Improving an approach to DTN

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Scope:

Delay-Tolerant Networking (DTN) encompasses a wide range of disrupted and disconnected networks with varied conditions. The Bundle Protocol is one approach to DTN.

Introduction:

The Bundle Protocol was tested in space on the UK-DMC satellite for the first 'Interplanetary Internet' tests. A number of problems were discovered in this protocol design, particularly with its lack of error detection and reliability, and with its dependence on synchronised clocks for delivery.

Motivations:

Improving communication for mobility is an active research area. Better approaches to routing, addressing and connectivity are still needed.
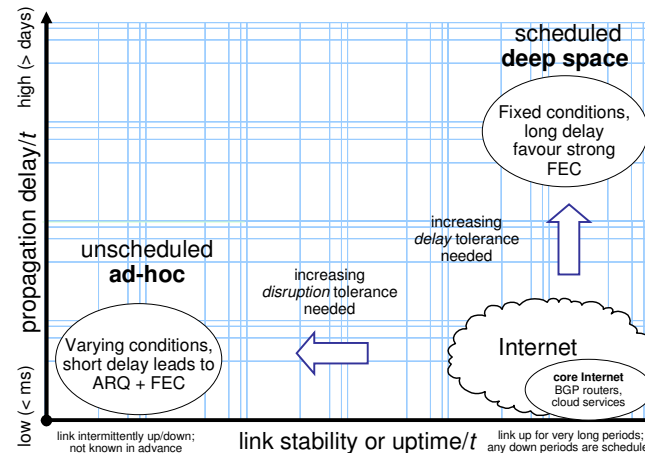
A wide range of different DTN scenarios

System Model:

The Bundle Protocol's architecture relies on a complex security model, which gives reliability only as a side-effect. Bundle Protocol deployments do not implement this security model, and so lack reliability.

Main Problem:

The Bundle Protocol ignores the well-known 'end-to-end principle' that dictates how reliability must be implemented.

Results:

We have now proposed a workaround to address the lack of reliability in the Bundle Protocol. This workaround uses the existing security architecture, requiring security mechanisms to support basic protocol reliability.

Summary:

We have identified shortcomings in the Bundle Protocol that will prevent its widespread adoption in DTNs. We are exploring other, different, approaches to DTN networking which do not have the drawbacks of the Bundle Protocol. Generic one-size-fits-all-solutions are unlikely to be the best for a particular scenario, while custom engineering suited to that scenario can improve overall performance.