Overview:

BGP - how it works
- Laundry list of flaws
- Some issues
- Economics and M100

How it works: Design goal: provide reachability

Unfortunately, loose tether holding the Internet today.

1. Path vector
2. Append check for loops
3. Apply import and export policies
4. Selection process

for end points

Consequences:
1. Single opaque path per network per ISP
2. No control over properties of path.

Flaws:

- Basic:
  1. Security: easy to hijack
  2. Convergence: pathological update sequences?

- Laboritz:
  1. Can cause the protocol to take very long
  2. To reach a point where everybody is in agreement.

- Others:
  3. Oscillations
  4. Dispute winners: hot-potato + policy
  5. Reliability, performance and control over path properties

Fixes:

- Security:
  1. Secure BGP
  2. Require protocol
  3. Secure - origin BGP
  4. Level changes: also
  5. Listen and whisper
  6. Changes need to be

Unresolved: ain't happening
Convergence: Hierarchical routing (LIS + DIV)

Performance and Reliability:

Multihoming and overlay routing and source routing
Single end control Support from a new control over entire path.

Control over path properties - no good solution today
that is both scalable and appealing.

Reason: no incentives for ISPs to honor the solution
or not enough control for end-points

MERO: backward compatible way of getting us there.

Design considerations:

- Single route is bad
- Existing routes OK for most users
- End-users need control over path properties
- Routes exist within BGP
- Route selection of an AS can be influenced by payment

Goal MERO is trying to achieve:

Design principles:

1. Pull-based route retrieval for backward compatibility
   (push-based too expensive; may be unnecessary)
2. Bilateral negotiation among ISPs to get additional
   routes
3. Selection export of extra routes if based on policies.
4. Tunnels to forward packets
Implementation - iBGP also implements single path selection
So - need coordination

Tunnel implementation

Edge

Router

Single Ip

Issues with iBGP:

1. When should an AS request an alternate path?
2. How does it know what to request and whether? and who to?
3. How exactly is the "protocol" especially between remote ISPs?

L0 wouldn't it need a contract and if it did, why not give more routes and not have to deal w/ understanding the semantic of the routes?

4. Still has convergence problems
5. What if neighbor pushes back due to unexpected traffic from sources not seen before?