

Sharing the best computational resources - a South African perspective

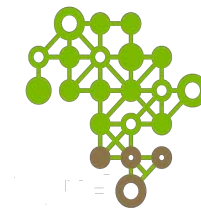
2010 Euro-Africa e-Infrastructure Conference Helsinki

9 December 2010



**Colin Wright: Manager – Cyberinfrastructure
Meraka Institute, CSIR, South Africa**

SANREN
South African National
Research Network



SA - VLDB

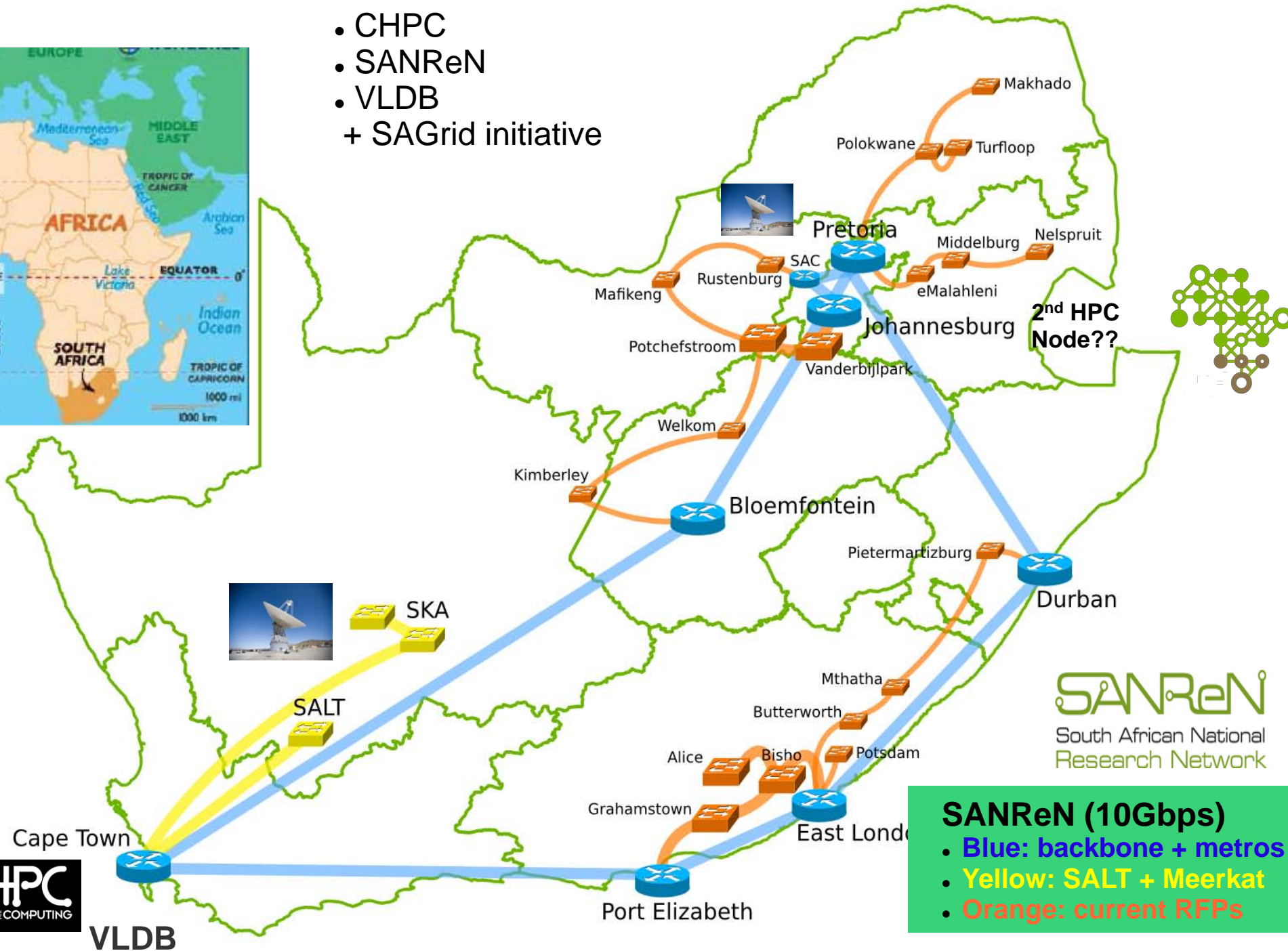
cjwright@csir.co.za

www.chpc.ac.za
www.sanren.ac.za
www.sagrid.ac.za



Current SA core national e-Infrastructure

- CHPC
- SANReN
- VLDB
- + SAGrid initiative



SANReN (10Gbps)

- Blue: backbone + metros
- Yellow: SALT + Meerkat
- Orange: current RFPs



VLDB

SANReN
South African National Research Network

Research Paradigms

Experiment



Theory

$$\left. \begin{aligned} \frac{d\alpha_1}{dt} &= -\frac{\epsilon}{\omega_2} f - \frac{\alpha_2}{2} \alpha_1 \alpha_2 \sin(\xi_2 - 2\xi_1) + \frac{\mu_1}{2} \alpha_1 \alpha_2 f \\ \frac{d\xi_1}{dt} &= \frac{1}{2} f \sigma_2 + \sigma_1 f - \frac{2\epsilon}{\alpha_1 \omega_2} \alpha_2 \alpha_1 \alpha_2 \cos(\xi_2 - 2\xi_1) \\ \frac{d\alpha_2}{dt} &= \frac{\epsilon}{\omega_2} f \frac{\alpha_1}{4} \alpha_1^2 \sin(\xi_2 - 2\xi_1) + \frac{\alpha_2}{2} \Omega^2 \cos(\xi_2) + \frac{1}{2} \mu_2 \alpha_2 \alpha_2 f \\ \frac{d\xi_2}{dt} &= \sigma \sigma_2 + \frac{\epsilon}{\alpha_2 \omega_2} f - \frac{\alpha_1}{4} \alpha_1^2 \cos(\xi_2 - 2\xi_1) + \frac{1}{2} \alpha_2 \Omega^2 \sin(\xi_2) f \\ \frac{d\Omega}{dt} &= \epsilon \left[\frac{1}{2} \alpha_1 \alpha_2 \omega_2 \Omega \cos(\xi_2) + \Gamma(\Omega) \right] \end{aligned} \right\} (28)$$



In many areas of Science the underlying laws are well known, but the equations are too complex to solve theoretically...??

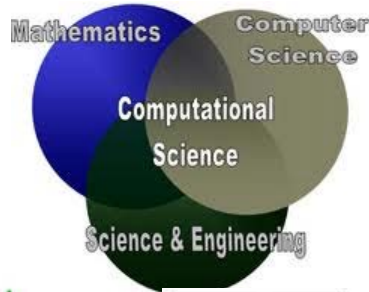
Research 3rd & 4th Scientific paradigms



Computational Science

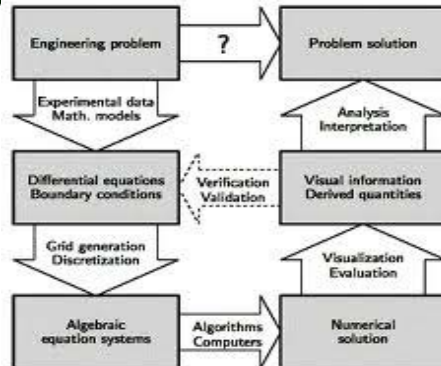
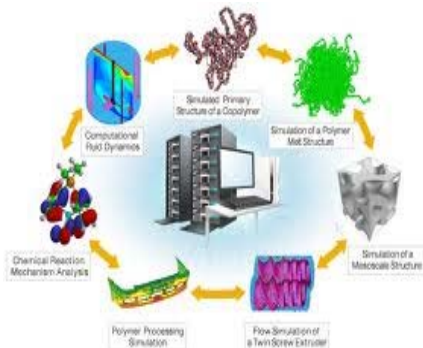
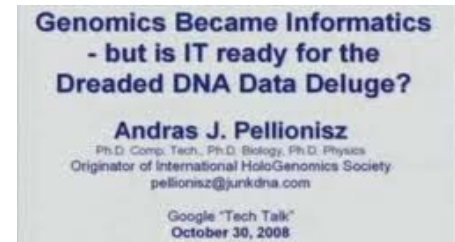


3



"The End of Theory: The Data Deluge Makes the Scientific Method te"??

4



Examples

E-VLBI a worldwide radio telescope

Southern Oceans

Status of the e-EVN

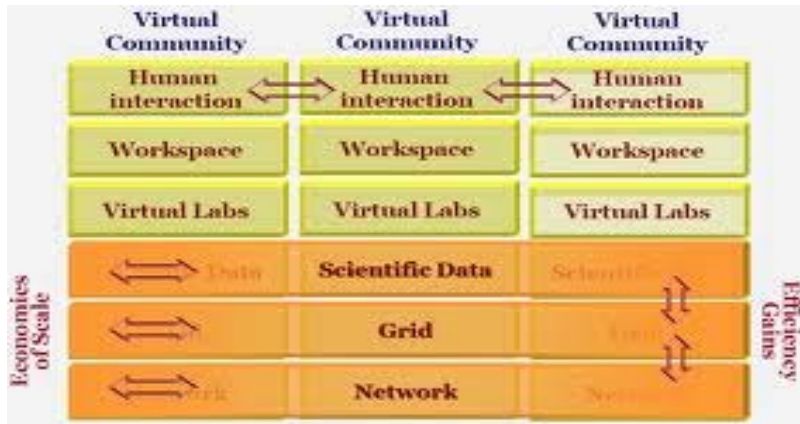


Network status as per 2007-09-21. Image created by Paul Bowen -cbowen@jive.rin. Satellite image: Blue Marble Next Generation, courtesy of NASA Visible Earth (visibleearth.nasa.gov).

HartRAO



ACCESS



Clouds Eduroam Multimedia

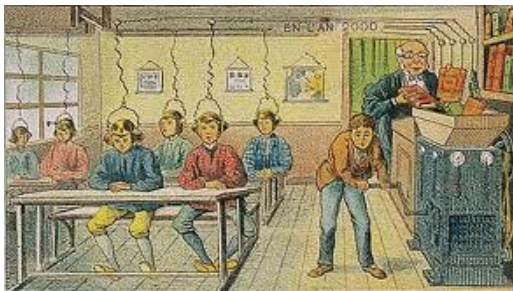
...

SANReN

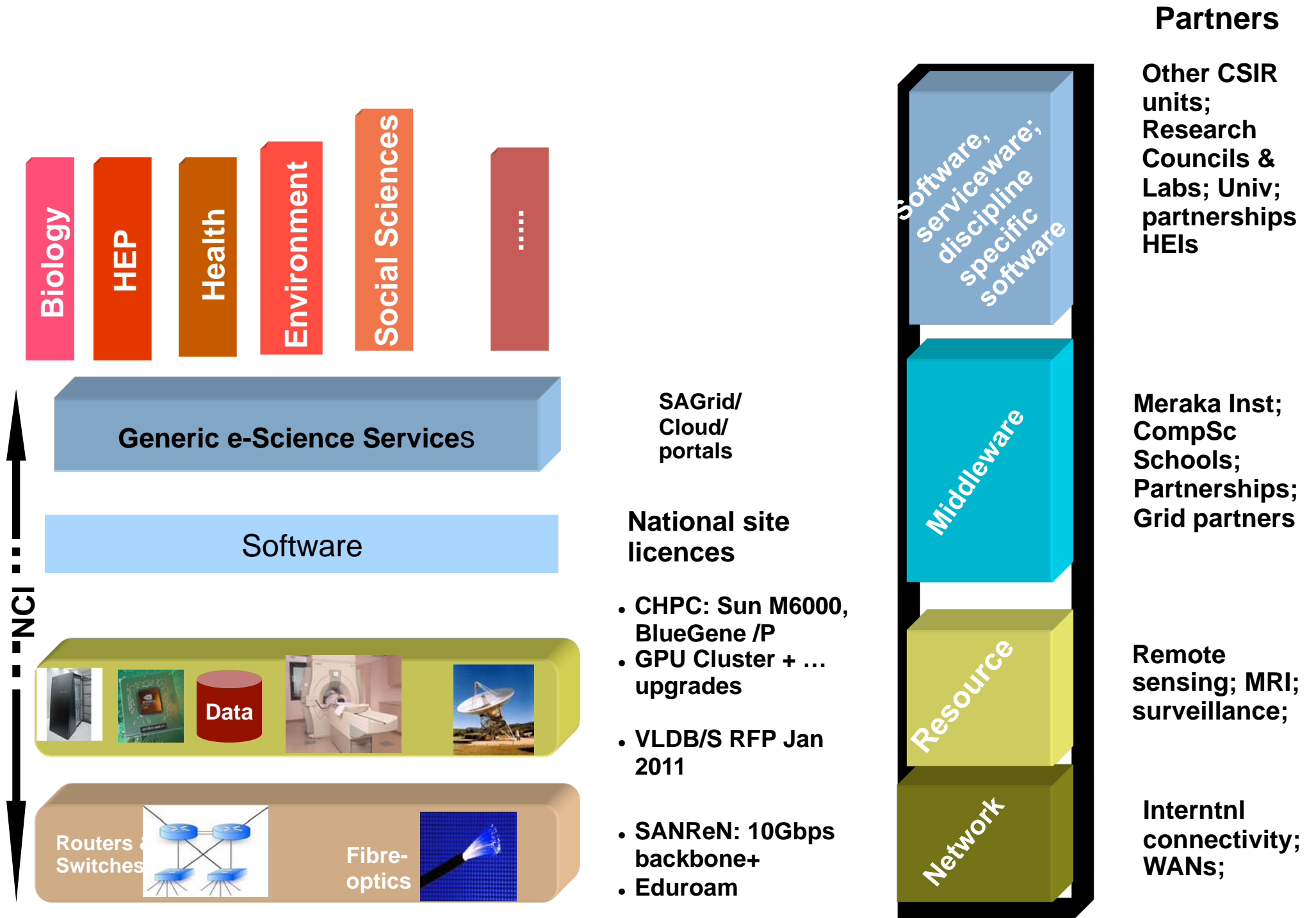
- Existing
- Tender awarded
- Tender in progress
- Future expansion



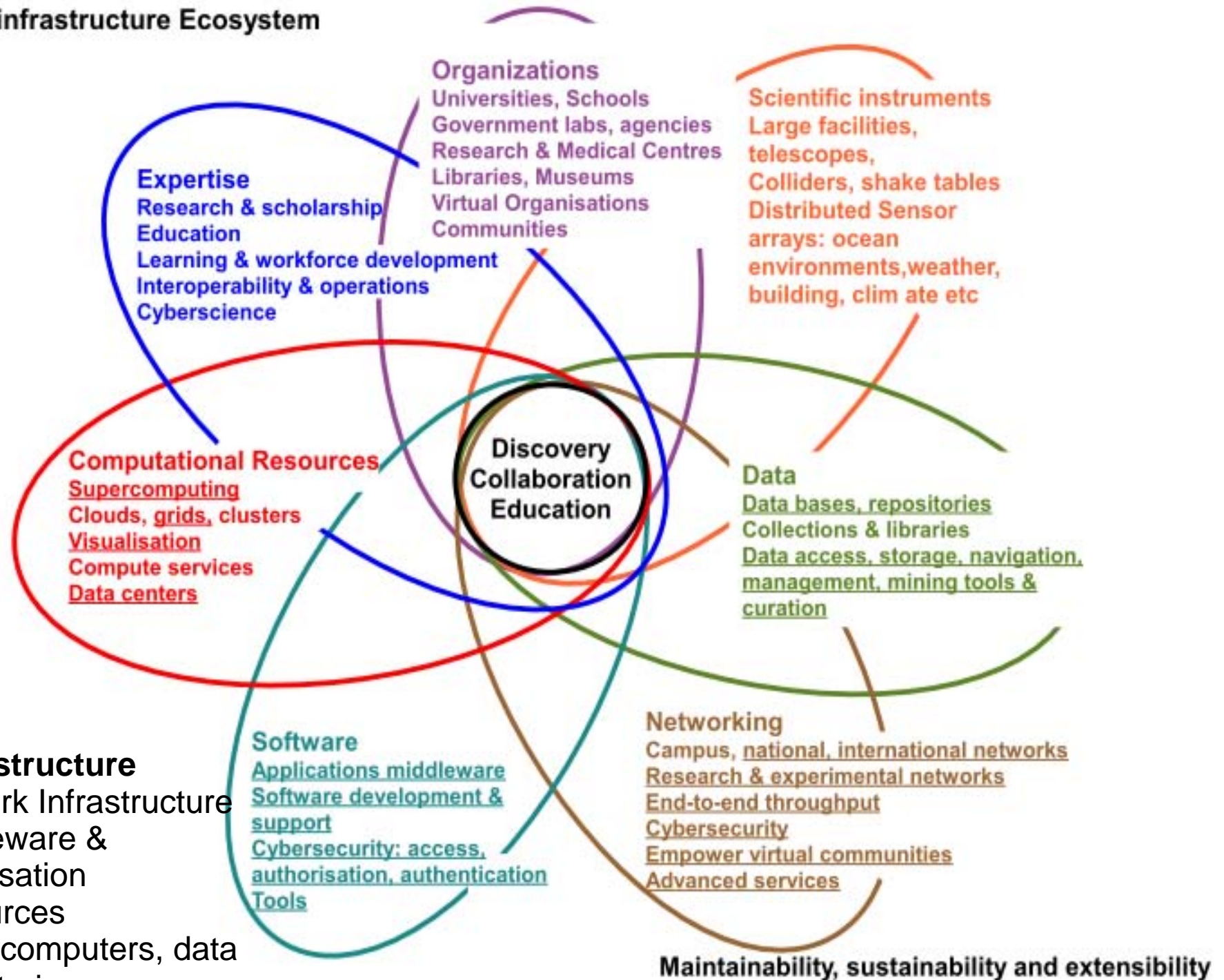
SANReN Long term vision. Simeon Miteff, 2010/11/29



Cyber Ecosystem



Cyberinfrastructure Ecosystem



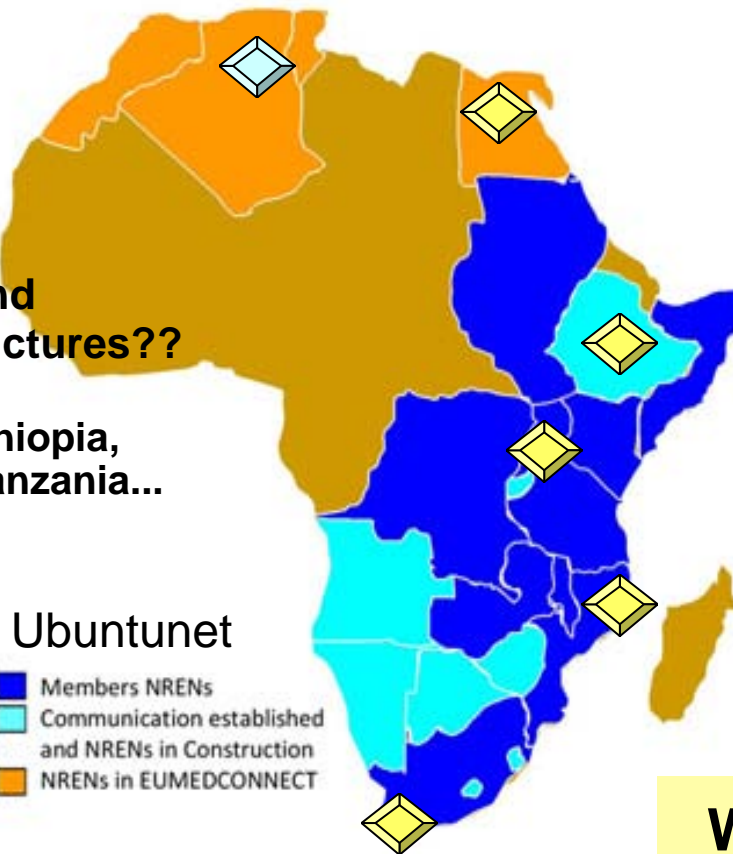
e-Infrastructure

- Network Infrastructure
- Middleware & organisation
- Resources
(supercomputers, data repositories, sensors)
- Data

... future collaborations?

Other HPCs and
Cyberinfrastructures??

HPC: Egypt, Ethiopia,
Rwanda, SA, Tanzania...
Algeria?



(Some) Existing / recent relevant EU Initiatives

- EU-Africa Strategic Partnership
- AfricaConnect
- CHAIN (Grid extension)
- EPIKH (Expand e-Infr know-how)
- Belief II (Bringing Europe's eElectronic Infrastructures to Expanding Frontiers)
- ERINA4africa (Investigating African e-Infr Applies of the Future)
- ?

Others

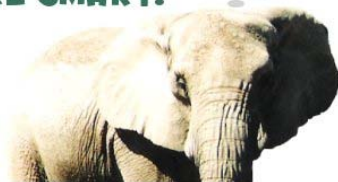
Unesco-HP Collaboratory

"The vision for the future is an open e-Infrastructure enabling flexible cooperation and optimal use of all electronically available resources". e - IRG!!

What do we do/ where do we go from here?

- Global & continental challenges
- Research is becoming increasingly international
- Data-driven, multi-scale, collaborations for complex problems
- Optimal utilisation of e-Infrastructures
- Sustainability
- Crossing the boundaries of Science
- Global Collaboration; Education & Training
- ??...that is what we are here for

**ELEPHANTS
ARE SMART!**



E=MC²

