

A background image of a dandelion seed head, with a large green rectangular overlay on the right side. The text is white and positioned on the green overlay.

FLOOD REFLECTION

DRAFT-PRZYGIENDA-LSR-FLOOD-REFLECTION

T. PRZYGIENDA, JUNIPER

C. BOWERS, JUNIPER

Y. LEE, COMCAST

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R. WHITE, JUNIPER

JUNIPER
NETWORKS

Engineering
Simplicity

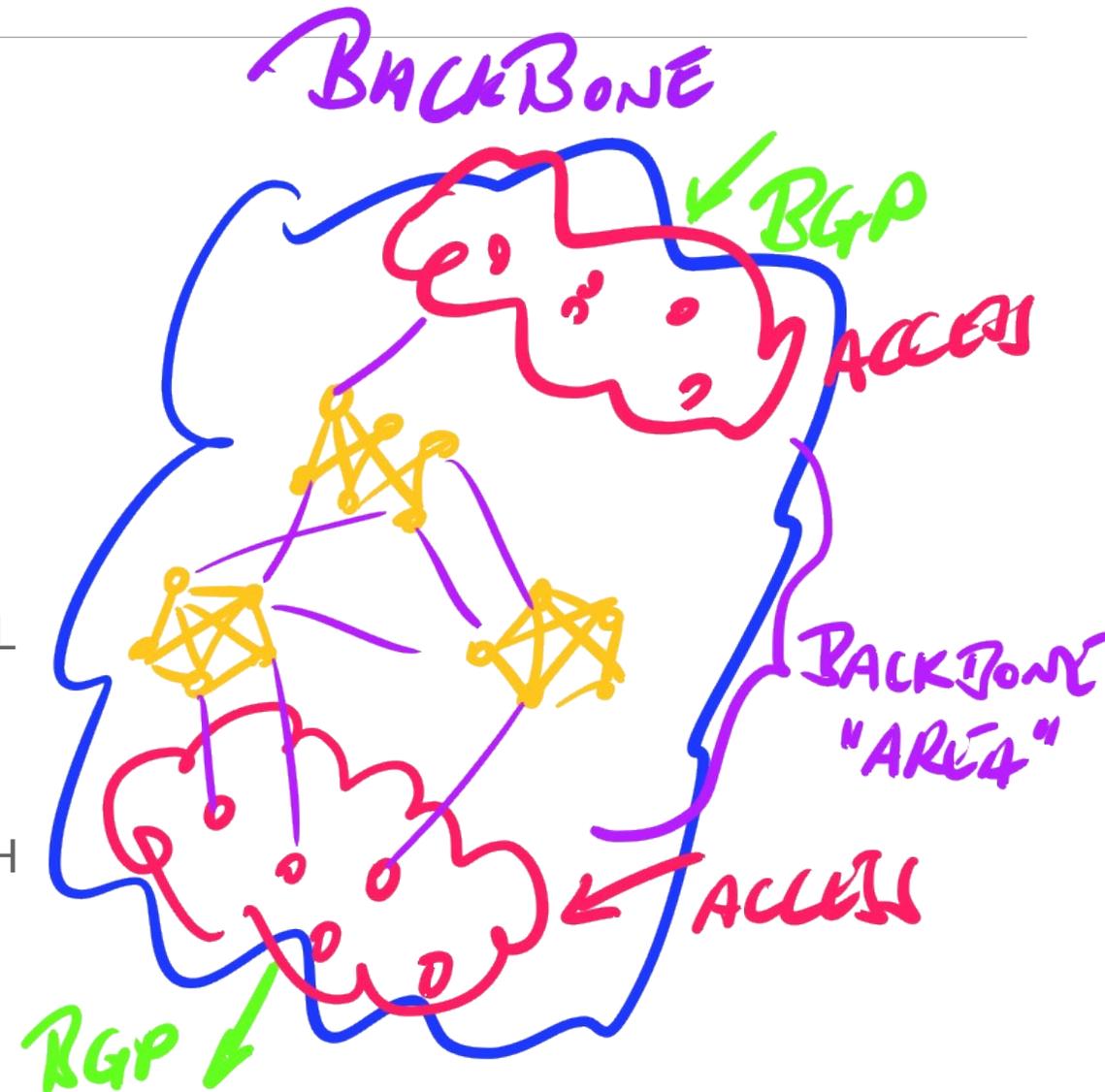


AGENDA

- PROBLEM
- DESIRED PROPERTIES
- SOLUTION OUTLINE

WE ARE ENGINEERS: WE CREATED A NEW PROBLEM

- IGP BACKBONES OF “VERY BIG CUSTOMERS” ARE MAX’ING OUT #LINKS AND #NODES 😊
- EVEN VERY, VERY GOOD IMPLEMENTATIONS ARE HITTING ARCHITECTURAL PROTOCOL LIMITATIONS
- IGPS ARE ARCHITECTURALLY BOUND BY ONE-SCALE-LIMITED-HUB, THE REST ARE ACCESS SPOKES
- CUSTOMERS LIKE MORE AND MORE VERY DENSE LOCAL “MESHES”
- IN ISIS HIDING TOPOLOGY IN AREAS IS NOT SATISFACTORY SINCE IT ALSO HIDES UNDERLYING PATH DIVERSITY IF L1 USED AS “L2 TRANSIT”

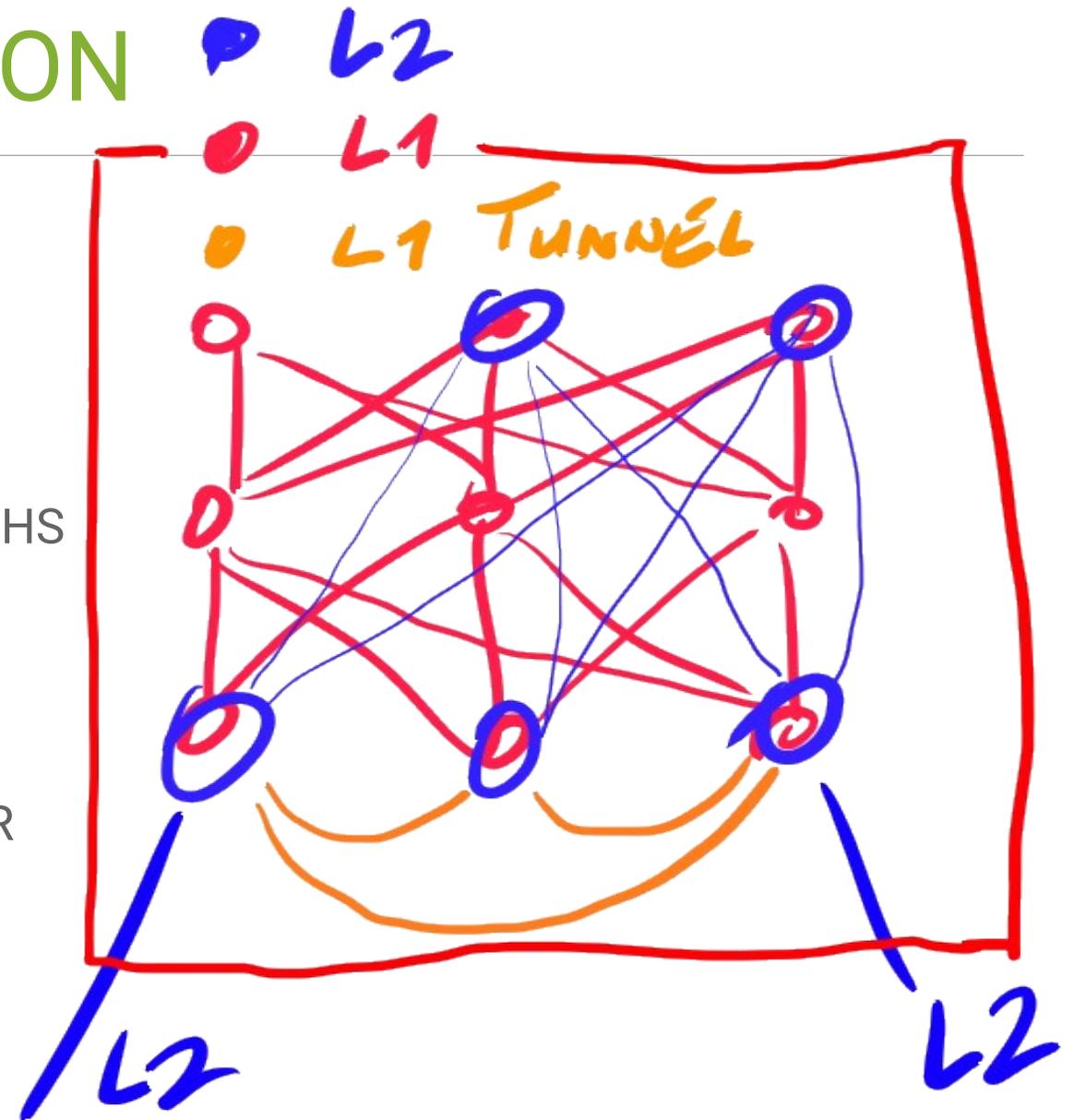


DESIRED PROPERTIES

- SCALE THE BACKBONE CAPACITY WITHOUT TRIGGERING THE CONTROL PLANE SCALE LIMITATIONS
- MORE SMALLER BOXES DESIRABLE FOR MORE FLEXIBLE CAPACITY PROVISIONING
- **NO, SERIOUSLY NO, FORKLIFT OF THE PROTOCOL**
- **SIMPLE, ROBUST CONFIGURATION**
- NO PROPRIETARY SOLUTIONS
- NO CENTRALIZED SINGLE POINTS OF FAILURE OR NSR-TYPE SOLUTIONS
- BGP-LS OR SOMETHING LIKE THIS TO EXPOSE THE “HIDDEN” PART OF
TOPOLOGY FOR TE

OUTLINE OF THE SOLUTION

- EQUIVALENT OF ROUTE REFLECTION FOR FLOODING
- FLOOD REFLECTORS ALLOW TO USE ALL L1 PATHS WITHOUT EXPOSING ALL L1 NODES TO THE “BACKBONE”
- BORDER ROUTERS USE SHORTCUT NEXTHOPS INSTEAD OF FOLLOWING L2 “FLOOD REFLECTOR ADJACENCIES”
- NODES “OUTSIDE” IN L2 CAN STAY OBLIVIOUS



BITS MORE DETAIL

- I1H/LSP L1 TLVS ARE USED TO DISCOVER CLIENT/SERVER OF A FLOOD REFLECTOR CLUSTER
- NO HIERARCHIES OR LINKS BETWEEN FRS IN SAME CLUSTER ALLOWED FOR SIMPLICITY (BURNT FINGERS FROM RR DEPLOYMENTS)
- ORANGE L1 TUNNEL MESH IS OPTIONAL

SO WHAT'S THE BIG DEAL AGAIN?

- ONLY FRS AND CLIENTS NEED PROTOCOL UPDATE WITH LOCAL CONFIGURATION KNOBS
- L2 CONTROL PLANE SCALES IN ROUGHLY LINEAR FASHION COMPARED TO N^2 FOR FULL TUNNEL MESH
 - PRACTICALLY SPEAKING GOOD ENOUGH FOR VERY LONG TIME TO COME
- L1 CAN FUNCTION AS TRANSIT FOR L2 UTILIZING ALL PATHS IN L1 EVEN IF HIDDEN IN L2 CONTROL PLANE
- ROBUST VS. MISCONFIGURATION & FAILURES, OPERATIONALLY SIMPLE TO DEPLOY AND DEBUG
- IT'S A KISS SOLUTION