

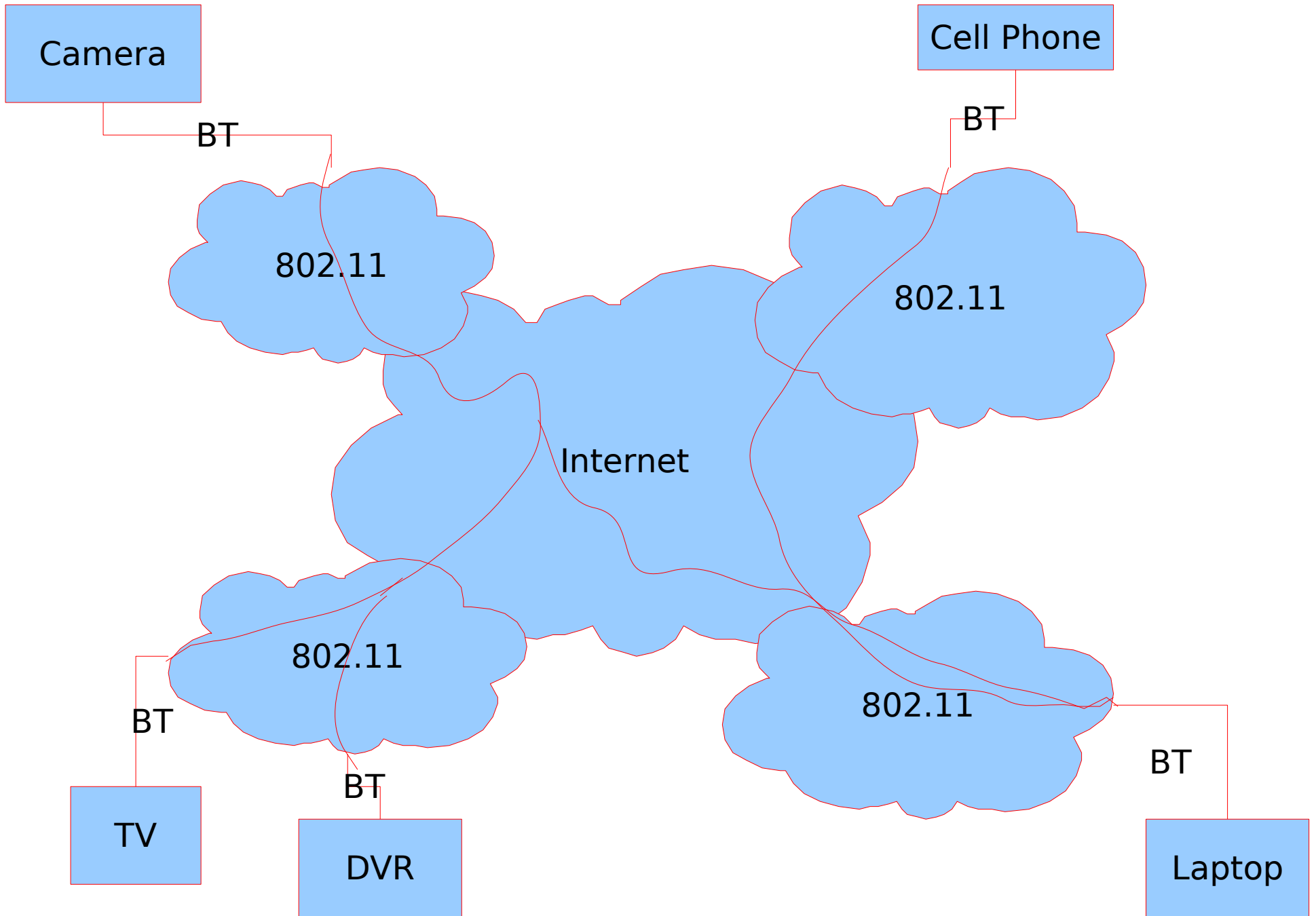
“BlueFi”

- Problem

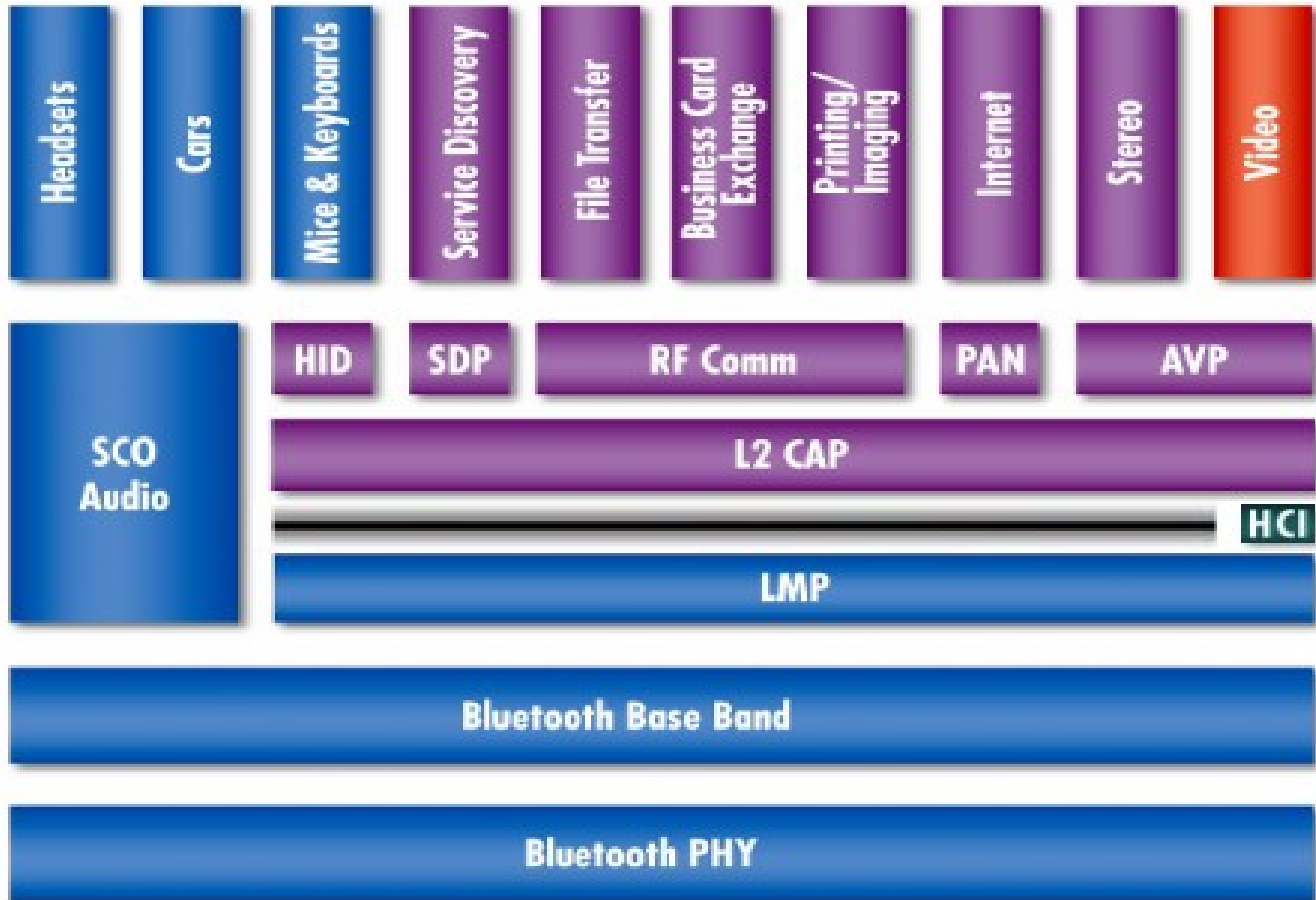
- Bluetooth devices can only communicate with other devices within very limited range

- Proposal

- Implement a 'Bluetooth access point' through which Bluetooth enabled devices can discover and connect to not only Bluetooth devices within close range, but also remote Bluetooth devices that are near other Bluetooth access points
  - Enable multicast of Bluetooth data through multiple 'Bluetooth access point' connections



# Bluetooth Stack



# BlueZ for Linux

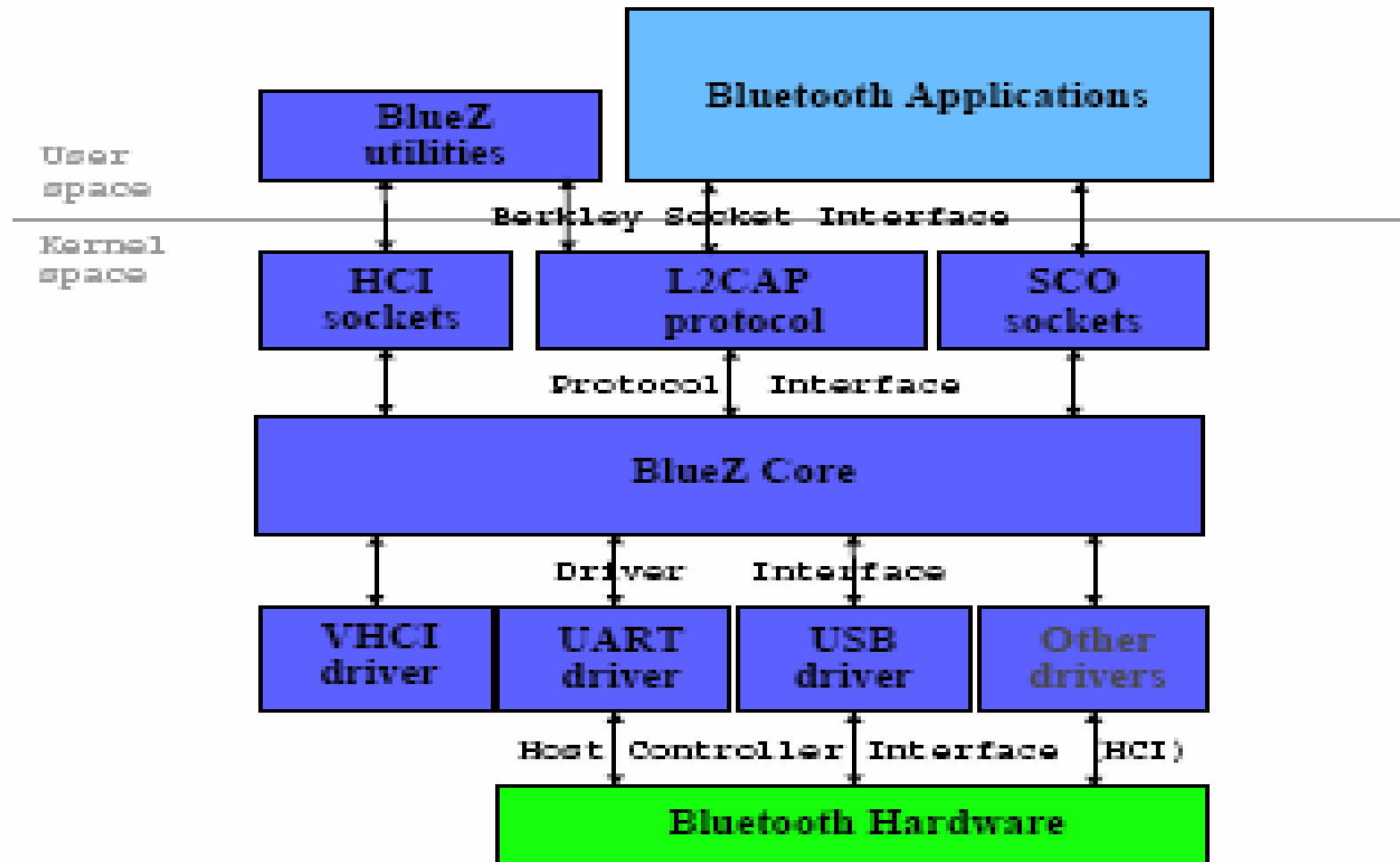


Figure 1: BlueZ Overview Diagram

# Architecture

- Local BT device performs inquiry, initiates connection with gateway, receives list of remote services available
- Local BT device selects service and connects to “shell” service on local gateway
- Local gateway initiates connection to remote gateway, forwards packets to/from local BT device
- Remote gateway initiates connection to real service on remote BT device, forwards packets back and forth

# Implementation

- Thread based
- Scanning thread periodically scans area for BT devices, transmits services to other gateway over TCP control channel
- Receiving thread listens to TCP control channel for updated device & service information
- Scanning thread spawns a thread for each service it transmits, which listens for TCP connections from other gateway
- Receiving thread spawns a thread for each service it registers, which listens for BT connections from local devices
- Application is basically an SDP wrapper

# Implementation Issues

- Most BT devices do not present user with choice of services from one device, but simply a list of devices
- Thwarts our architecture because in this case the user does not know what remote device they are connecting to
- Could be overcome with client-side changes, but unfeasible



# Alternative Design

- Implement an application that sits directly on top of HCI layer and simply relays HCI packets to other BT devices
- Much less complex implementation, don't have to deal with SDP, parsing service records
- Can create Virtual BT devices on gateway to represent remote devices
- Many more design issues

# Outstanding Questions

- How can we override the inquiry protocol to respond multiple times (once for each virtual device) from one physical device
- All virtual devices must have same BT Address because BT radios do not have 'promiscuous mode'
  - How do we demultiplex packets?

Demo