Planning for Protocol Transitions
draft-iab-protocol-transitions-03

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There are different types of transitions

- Transition (n.): the process or a period of changing from one state or condition to another

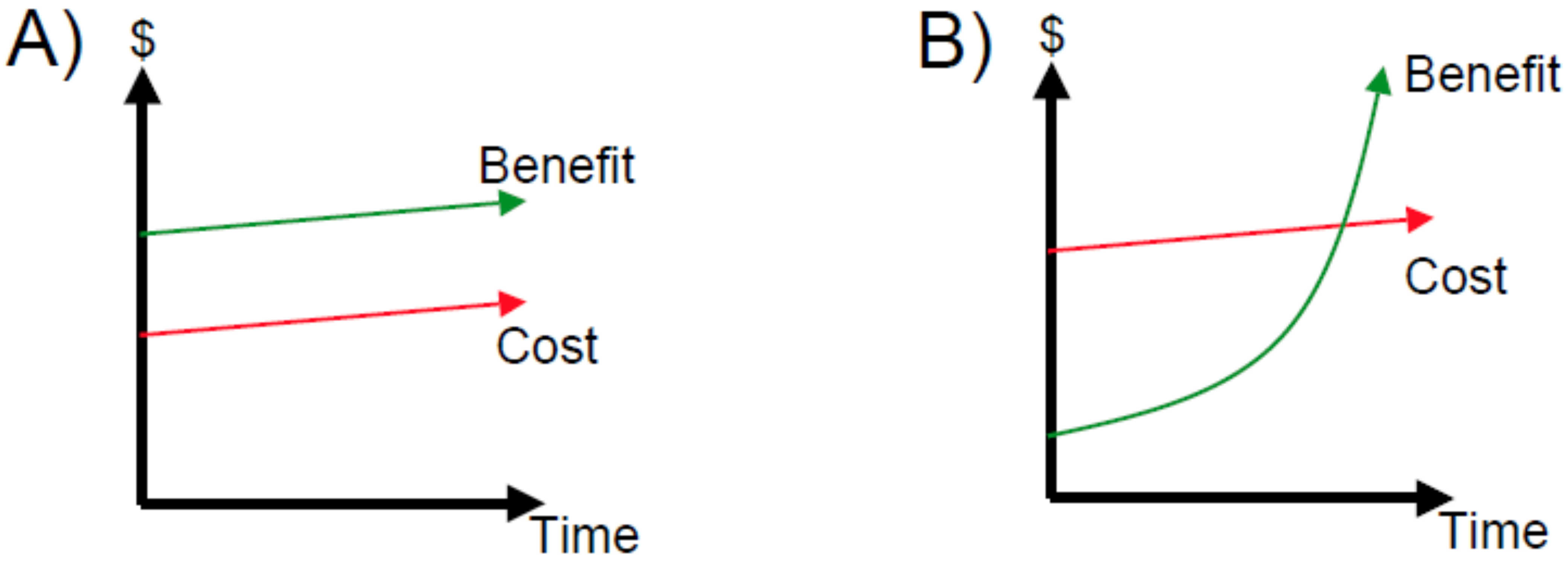
- Technical transitions
  - IPv6, DNSSEC, https, IDN, EAI, …
- Organizational transitions
  - IANA, web site host, …

- Focus is on protocol transitions (though some principles will probably also apply to other kinds)

Some principles from RFC 5218

- Incentive: Easiest when benefits come to those bearing the costs
  - To succeed, the benefits must outweigh the costs at each entity
- Incremental Deployability: Backwards compatibility is easier
  - Easiest when changing only one entity still benefits that entity
- Total Cost: Don’t underestimate the costs of things other than the hardware/software
  - Operational tools and processes, training, accounting/billing, legal, etc.
- Extensibility: Design for extensibility so that things can be fixed up later

Example Cost/Benefit Graphs



Some Observations From ITAT Workshop (RFC 7305)

- Early-Adopter Incentives: Part of bitcoin’s strategy was extra incentives for early adopters
- Policy Partners: Policy-making orgs (RIRs, ICANN, etc.) can be important partners

Transition vs Co-existence

- Backwards compatibility means no significant difference
- Else either need transition (i.e. replacement) or co-existence (i.e., overlap period)
  - “Flag day” style transition increasingly impractical as number of entities involved increase
  - Coexistence increases costs during overlap period
  - An extended overlap period might result in further deployment of old mechanism

Any transition strategy for a non-backward-compatible mechanism should include a discussion of duration of overlap period (if any)

Backward compatibility, or lack thereof

- A translation/adaptation layer is often required if the mechanisms are not interoperable.
- Translation in the middle of the path can hamper end-to-end
- Translation at the end can be a resource issue if in a constrained node

Any transition strategy for a non-backward-compatible mechanism should include a discussion of where it is placed and a rationale.

What makes for a good transition plan?

1. Explanation of incentives for each entity involved
2. Description of phases
   - e.g.: pilot, co-existence, deprecation, removal
3. Timeline
4. *Way to measure whether transition is succeeding*
5. *Contingency plan in case something goes wrong*
6. Way to communicate plan to entities affected and incorporate feedback

TSV: an area in transition

- MPTCP
  - Purely end-to-end: incentives are relatively simple…
  - …but lots of design work around option-meddling middleboxes
- Explicit Congestion Notification
  - Server support has passed 70%, default client support rolling out.
  - Development ongoing: TSVWG hummed for “reclamation” of ECT(1) for L4S.
- QUIC
  - Replaces TCP for some applications.
  - Plan is indefinite coexistence with TCP for fallback.
  - Discussion of interplay between protocol design and UDP impairment/blocking.