LHC Open Network Environment (LHCONE)

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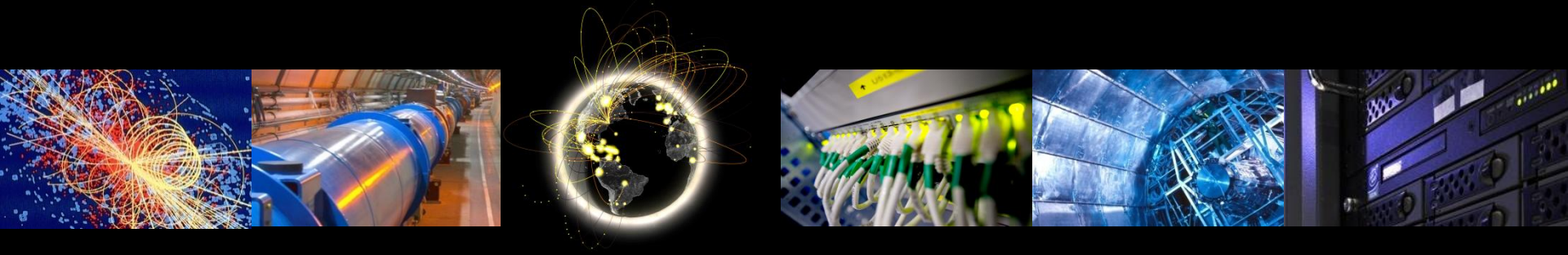
March 2011 GDB



WLCG
Worldwide LHC Computing Grid

Outline of the presentation

- What's the problem?
- What are the constraints?
- What is the proposed solution?
- How did we arrive at the proposed solution?
- Next steps…

Preamble

The LHCONE web-site is:

http://lhcone.net

(read the architecture document!)

Artur Barczyk gave an excellent presentation on LHCONE at recent GLIF meeting in Hong Kong:

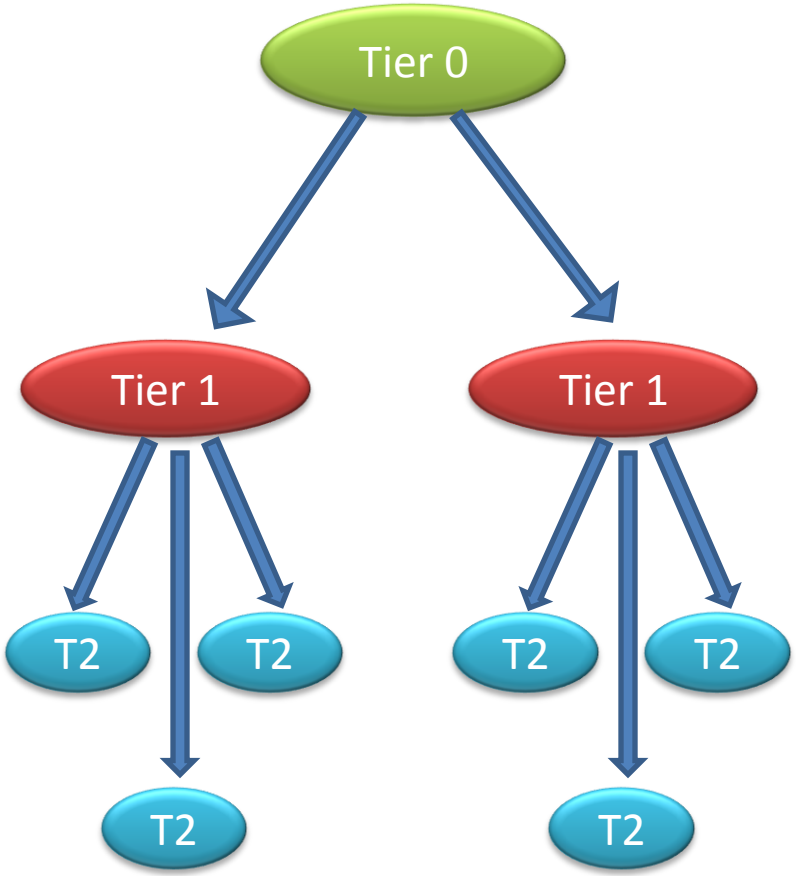
http://www.glif.is/meetings/2011/winter/slides/110225-lhcone-AB.pdf

What's the problem?

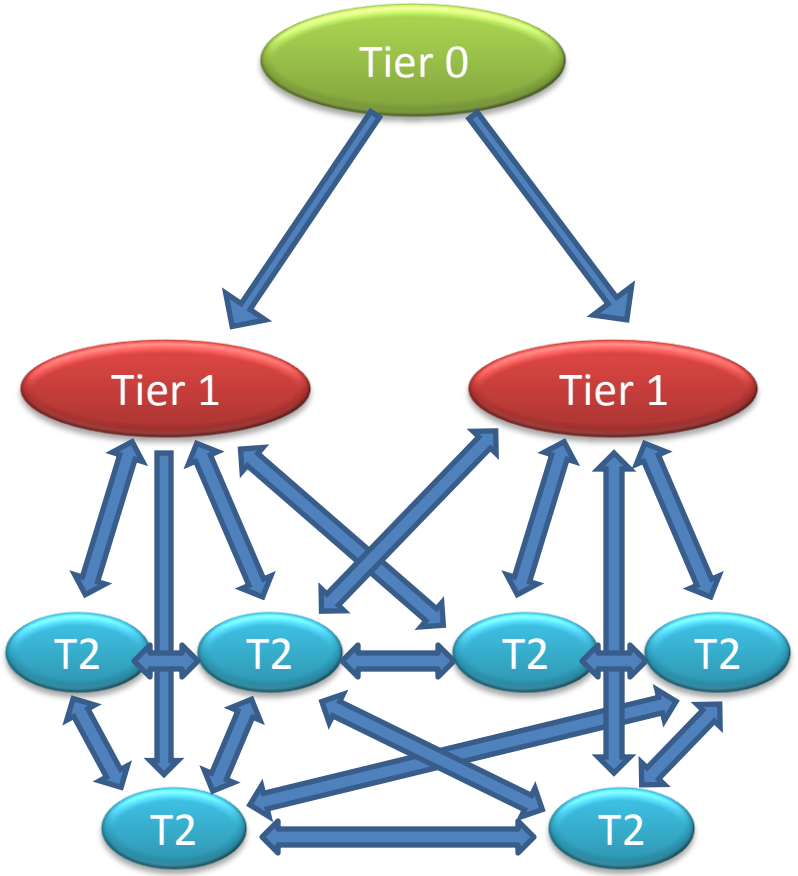
- LHC experiments' data models have evolved
- On-demand to supersede Pre-placement
- Network usage will increase & be more dynamic (less predictable)
  - need to enable high-volume data transport between T1s, T2s, and T3s.
- General-purpose R&E networks should not be swamped with Tier1/2/3 LHC traffic

Thermodynamics?

MONARC Model



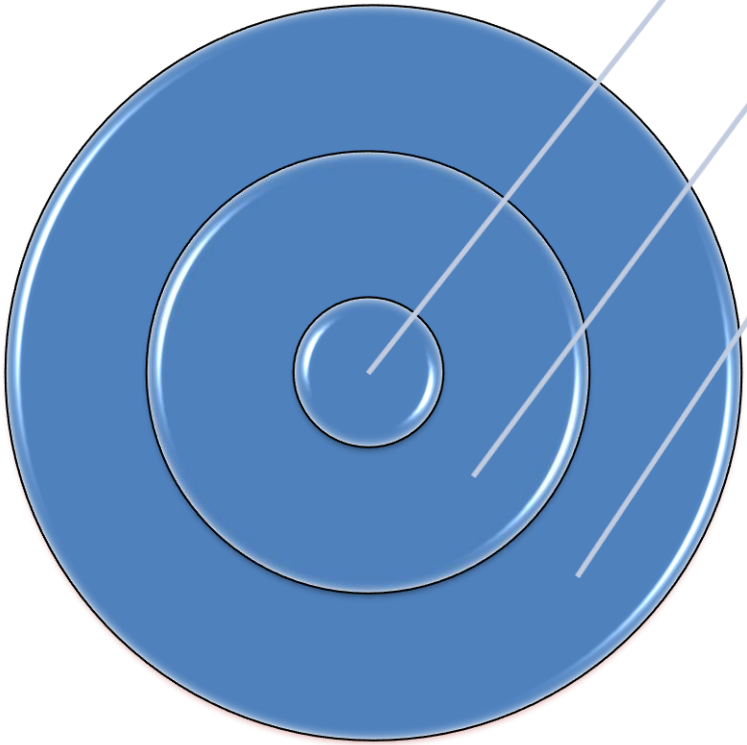
New Data Model



What are the constraints?

- LHCOPN works well - so don't break it!
- T1/2/3s are not all equal -> architecture must be all-inclusive
- No central structure - distributed management & operations
- Design for agility and expandability (new technologies; changes in traffic volumes)
- Must be appealing to funding agencies
- Need good monitoring

Conceptually…



LHCOPN

T0 – T1, T1 – T1

LHCONE

T1, T2, T3

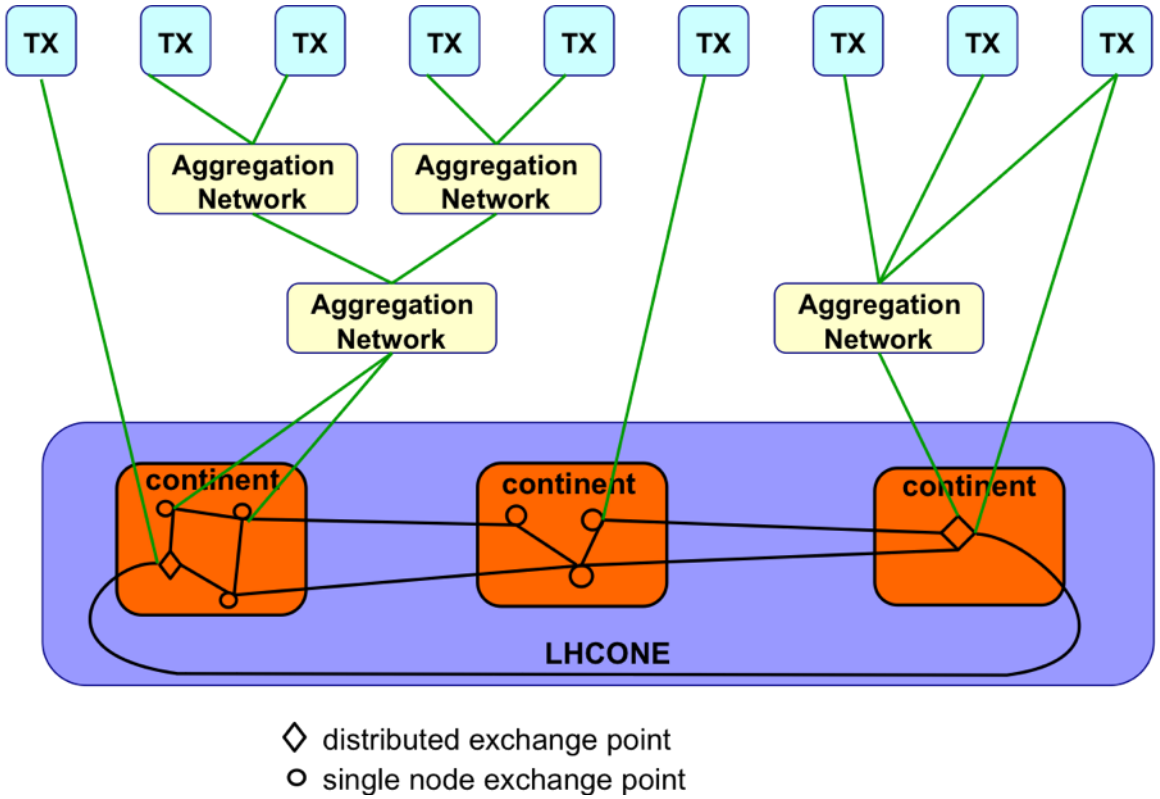
GPN

T1, T2, T3 over general-purpose IP research infrastructure

What is the proposed solution?

- LHCONE builds on the familiar idea of exchange points
- Exchange points will be built in carrier-neutral facilities so that any connector can connect with their own fiber or using circuits provided by any telecom provider.
- LHCONE enables T2s and T3s to obtain their data from any T1 or T2
- Use of LHCONE will alleviate the general R&E IP infrastructure
- LHCONE provides connectivity directly to T1s, T2s, and T3s, and to various aggregation networks, such as the European NRENs, GÉANT, and North American RONs, Internet2, ESnet, CANARIE, etc.

Schematic of LHCONE



How did we get here?

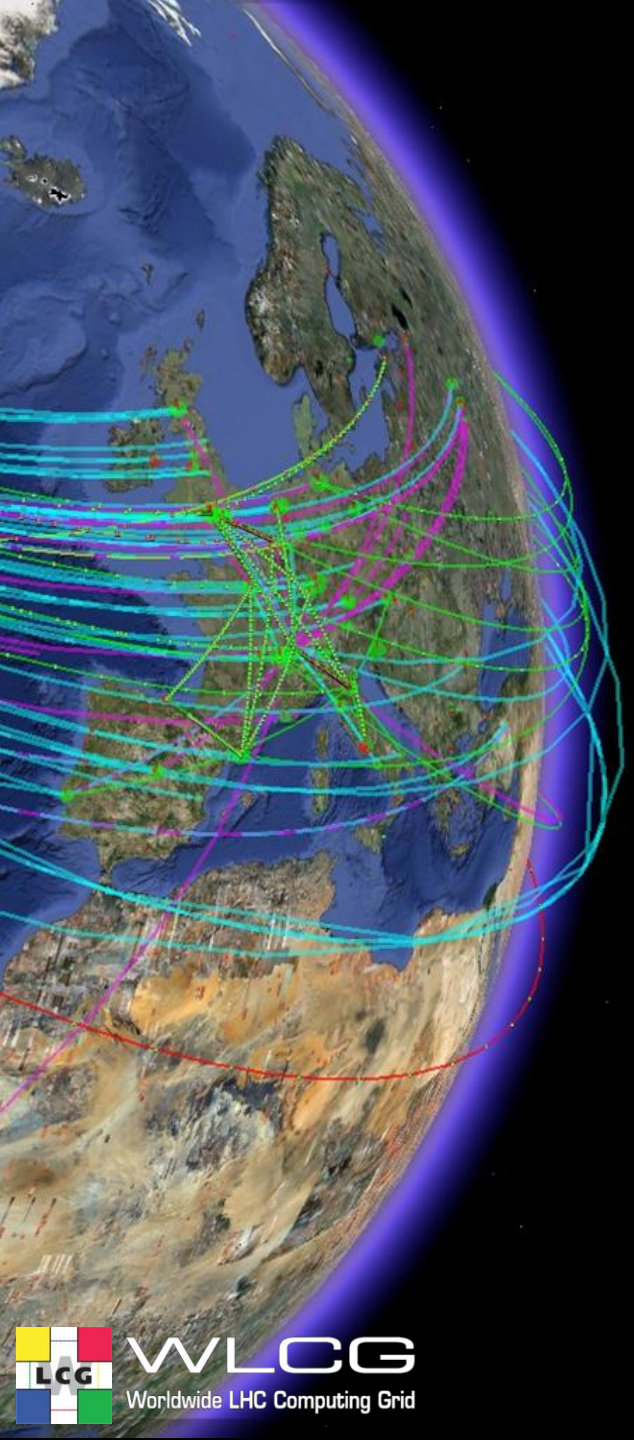
- Transatlantic Workshop at CERN, June 2010
- Fisk–Bos paper formalized experiments' requirements in September
- LHCOPN meeting at CERN, October 2010
  - CERN asked community for ideas
  - 4 papers produced
- LHCT2S Meeting at CERN, January 2011

  Working group produced draft paper
- LHCOPN meeting in Lyon, February 2011

  Dedicated session, WG mandated to refine architecture

Next steps…

- Solicit comments on proposed approach
  - Get feedback/approval from GDB
- Build a prototype (first switch installed at CERN)
- Refine architecture document and work on governance, operations model, monitoring…



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