GLIF and the HPC Community:

The Infiniband factor

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HPC's gradual embrace of Infiniband

- 1999: Intel, IBM, Sun, HP, Microsoft, Compaq and Dell agree on the original Infiniband standard to solve a looming problem of a PCI (Peripheral Component Interconnect) bottleneck

- 2003: Virginia Tech builds an InfiniBand cluster ranked number three on the SC Top500 at the time.

- IB becomes increasingly popular for cluster interconnects as it beats Ethernet on both price and latency.

- June 2014: 222 of the Top 500 use Infiniband, 104 of the Top 200.

- The Ethernet camp tries to counter with RoCE (RDMA over Converged Ethernet) and now RoCEv2 for the data centre space.

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A*STAR's vision:
a Supercomputer of Supercomputers

Professor Tan Tin Wee and Dr. Marek Michalewicz proposed to
demonstrate something totally new, never done before,
using a very high speed transpacific connection at SC14

**High speed transcontinental transmission of native Long
Distance Infiniband connecting High Performance
Computing (HPC) centres on both continents and have
them operate as one!**

**Apply SDN like Infiniband subnetting developed by
Obsidian combined with the A*STAR initiated
Infinicortex to create a Galaxy of supercomputers
capable to work as one, tackling the biggest
computational challenges**

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Making the vision a reality

- Testing completed using dark fibre between two A*CRC sites and also with the National University of Singapore using Singaren's new SLIX over 80km. Convincing results of the Infiniband testing led us to a first deployment at 2x 40gbps between our Biopolis and Fusionopolis sites.

- Infiniband over Ethernet testing with Tokyo Institute's Tsubame-KFC successfully completed using Singaren, APAN and JGN-X.

- Infiniband over IP testing completed with the NCI (National Computational Infrastructure) at the Australian National Unversity in Canberra using existing Singaren, APAN and AARnet infrastructure.

- 10gbps dedicated link between Singapore and the USA for layer 2 'native' Infiniband testing with ORNL and others starting today October 1st.

- Finalizing a 100gbps between Singapore and New Orleans for SC14.

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Long Distance Infiniband:
a potential R&E networking game changer

The global HPC needs are in resonance with those of the global R&E networking community and especially GLORIAD and GLIF

The HPC community is faced with a continuing exponential growth of data generated and current NREN internetworking capacity is already insufficient considering only the needs of genomics data interchange.

To reach exascale computing, a distributed approach is probably required if only to cope with power requirements and disaster recovery

Adoption of native Infiniband as a commonly used layer 2 transmission protocol by NREN's would, for the first time in 25 years, give NREN's a clear lead and differentiation from commercial network operators.

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Circle the globe at 100gbps with ACE-100?

- With ANA-100 now a reality and ACA-100 most likely in 2015, the only missing piece to circle the globe would be ACE-100.

- The major deterrent remains the current price level on the Asia-Europe cable routes due to regulation and lack of real competition. Prices are gradually coming down but continue to be mostly out of reach.

- Two new Asia-Europe cables, Seamewe-5 and AAE-1 with RFS dates of late 2016 will add 24Tbps and 40Tbps respectively. Reliance announced a new Singapore-India cable.

- Time to lobby and negotiate hard, maybe for a couple of IRU'S 2016 is the time to complete the Circle the Globe 100 challenge..☺

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Thank You

Creativity requires the courage to let go of certainties.

Erich Fromm