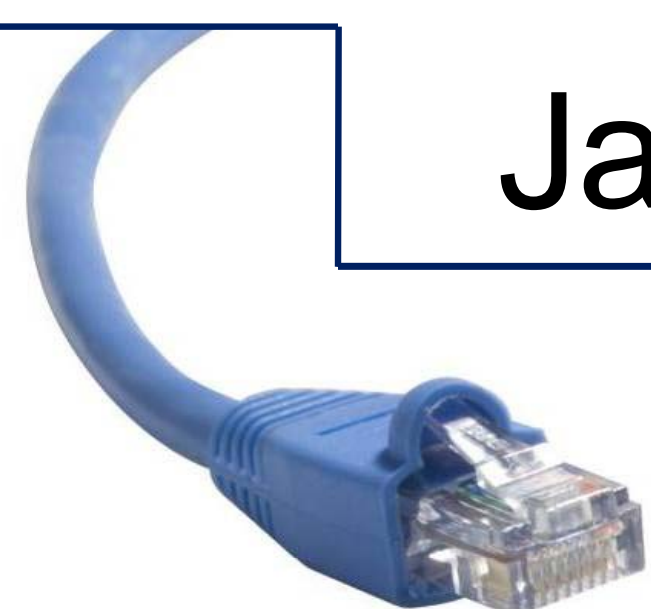
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### Testbed Use-Cases



#### Scientific Experiments

- Experiments must be repeatable and results must be reproducible
- This allows for scientific collection of data



#### Testing Experiments

- Requirements for repeating or reproducing experiments may only require pass/fail results
- Typically focused on assurance



#### Prototyping Experiments

- Experiments typically explore limitations of program or environment
- Typically focused on functionality

### Testbed Characteristics and Implications

We outlined the characteristics of several well-known and often used testbeds.

The information provided in this review is intended to support researchers in choosing the most appropriate testbed based on their experimental goals.



#### PlanetLab

Heterogeneous nodes accurately represent live internet conditions
Variability allows for a wide range of testing scenarios
Constantly changing conditions make it difficult to reproduce precise results
Response centered security policies do not prevent misuse of PlanetLab resources

#### Seattle

Allows high-level user control that allows for more reproducible results or conditions
Less accurate representation of live internet or networks
No low-level access to end hosts
Resource isolation incorporated in design to allow maximal safety when experimenting

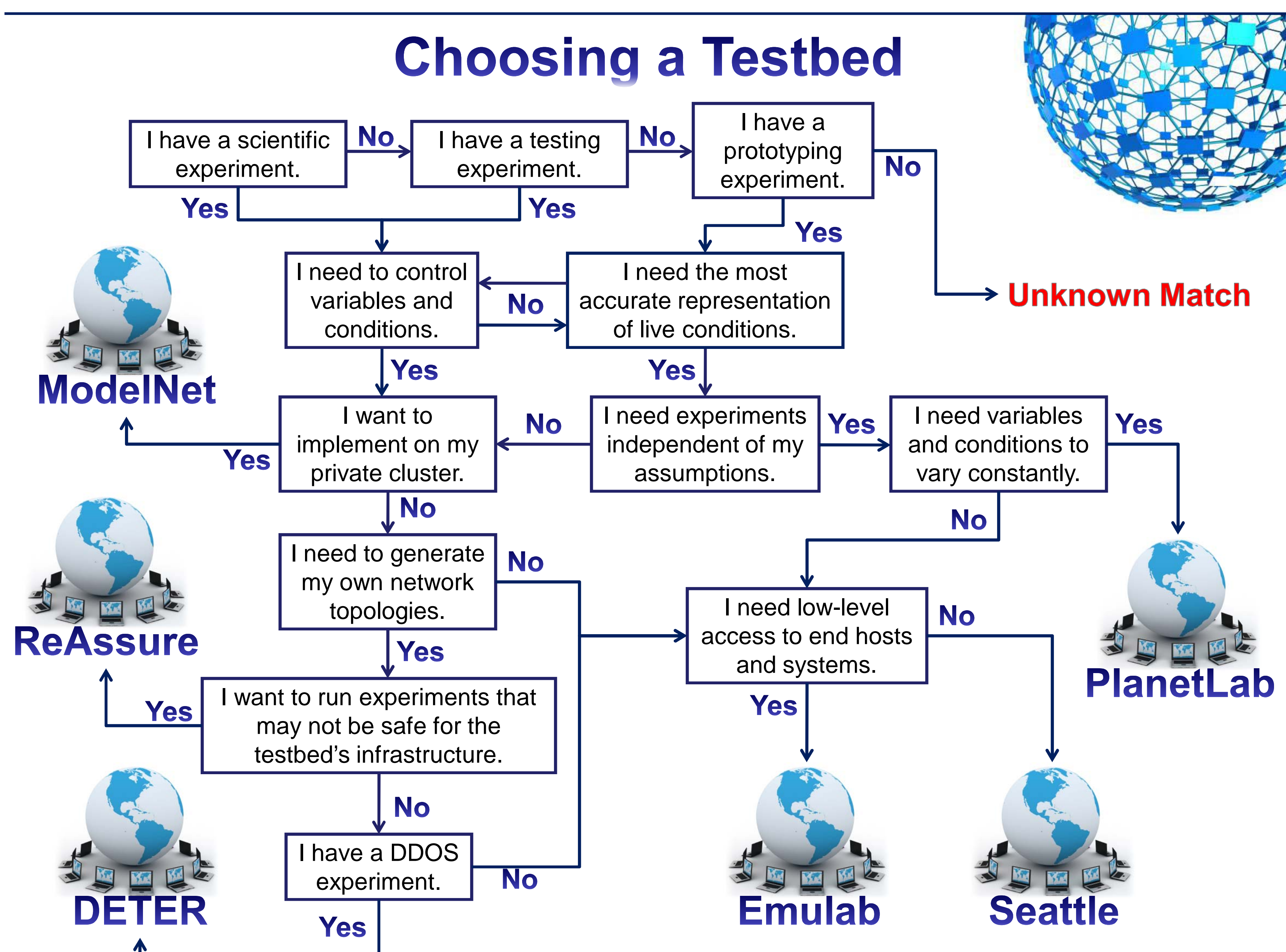
#### Emulab

Allows complete control making it easy to reproduce precise results or conditions
User generated topologies may not represent actual networks or live internet
Results in possibility of user error (incorrect assumptions, variables etc)
Can be used to implement more specific scenarios (i.e. DETER)

#### ModelNet

Implemented on researcher's local cluster and subject to those limitations.
Is very configurable as it can be used to emulate almost any topology or condition
Is an emulation raising the question of how accurately it represents live conditions
Could be limited by assumptions or stipulations enforced by the user

### Choosing a Testbed



### Future Plans: Testbed Development

- GENI (Global Environment for Network Innovations)
- NSF funded testbed under development
- Creators considering several security threat models



Where GENI will fit in the adjacent flowchart will soon be determined.

### References

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