ECSE-6600: Internet Protocols

Informal Quiz #13: P2P and Sensor Networks

Shivkumar Kalyanaraman:
GOOGLE: “Shiv RPI”
shivkuma@ecse.rpi.edu

Rensselaer

RSVP

P2P and Sensor Networks (Slide set #14): Informal Quiz

Shivkumar Kalyanaraman

Rensselaer Polytechnic Institute

P2P and Sensor Networks

T F

- ☐ ☐ The goal of P2P networks is limited to using the storage capacity of a large number of PCs.
- ☐ ☐ P2P networking happens at Layer 3 in the OSI hierarchy
- ☐ ☐ A central problem in P2P networks is to map the name of an object to its location.
- ☐ ☐ Napster uses a distributed directory and distributed object storage architecture
- ☐ ☐ Overlays are often used as an economical deployment strategy when barriers exist for deployment at lower layers (eg: for multicast etc)
- ☐ ☐ MP3 downloading accounts for the largest fraction of web traffic in 2006.
- ☐ ☐ P2P traffic accounts for roughly 40-60% of all internet traffic in 2006
- ☐ ☐ Flooding is the only way to implement lookup in a distributed directory.
- ☐ ☐ The basic gnutella protocol is decentralized, but not scalable because it depends upon flooding for query routing.
- ☐ ☐ Flooding-based systems are efficient in finding popular objects, but inefficient in locating rare objects.
- ☐ ☐ Bittorrent decentralizes the file download process in addition to the location-service process.
- ☐ ☐ Leechers in bittorrent are nodes that have the entire file.
- ☐ ☐ Bittorrent includes an unchoking method to reduce load on individual nodes; and ensure fair participation by all nodes.

P2P and Sensor Networks

- DHT involves a hash space to which both node-IDs and object-IDs map to and nodes maintain different pieces of the hash space, with links to a set of neighbors for content routing.
- DHTs are not robust to node failure.
- DHTs involve multiple application-level hops before arriving at the node containing the key-to-value mapping.
- CAN uses a circle to organize its hash-space.
- In the post-internet age, distributed systems involve very-large-scale systems, and typically with weaker semantics.
- The current internet infrastructure implements a host-centric architecture
- Users access the web in a data-centric manner: they don't care about the location/host where the object is stored; and only care about the object itself.
- DHTs allow scalable, data-centric lookups using flat-IDs.
- Data independence matters when the environment changes faster than the high-level application interface.
- Hierarchical indirection structures like DNS are inflexible and do not offer data independence.

P2P and Sensor Networks

- Sensor networks involve networking meeting sensors, actuators and embedded systems.
- Sensor networking can allow collaborative sensing of previously unobservable phenomena
- Sensornets are inherently data-centric: users don't know or care which sensor(s) hold the data they want.
- Energy efficiency is a key consideration in sensornets; communication is also often very expensive compared to computation
- The challenge in sensornets is to come up with a new set of layered protocols rather than stove-piped custom solutions for specific problems
- In-network processing (like active networking) is a common feature of sensornets
- Sensornets worry not only about connectivity, but also network lifetime and cumulative sensing coverage of the sensor field
- Distributed compression, multi-resolution signal processing and pattern-triggered data collection are features unique to sensor networks compared to p2p and internet.
- The sensor net can be viewed as a kind of distributed database.