UCDAVIS
UNIVERSITY OF CALIFORNIA

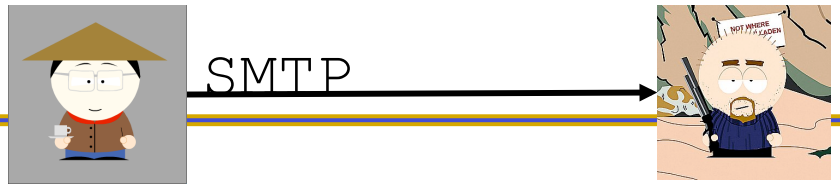
Davis Social Links @

Experiment Workflow and Services Working Group

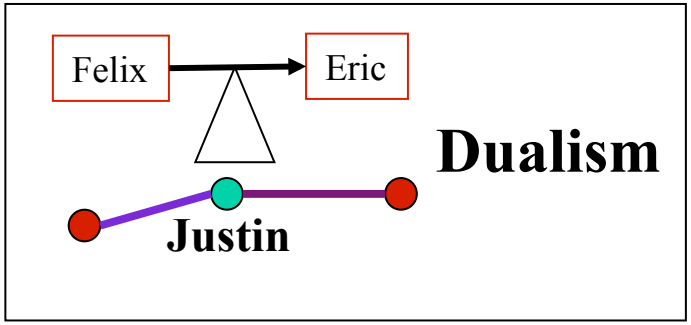
S. Felix Wu
Computer Science Department
University of California, Davis

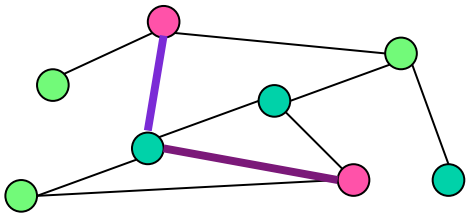
wu@cs.ucdavis.edu
http://www.facebook.com/sfelixwu

Davis California
geni
Exploring Networks of the Future

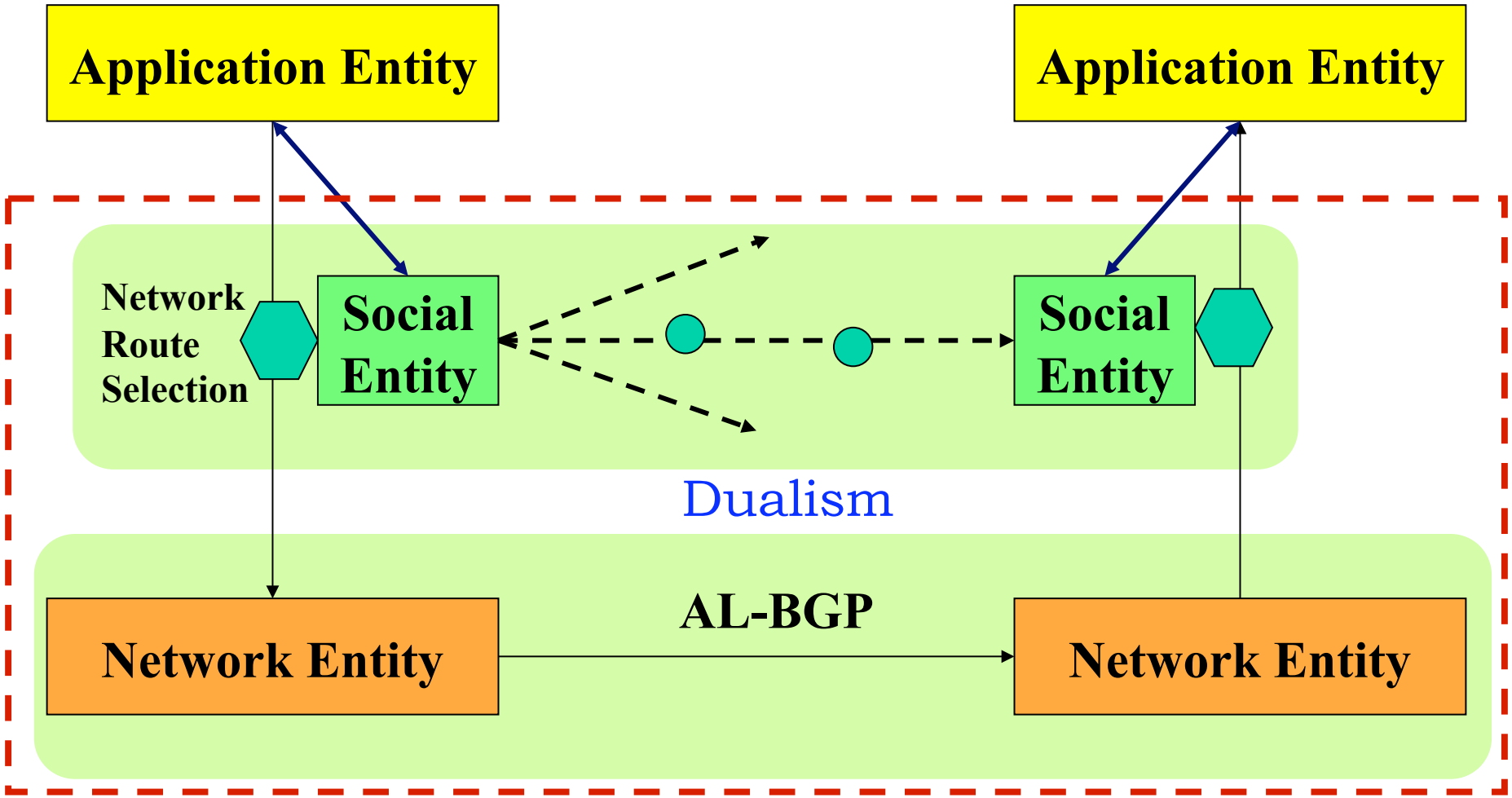


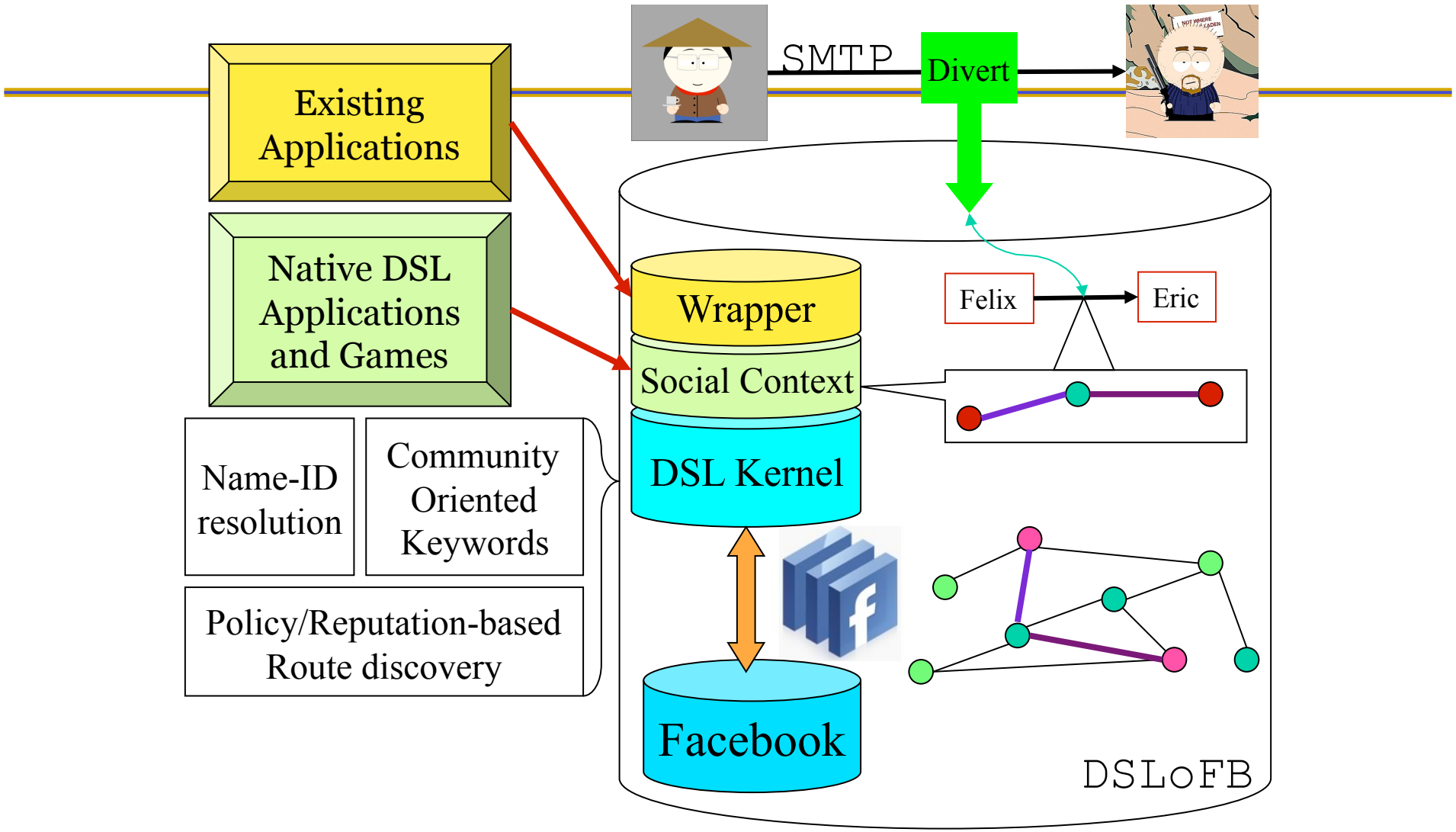
We are trying to make the information of social context and relationship explicit!

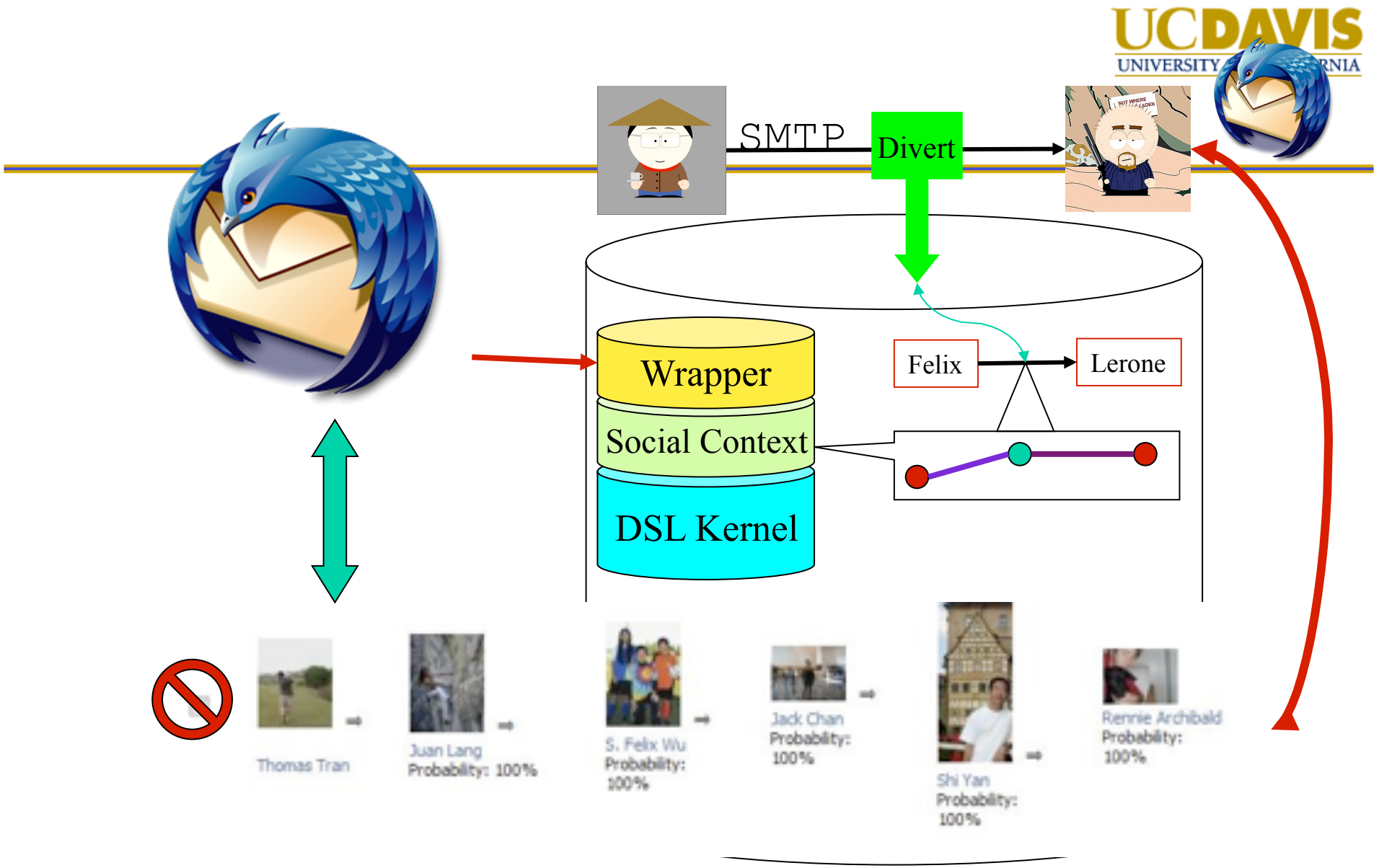


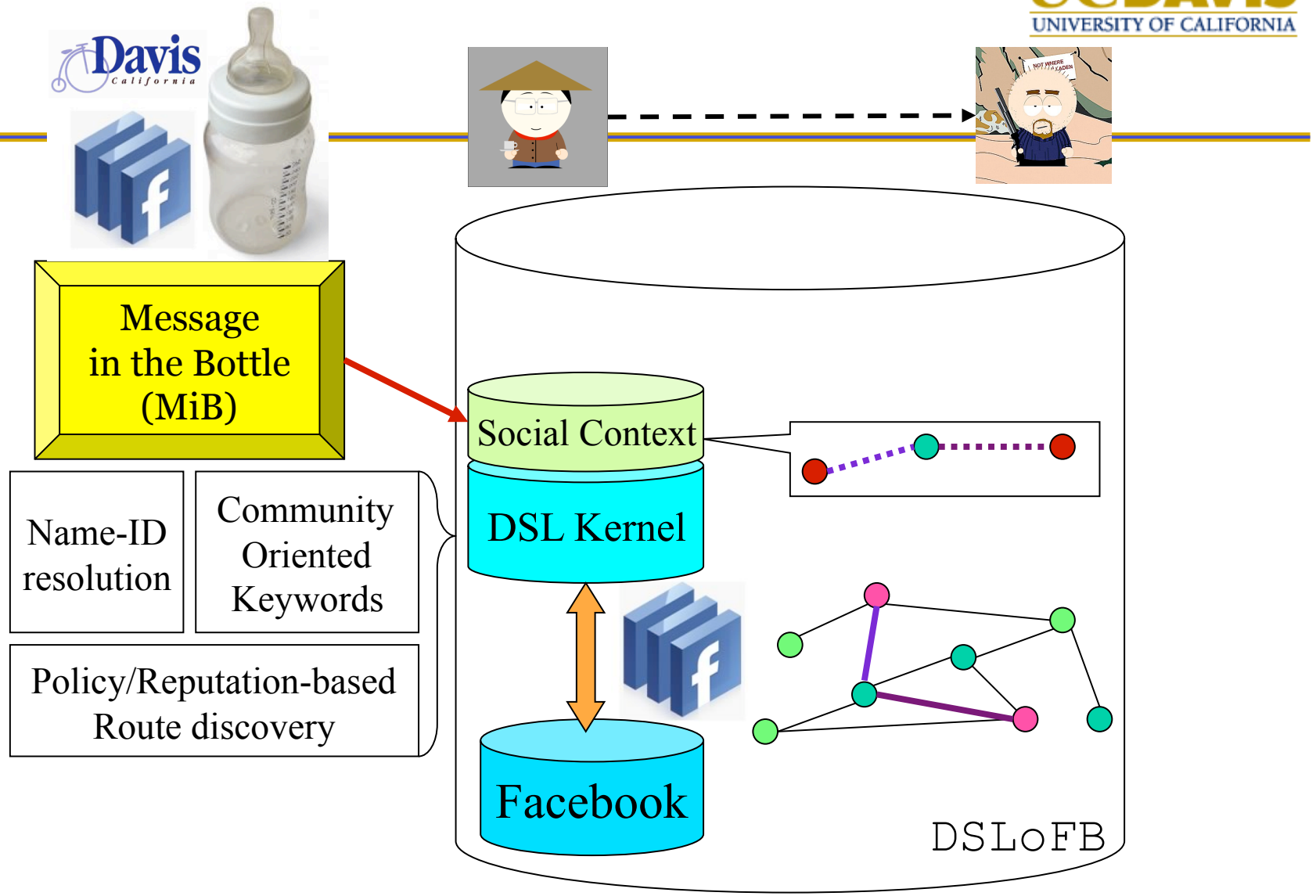


GENI Experiment




Existing Applications
Native DSL Applications and Games
Name-ID resolution
Community Oriented Keywords
Policy/Reputation-based Route discovery
SMTP
Divert
Wrapper
Social Context
DSL Kernel
Facebook
Felix
Eric
DSLoFB

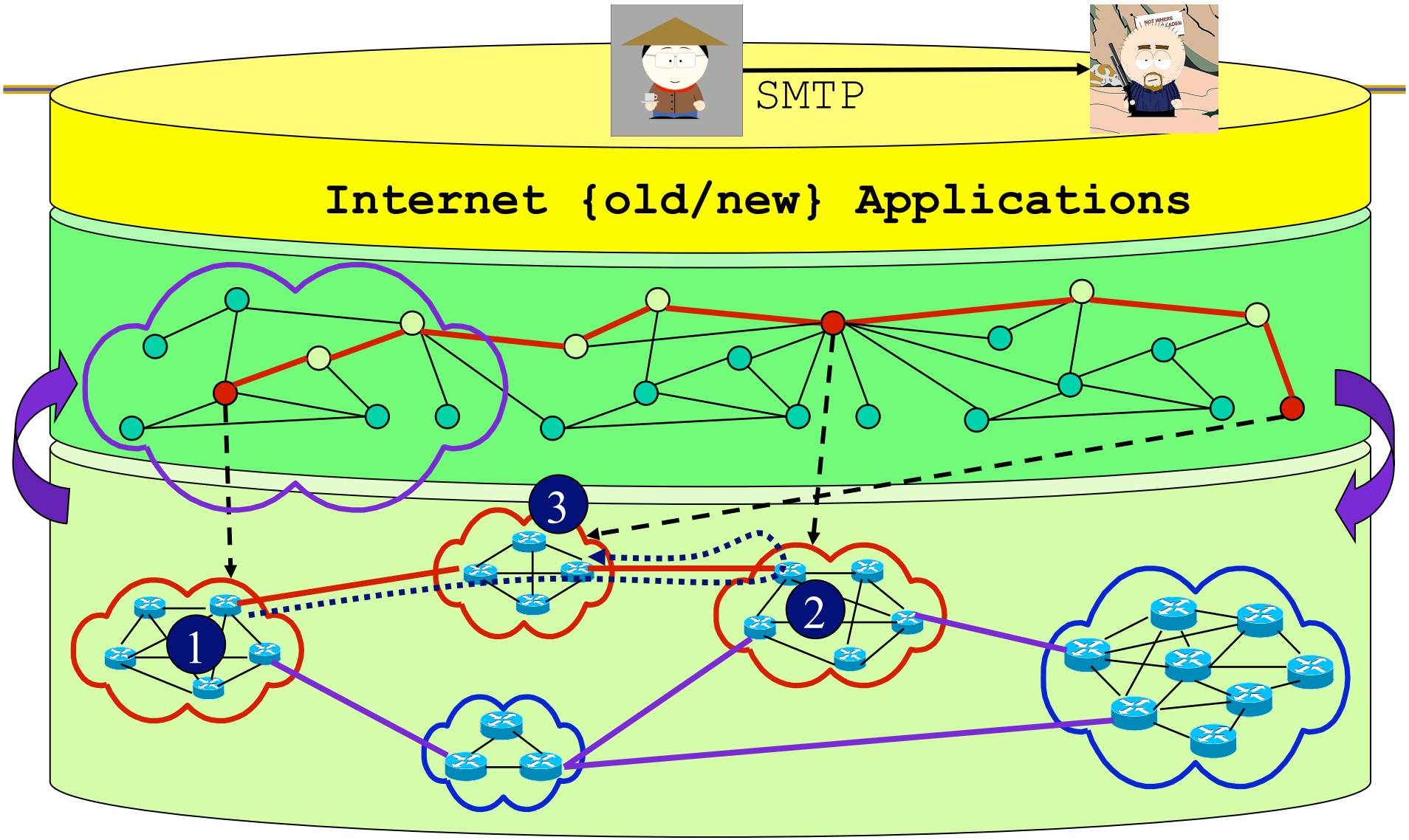

SMTP
Divert
Wrapper
Social Context
DSL Kernel
Felix
Lerone
Thomas Tran
Juan Lang
Probability: 100%
S. Felix Wu
Probability:
100%
Jack Chan
Probability:
100%
Shi Yan
Probability:
100%
Rennie Archibald
Probability:
100%


Message
in the Bottle
(MiB)
Name-ID
resolution
Community
Oriented
Keywords
Policy/Reputation-based
Route discovery
Social Context
DSL Kernel
Facebook
DSLoFB

Three Layers

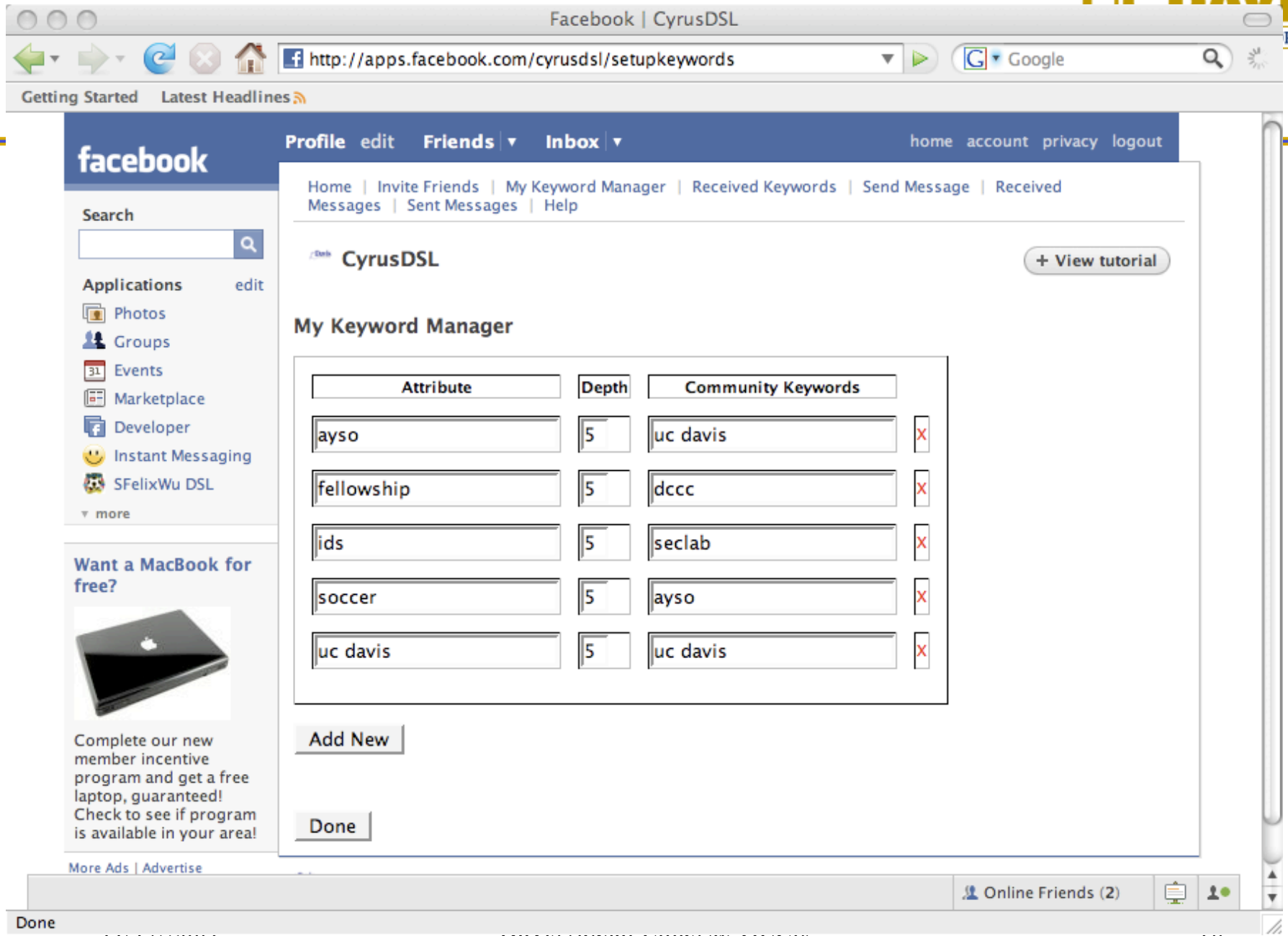
- User Access layer
  - Native & Existing Applications
- Social Control Layer
  - The core of DSL
- Network Control Layer
  - Network Virtualization

ISP + SCSP(Social Community Service Provider)



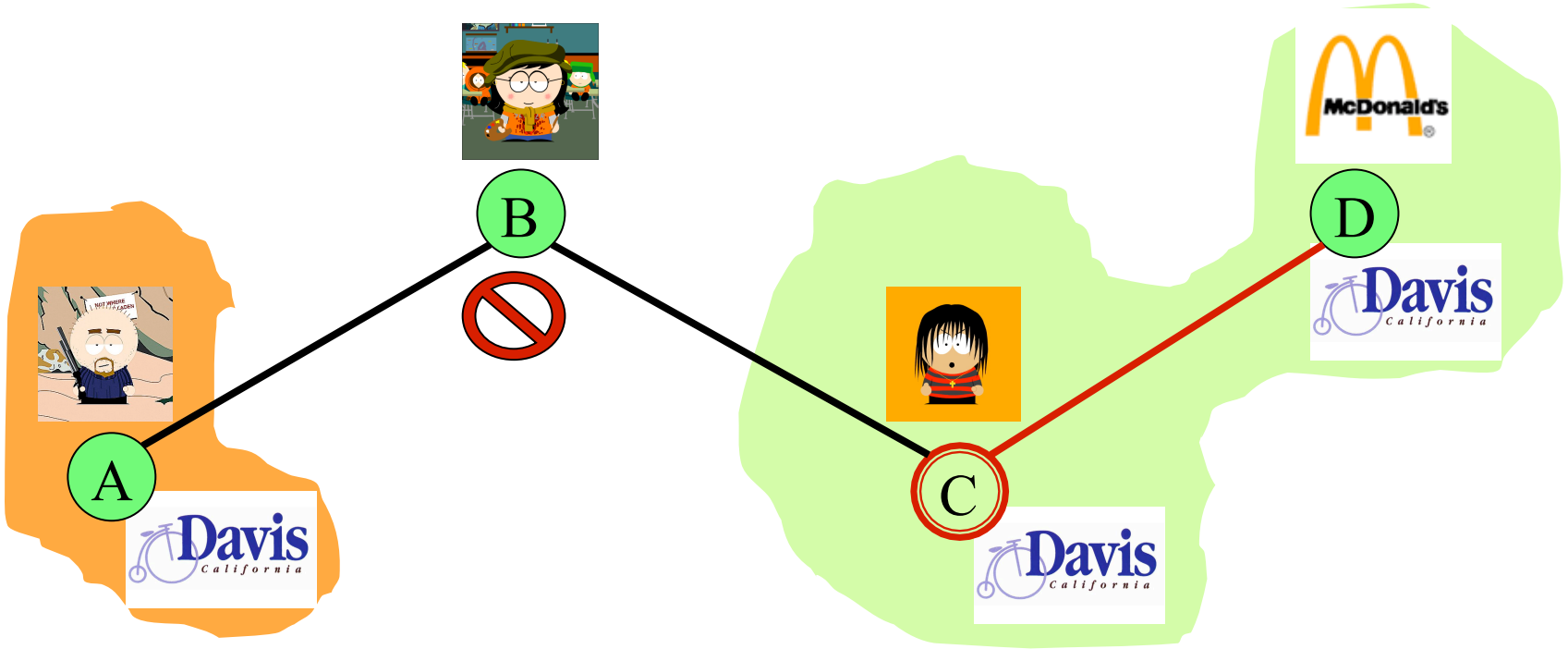
as the Social Peer

- Attributes:
  - {McDonald's Express, 640 W Covell Blvd, # D, Davis, (530) 756-8886, Davis Senior High School, Community Park, North Davis}



Experiment Workflow and Services,
Salt Lake City, Utah

Davis Community

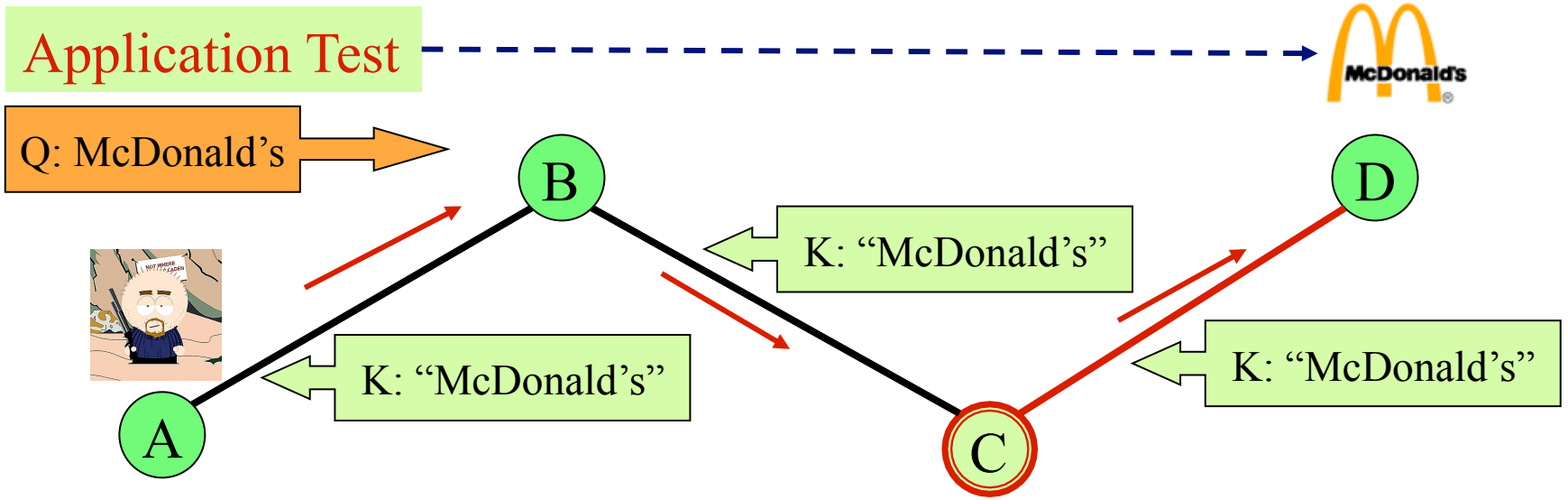


- A connected graph of social nodes sharing a set of community attributes

GENI Experiment

- Leverage (and discover) the "features" of ProtoGENI as much as possible for our NSF FIND project.
- Build something on "DSL" that is attractive and usable by real users
  - feedback to the FIND/GENI community
- Share and reuse the experiments (data traces and models, under IRB)

Finding

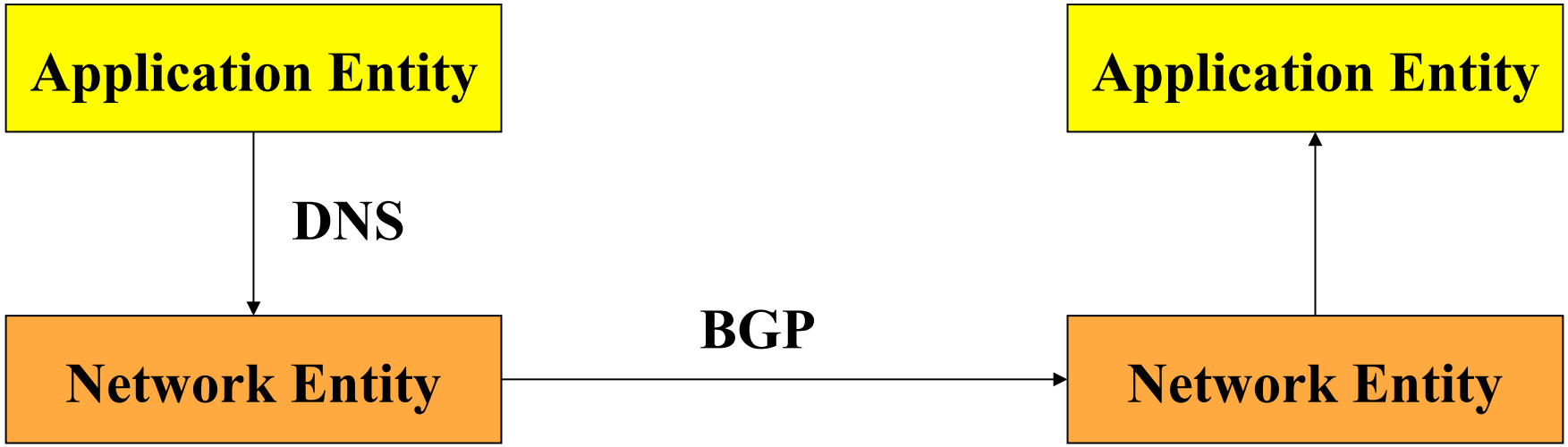


Search Keyword: "McDonald's"

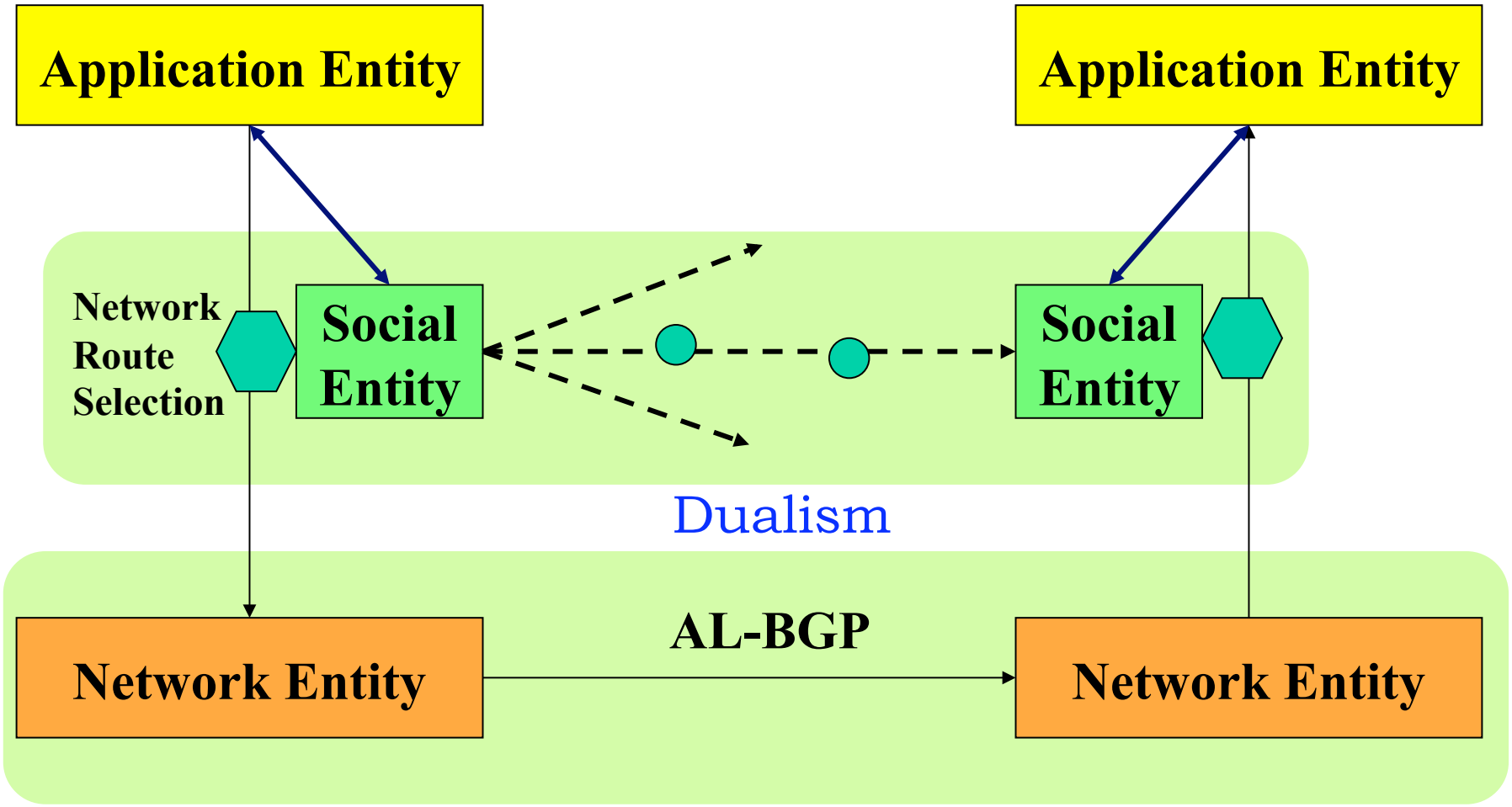
Questions: is this the right McDonald's?

"Routable Identity"

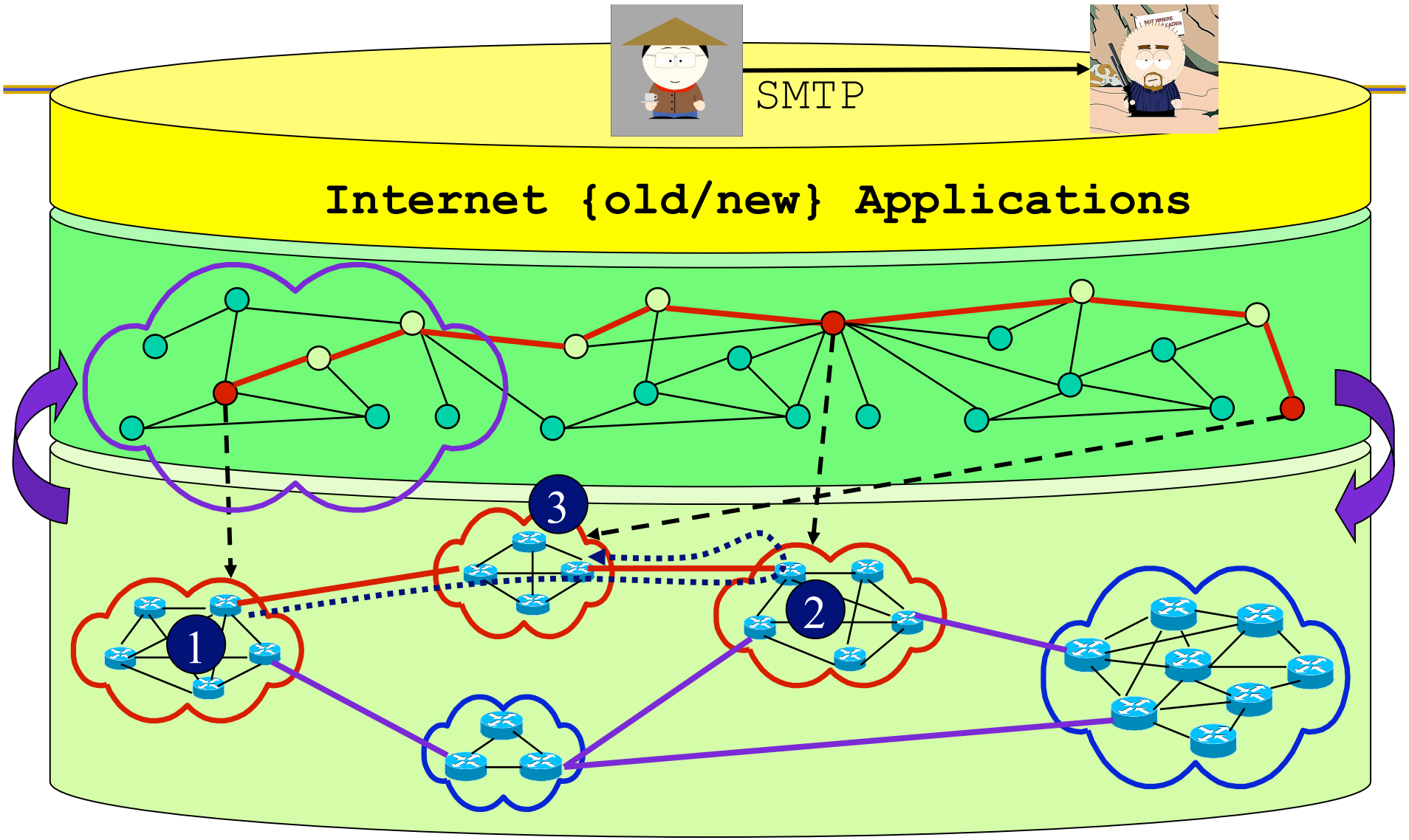
- Application identity =M=> Network identity
- Network identity =R=> Network identity
- Network identity =M=> Application identity



"Social Control Layer"



ISP + SCSP(Social Community Service Provider)



Requirements

- Duration:
  - Is the intended experiment short-lived (e.g., requiring more interactive features) or long-lived (e.g., requiring (error) event notification rather than interactive support)
- Layering:
  - What layer of abstraction does the experiment want to control?
- Domain:
  - What type(s) of resources does the experiment need?
- Scale:
  - How many resources comprise the experiment?

Requirement #1

- Duration:
  - Is the intended experiment short-lived (e.g., requiring more interactive features) or long-lived (e.g., requiring (error) event notification rather than interactive support)

- We need 24/7 for a number of years. (Long-Lived)
- We will also need some capability to support robustness and automated reset/reload (and consistently recover the system state as much as possible)

Requirement #2

The following phase transition should be transparent to the DSL users.

- Layering:
  - What layer of abstraction does the experiment want to control? (e.g., does it need to control the topology and link characteristics? or does it need to completely replace IP with a new packet format and router processing? does it need to control/install in-network transport services e.g., retransmission or encryption, or … service? or does it need to control placement of application-level (e.g., P2P) services? etc)

- Phase #1: Social Control layer but over an traditional IP/ Facebook layer.
  - focusing on Social-based Access Control
- Phase #2: DSLNet (I.e., no IP addresses and DNS in the OSN kernel)
  - Routers need to exam social context information for forwarding a packet

Requirement #2.5

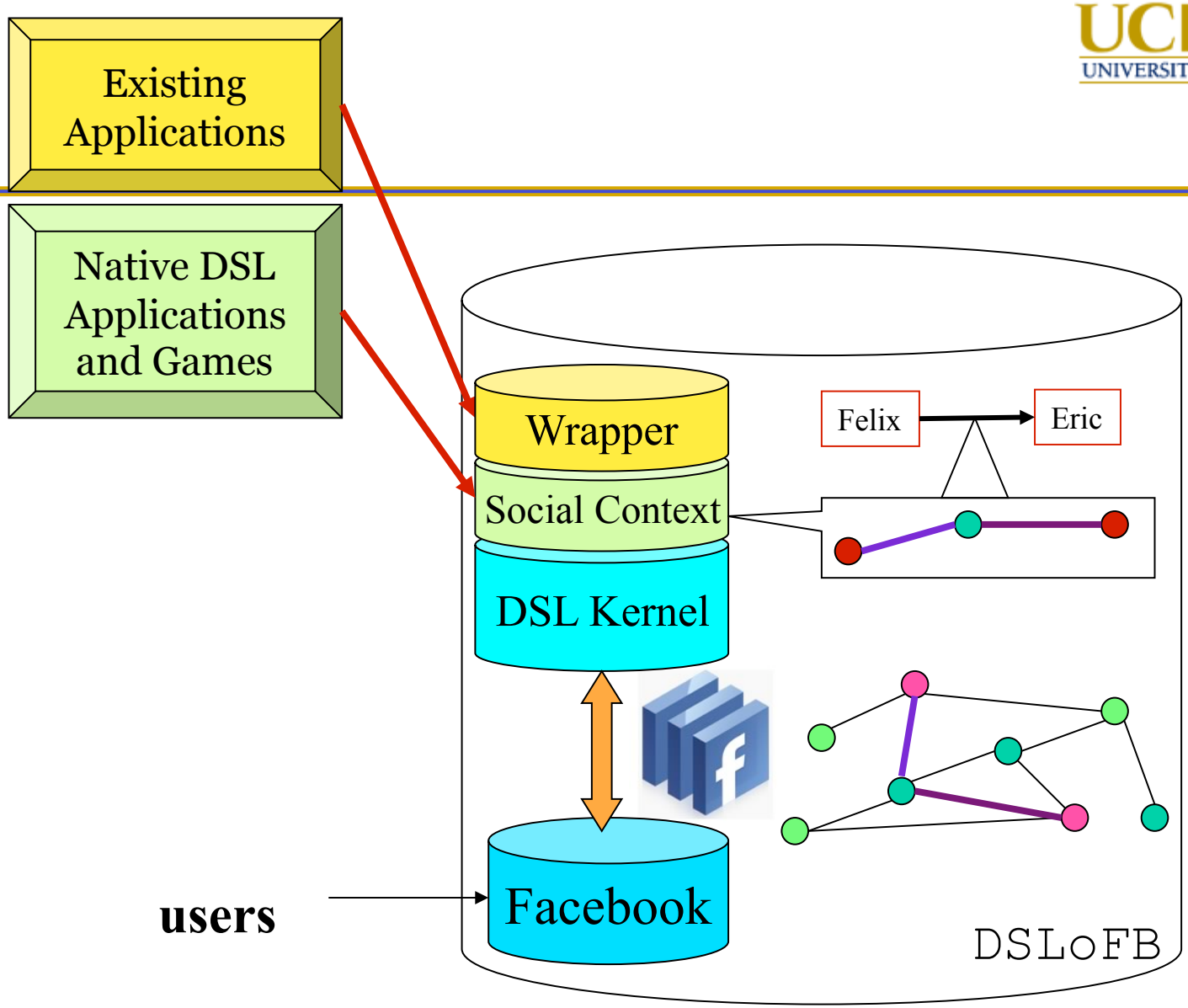
- Layering:

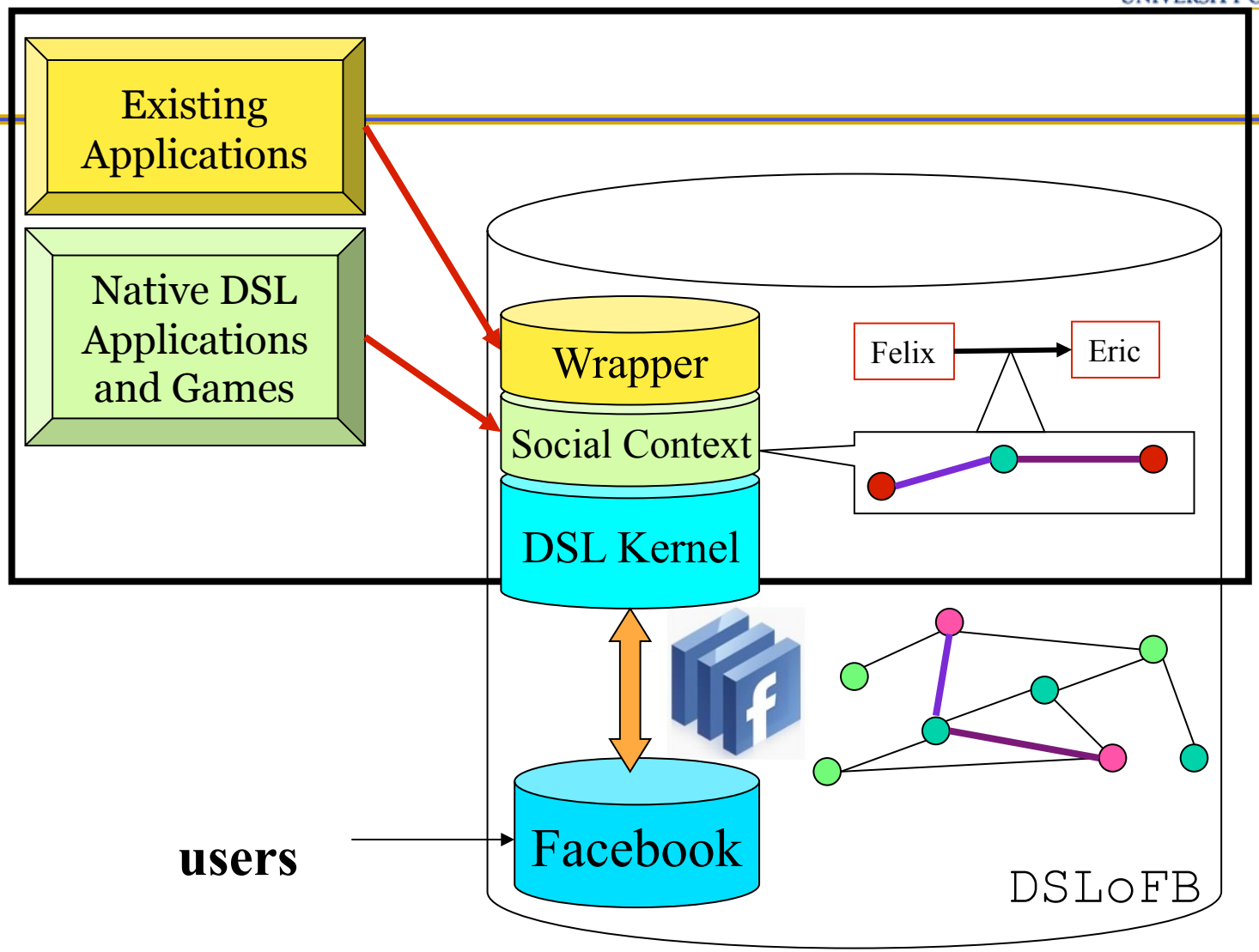
- Internet-based Access to ProGENI

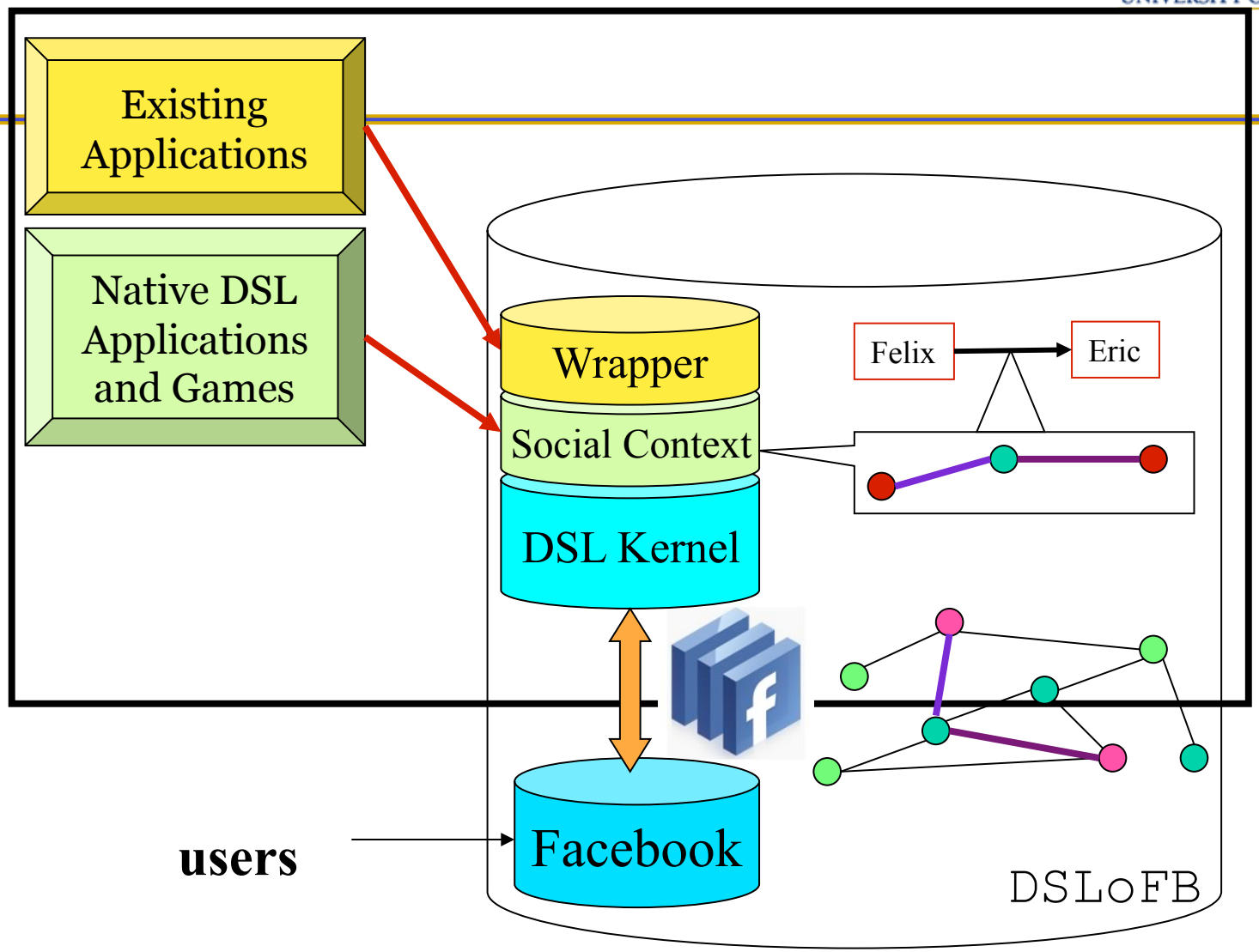
- Currently, ALL DSL/FB users will need to go through both www.facebook.com and dsl.cs.ucdavis.edu
- We like to create a few SCSP (Social Context Service Providers) within ProtoGENI such that the service can be decentralized more.
  - Maybe some DNS tricks

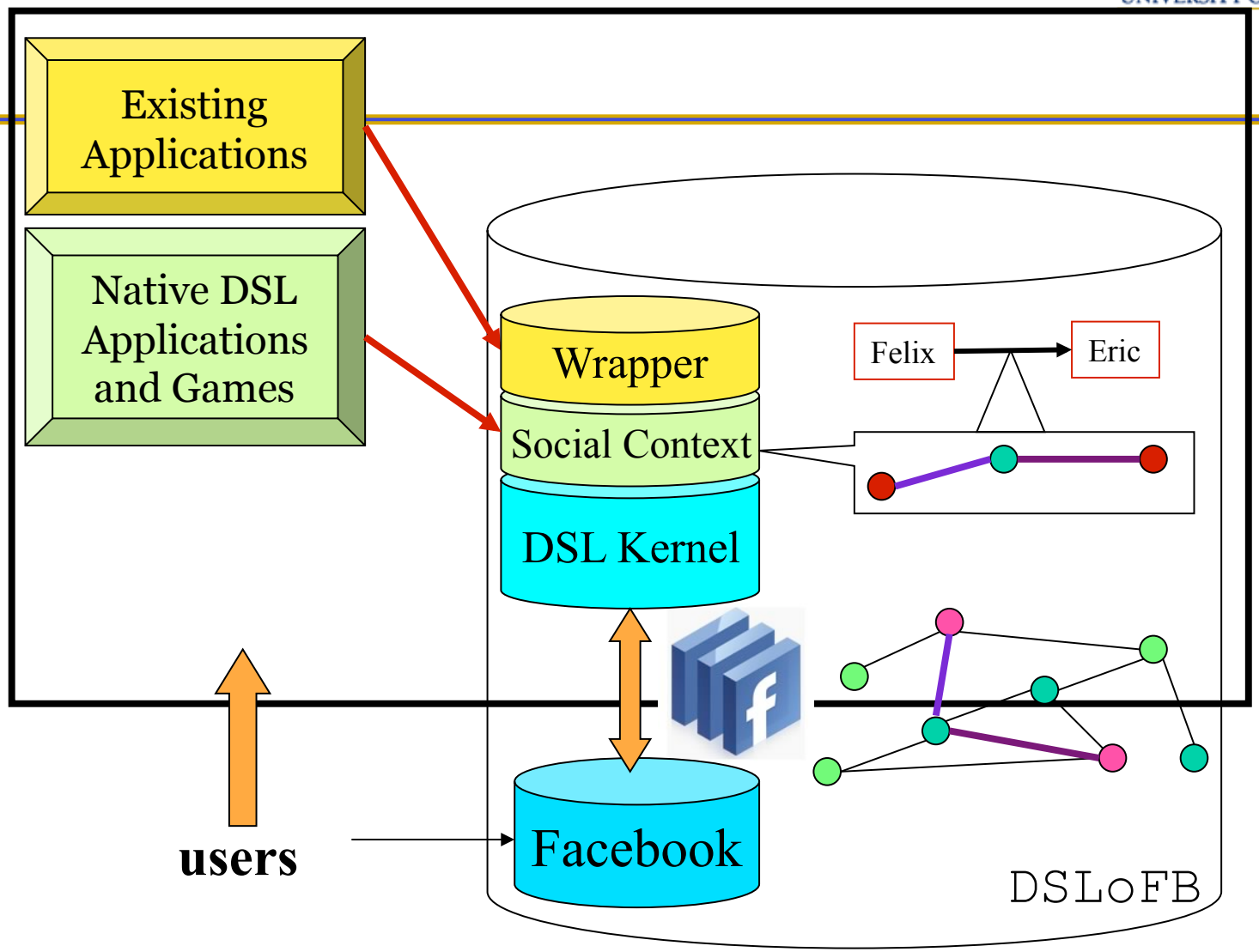
Requirement #2.25

- Layering:
- Internet-based Access to ProGENI
- Alternatively, we can create a bunch of SCSP's (like Facebook, Orkut, MySpace Twitter) to allow diversified access to ProtoGENI. Then, the OSN's get re-united within the ProtoGENI.


Existing Applications
Native DSL Applications and Games
Wrapper
Social Context
DSL Kernel
Facebook
Felix
Eric
users
DSLoFB


Existing Applications
Native DSL Applications and Games
Wrapper
Social Context
DSL Kernel
Felix
Eric
Facebook
users
DSLoFB


Existing Applications
Native DSL Applications and Games
Wrapper
Social Context
DSL Kernel
Felix
Eric
Facebook
users
DSLoFB


Existing Applications
Native DSL Applications and Games
Wrapper
Social Context
DSL Kernel
Felix
Eric
Facebook
users
DSLoFB

Requirement #3

- Domain:
  - What type(s) of resources does the experiment need? (e.g., wireless, wired, mobile, sensor, storage, …, or some combination)

- Wired
  - openflow to bypass Facebook
- Storage
  - for both DSL kernel OSN graph and space for individual users
- Custom OS/Software Images

Requirement #3.5

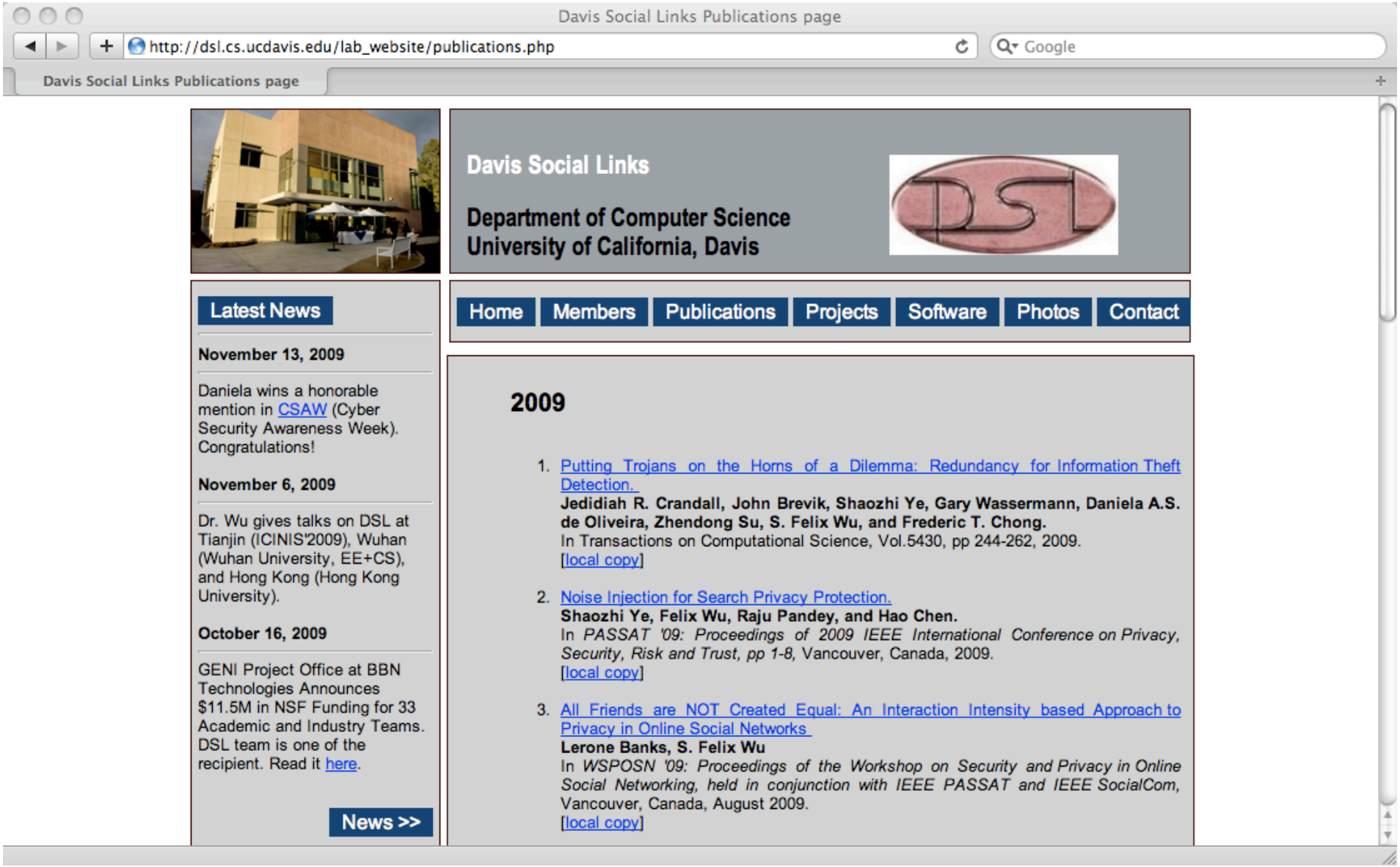
- Domain:
  - What type(s) of resources does the experiment need? (e.g., wireless, wired, mobile, sensor, storage, …, or some combination)

- On-the-fly, allocation and migration
  - Predicting Twitter messaging bursts and exploring the social locality (and mapping this to cluster mobility)

Requirement #4

- Scale:
  - How many resources comprise the experiment? (e.g., very large experiments will need tools that help manage large sets of resources collectively rather than individually; whereas small experiments may want tools that interact with each resource individually).

- Initially, our experiment will be small scale, but we are looking forward to the "*growing pain*".


Davis Social Links Publications page
http://dsl.cs.ucdavis.edu/lab_website/publications.php
Google
Davis Social Links Publications page
Davis Social Links
Department of Computer Science
University of California, Davis
DSL
Latest News
November 13, 2009
Daniela wins a honorable mention in CSAW (Cyber Security Awareness Week). Congratulations!
November 6, 2009
Dr. Wu gives talks on DSL at Tianjin (ICINIS'2009), Wuhan (Wuhan University, EE+CS), and Hong Kong (Hong Kong University).
October 16, 2009
GENI Project Office at BBN Technologies Announces $11.5M in NSF Funding for 33 Academic and Industry Teams. DSL team is one of the recipient. Read it here.
News >>
Home
Members
Publications
Projects
Software
Photos
Contact
2009
1. Putting Trojans on the Horns of a Dilemma: Redundancy for Information Theft Detection.
Jedidiah R. Crandall, John Brevik, Shaozhi Ye, Gary Wassermann, Daniela A.S. de Oliveira, Zhendong Su, S. Felix Wu, and Frederic T. Chong.
In Transactions on Computational Science, Vol.5430, pp 244-262, 2009.
[local copy]
2. Noise Injection for Search Privacy Protection.
Shaozhi Ye, Felix Wu, Raju Pandey, and Hao Chen.
In PASSAT '09: Proceedings of 2009 IEEE International Conference on Privacy, Security, Risk and Trust, pp 1-8, Vancouver, Canada, 2009.
[local copy]
3. All Friends are NOT Created Equal: An Interaction Intensity based Approach to Privacy in Online Social Networks
Lerone Banks, S. Felix Wu
In WSPOSN '09: Proceedings of the Workshop on Security and Privacy in Online Social Networking, held in conjunction with IEEE PASSAT and IEEE SocialCom, Vancouver, Canada, August 2009.
[local copy]