SCoNet : Simulator COntent NETworking

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SCoNet SIM : WHAT IS IT?

SCoNe is an NS3 based simulator supporting the CCNX 1.0 protocol.
Designed for rapid development and ease of use.
The code is under GPL2
Uses *some* ndnSim v1 code

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SCoNet SIM : WHAT'S SUPPORTED

- Interest, InterestResponse, and Data Packets
- Configurable (Utility) Caching and Security
- Full TLV implementations, Hierarchy support
- Consumers, Producers

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SCoNet SIM : WHAT ISN'T SUPPORTED

- CCNX Fragmentation
- *Partial Security Implementation (Checksum)*
- Planned, but not yet!
  - Manifest support
  - Chunking from a Producer
  - More Validation methods (e.g. signing)

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SCoNet : WHAT IS DIFFERENT

- Uses SIFAH for forwarding
- Uses Utility Networking
- TLV ID’s are unique, opposed to relative
- Packets are pure TLV, no fixed header
- Added a separate Security Module.

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TLV FEATURES

- 3 Types - Container, Endian, Raw
- Byte Endian/ASCII XML wire format
- SetObjectData - Shallow/Deep Copy ANY data type (e.g. float)
- Packet Types are encapsulated TLVs, to interface with NS3

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TLV Code -- Make it simple!

- ExistTLV(TLV, “TLV_NAME”)
- SetTLV(PARENT_TLV, NEW_TLV)
  - *SetTLVData(TLV, “TLV_NAME”, Data)*
- GetTLV(TLV, “TLV_NAME”)
- DeleteTLV(TLV, “TLV_NAME”)
- CreateValidTLV(new_TLV, “TLV PACKET”)

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TLV Packet Merging

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Utility Networking, Pt 1

Utility Networking is the overall term for the integrated scalar utilities modules for networking.

Caching, Forwarding, and Security, use aggregated scalar utilities, which allow intra-module and inter-node communication. Can be used with SDN data-control planes

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Utility Networking, Pt 2

Utility Networking reduces existing algorithms and functional output to normalized scalar values between [0, 1].
Each algorithm or function can be used and compared in an equivalent manner.
May evaluate each Packet type.

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Utility Networking, Pt 3

What do we do with a scalar value?

- Thresholds are set on the scalar value.
- Actions are implemented on associated thresholds.
  - Caching: x < PURGE_THRESHOLD, Purge
  - Prefetch: y > PREFETCH_THRESHOLD, Prefetch Data

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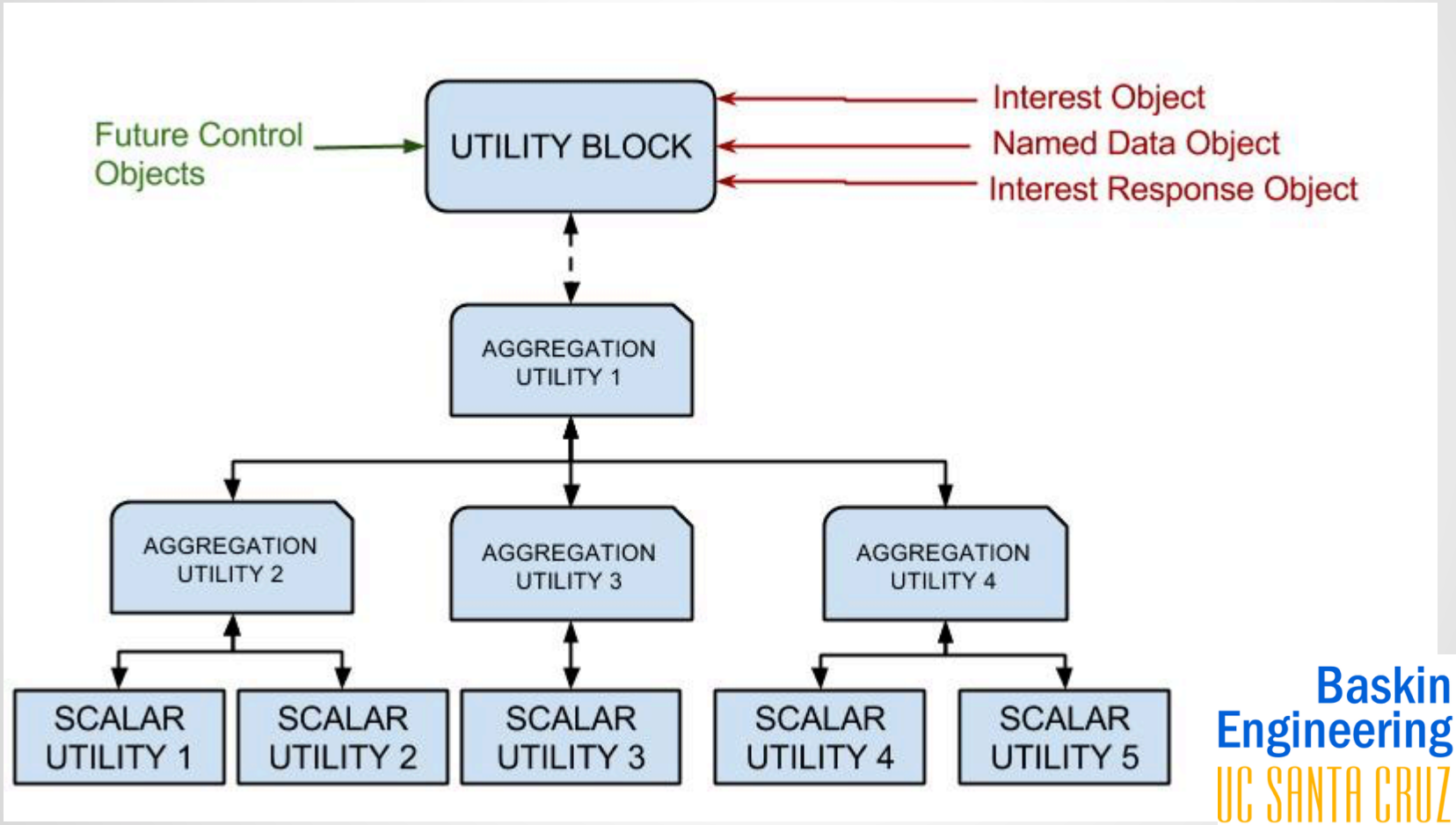
Utility Networking, Pt 4



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Utility Networking, Pt 5

Earlier version of Utility Networking was implemented in SRI's Encoder project for CBMEN.
www.darpa.mil/Our_Work/STO/Programs/Content-Based_Mobile_Edge_Networking_(CBMEN).aspx
Encoders: encoders.csl.sri.com

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Utility Caching, Pt 1

Which Utilities?

- Aggregation: MIN, MAX, MULT, SUM, …
- Algorithmic: LRU, HASH, FRESH, RND, HTL (Hops to Live), NameQoS, …
- Inter-Intra Modular: Security/SDN
- *SENSOR: GPS, BATTERY, …*

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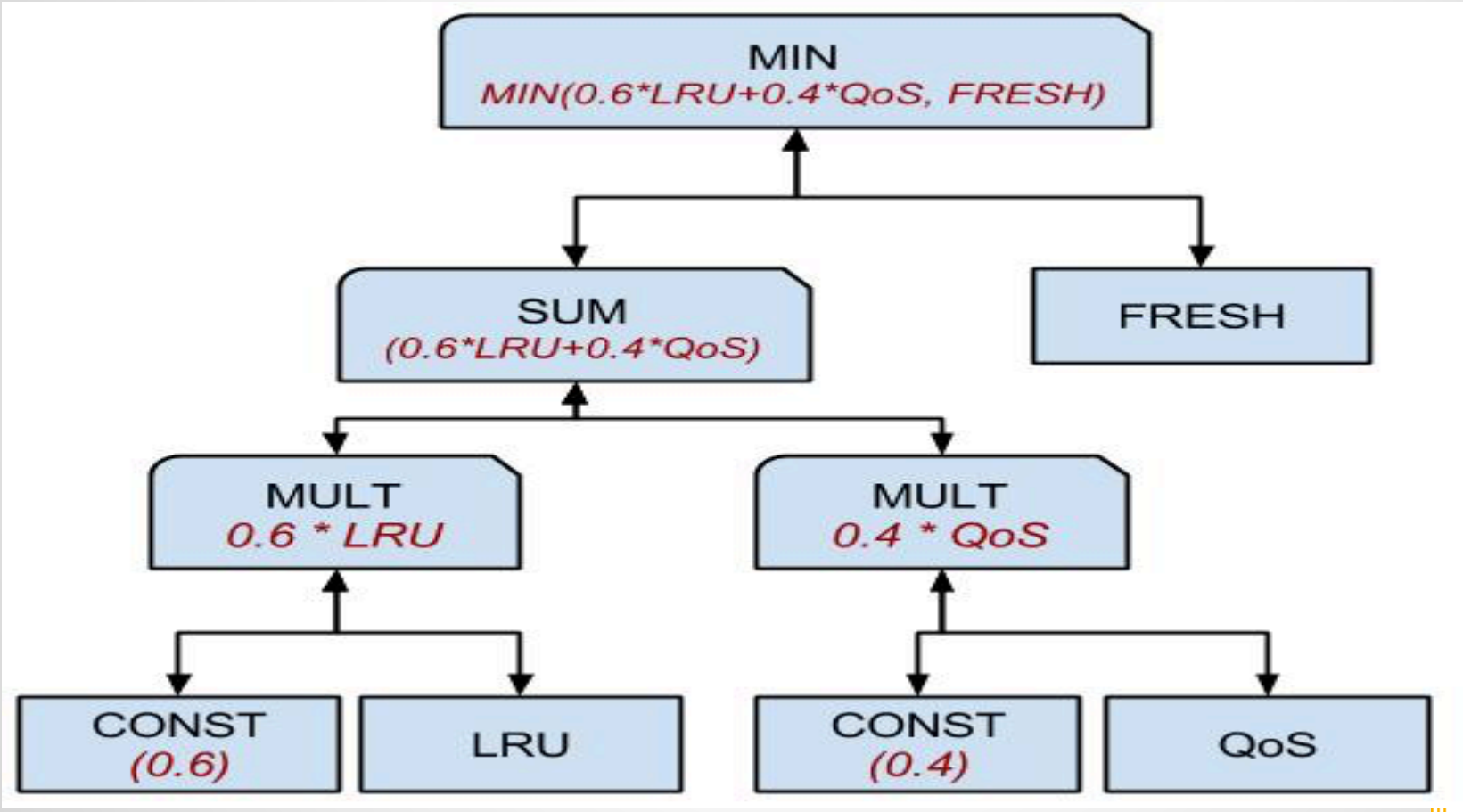
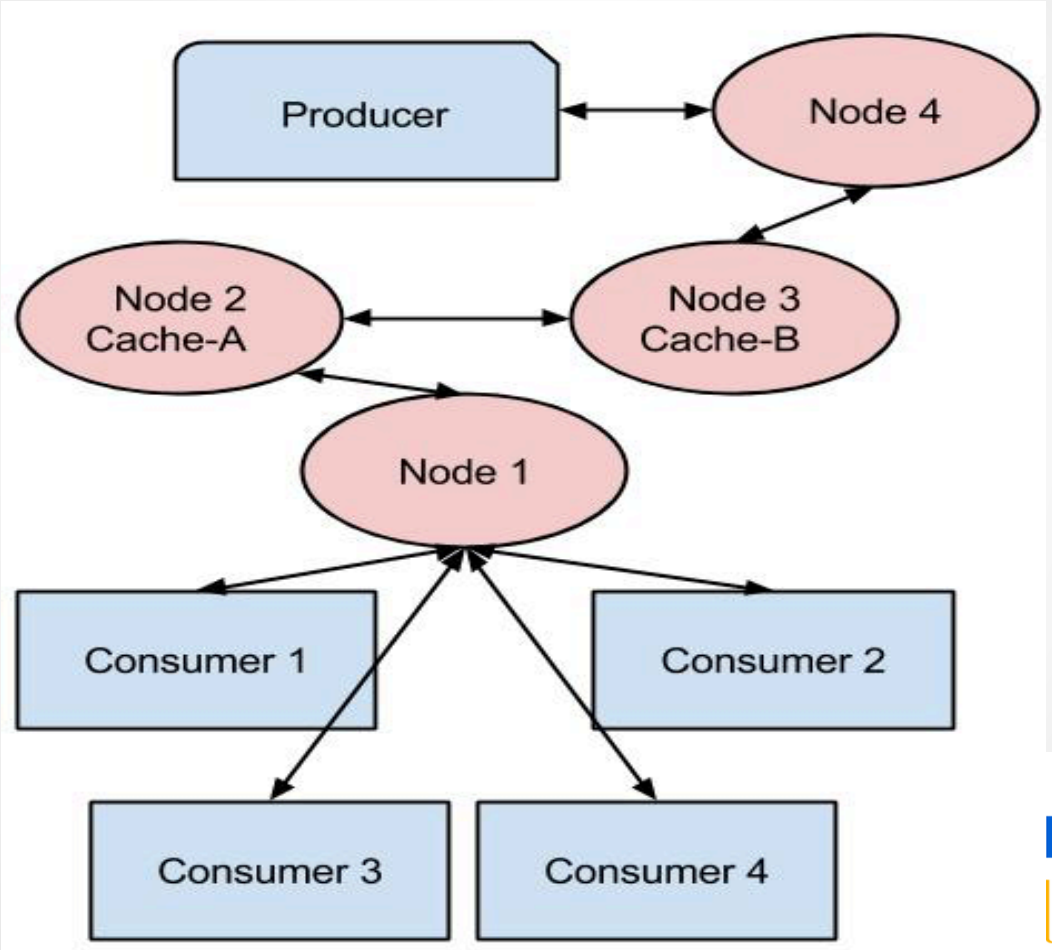
Utility Caching, Pt 2



Utility Caching, Pt 3



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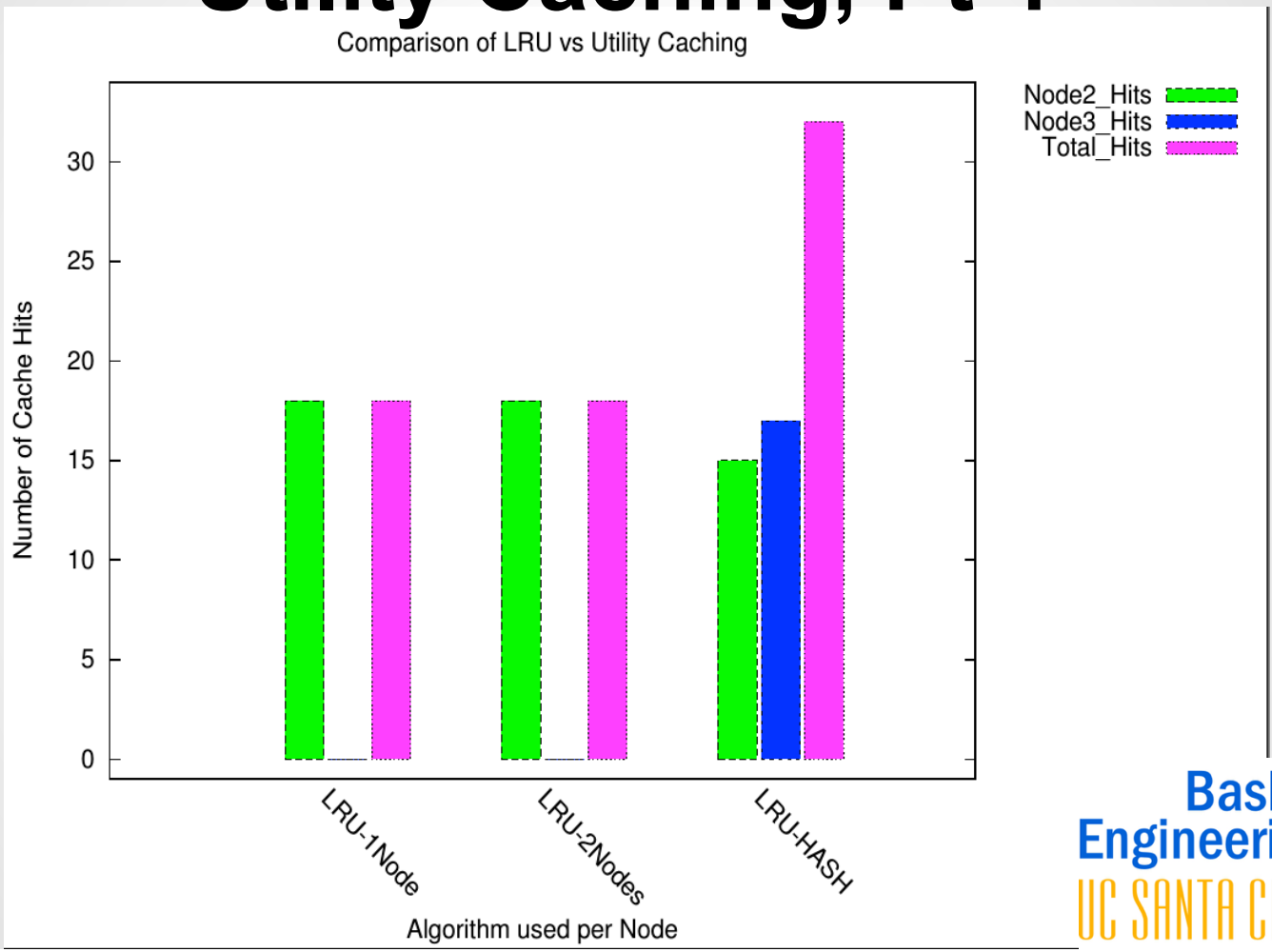
Utility Caching, Pt 4



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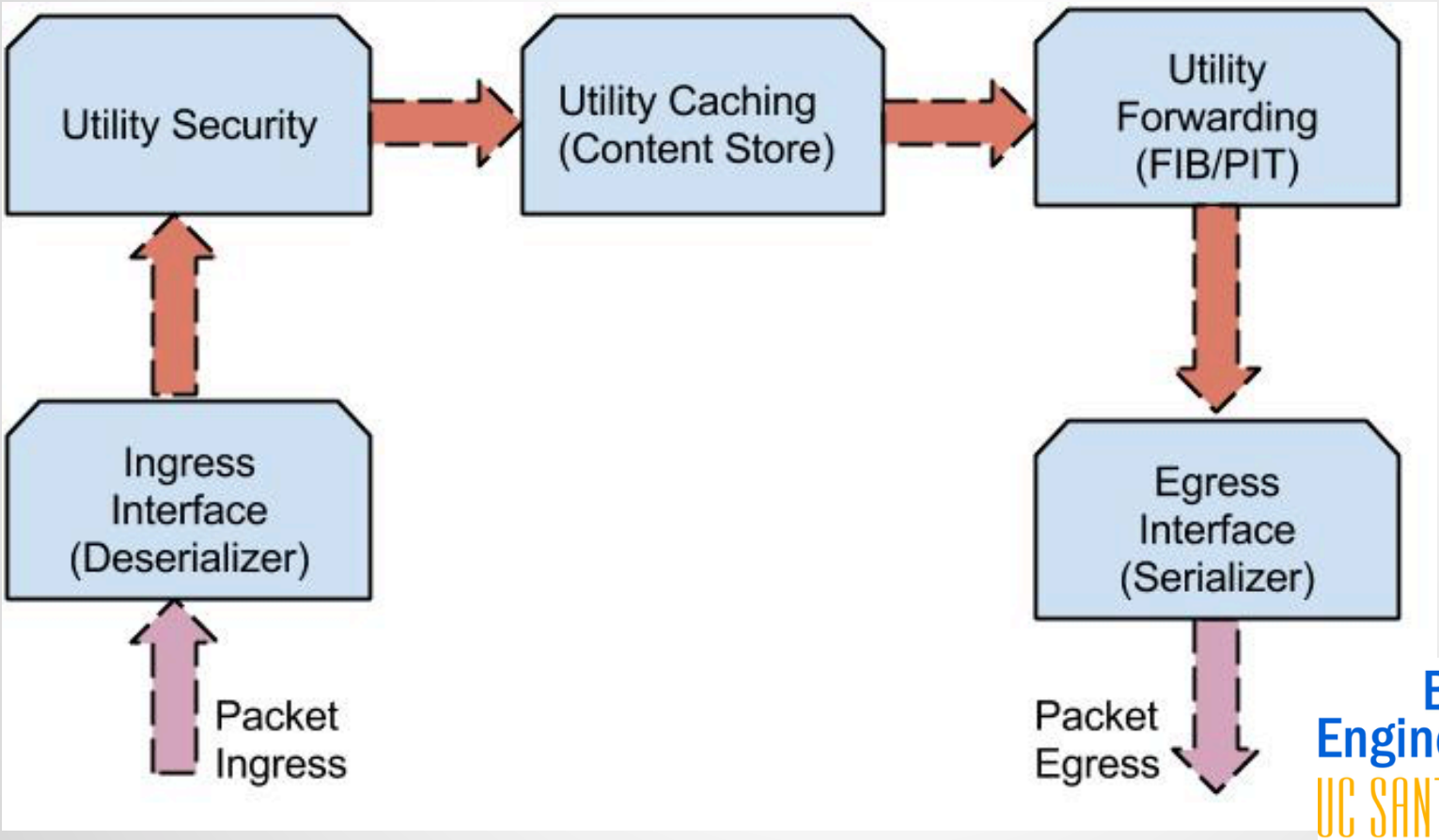
Utility Security



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FUTURE FEATURES

- MANIFESTS, CHUNKING
- UTILITY FORWARDING, UTILITY PREFETCH
- SENSOR SUPPORT
- PYTHON SUPPORT
- AUTO-CONFIG SUPPORT
- EXAMPLES, DOCUMENTATION
- Further TLV Abstraction

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WHERE CAN I GET IT?

https://github.com/jlmathew/ScoNet.git

Currently, the entire NS3 branch.
Configure with no examples, tests, or python.

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QUESTIONS?

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