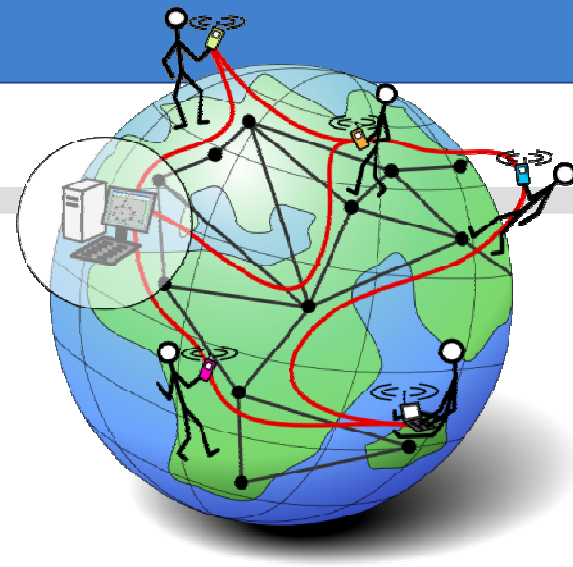


### Motivation

#### Internet Communication today...

- has to overcome various problems
- broken e-to-e-connectivity (e.g. Middleboxes)
- protocol and network heterogeneity
- network dynamics (e.g. link outages)
- user mobility

...what if it would be handled transparently?



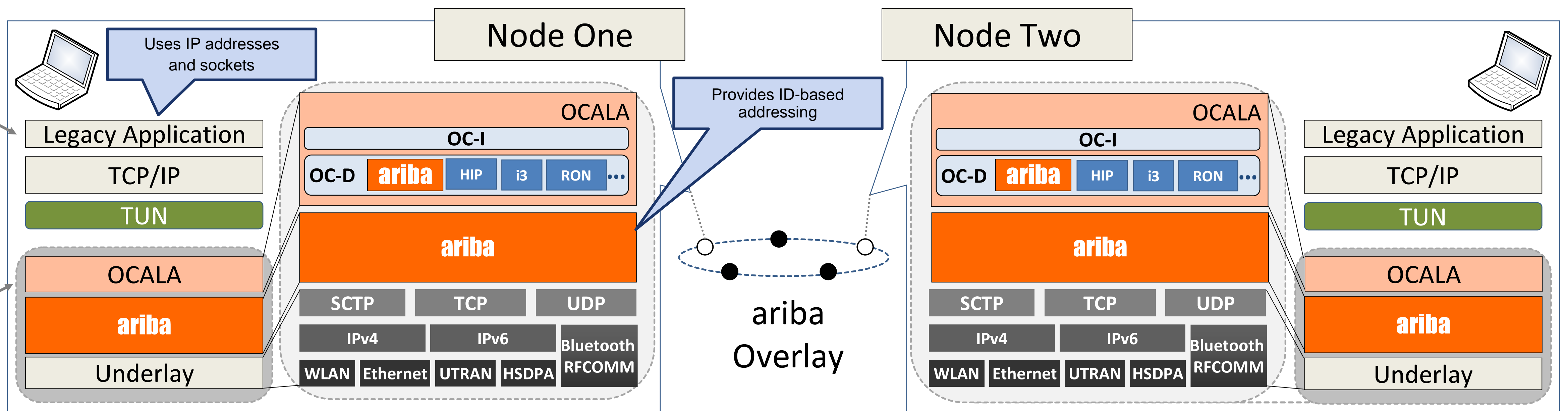
#### THE **ariba** UNDERLAY ABSTRACTION

- Self-organizing transport connectivity across different heterogeneous networks
- Integrated solution with ID-based addressing providing a virtual network per application context
- Eases service and application development and deployment
- **But: Legacy Applications must be ported!**
- Transparent, easy-to-use access to ariba features is needed

### Approach

#### Approach

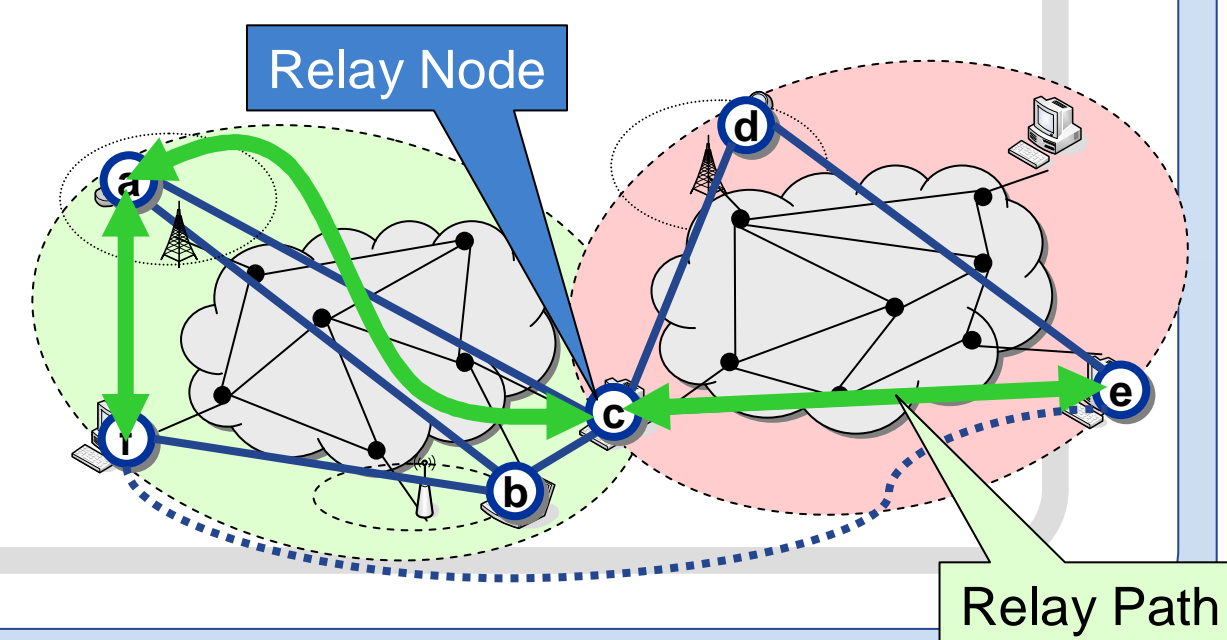
- Enable legacy applications to use ariba without modifications
- Use OCALA to map between realms



#### THE **ariba** UNDERLAY ABSTRACTION

- Transparent network substrate for OCALA Legacy Apps and customized ariba applications

- Use Relay Paths to connect heterogeneous regions
- Hide Heterogeneity



### Contribution

- ✓ Provision of an invariant network substrate handling network issues like NAT and protocol heterogeneity
- ✓ Accessible by legacy applications w/o modifications
- ✓ Cope with mobility and network dynamics
- ✓ Open-source release of ariba available

### Demonstration Scenario

- Example Legacy Functionalities: Ping, XMPP, HTTP, Whiteboard

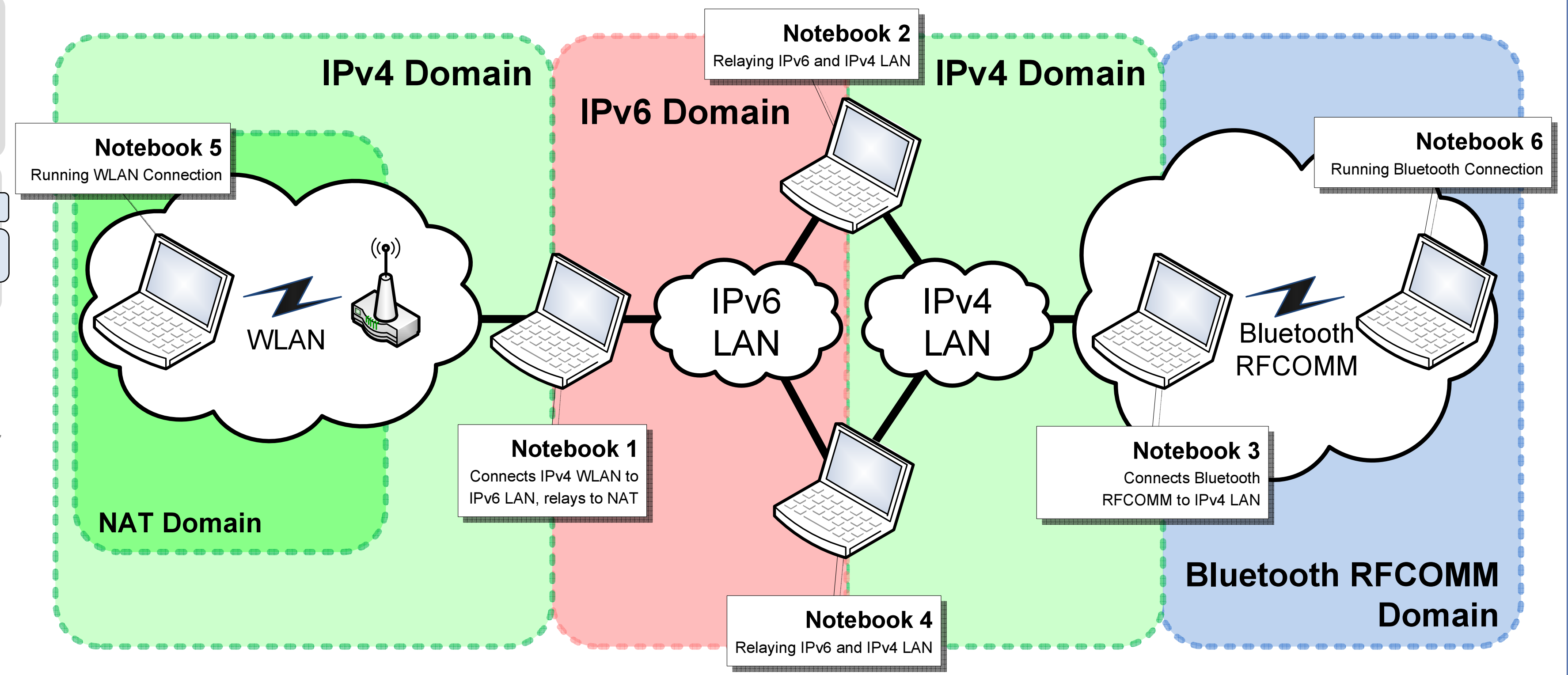
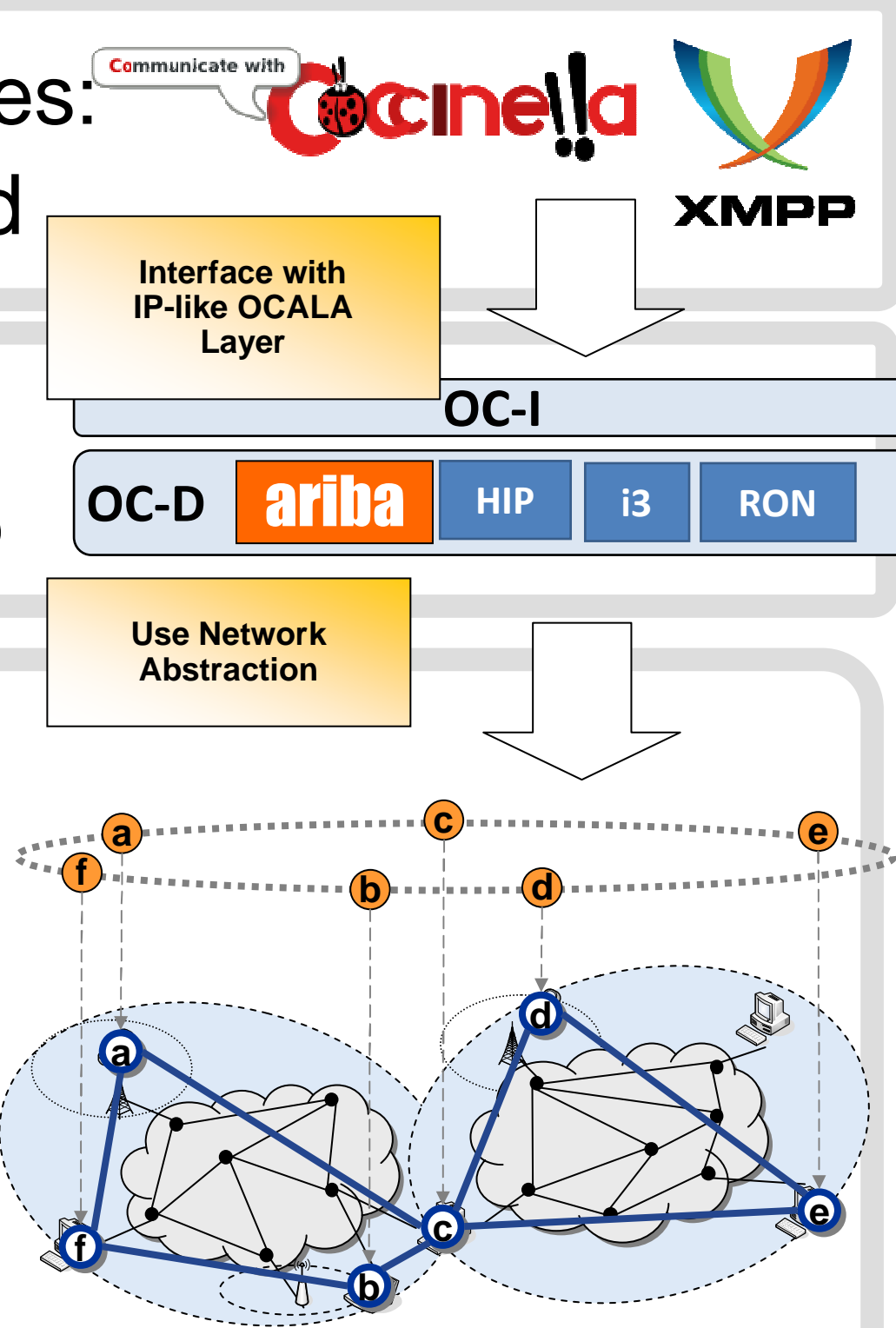
- Mediation between IP-like interface and ariba OC-D stub

#### THE **ariba** UNDERLAY ABSTRACTION

- Chord-based control overlay
  - provides basic connectivity
- Virtual Links and Relay Paths
  - handle network heterogeneity
  - end-to-end connectivity

- Bootstrapping

- discover peers by using mDNS, Multicasting, BT-SDP



THE **ariba** UNDERLAY ABSTRACTION is part of the Spontaneous Virtual Networks (SpoVNet) Architecture **SPOVNET**

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[2] C. Hübsch, C. Mayer, S. Mies, R. Bless, O. Waldhorst, M. Zitterbart: Reconnecting the Internet with ariba - Self-Organizing Provisioning of End-to-End Connectivity in Heterogeneous Networks, ACM SIGCOMM Computer Communication Review, Vol. 40, (1), p. 131-132, Jan 2010

[3] S. Mies, O. Waldhorst, and H. Wippel. Towards End-to-End Connectivity for Overlays across Heterogeneous Networks. In Proc. Int. Workshop on the Network of the Future (Future-Net 2009), co-located with IEEE ICC 2009, Dresden, Germany, June 2009

[4] O. Waldhorst, C. Blankenhorn, D. Haage, R. Holz, S. Mies. Spontaneous Virtual Networks: On the Road towards the Internet's Next Generation. It - Information Technology Special Issue on Next Generation Internet, 50(6):367-375, Dec. 2008. <http://www.spoynet.de>

[5] Ariba Virtual Network Substrate. <http://www.ariba-underlay.org>