

Mobile Computing #MC01 Introduction

CS60002: Distributed Systems
Winter 2006-2007

Course Outline

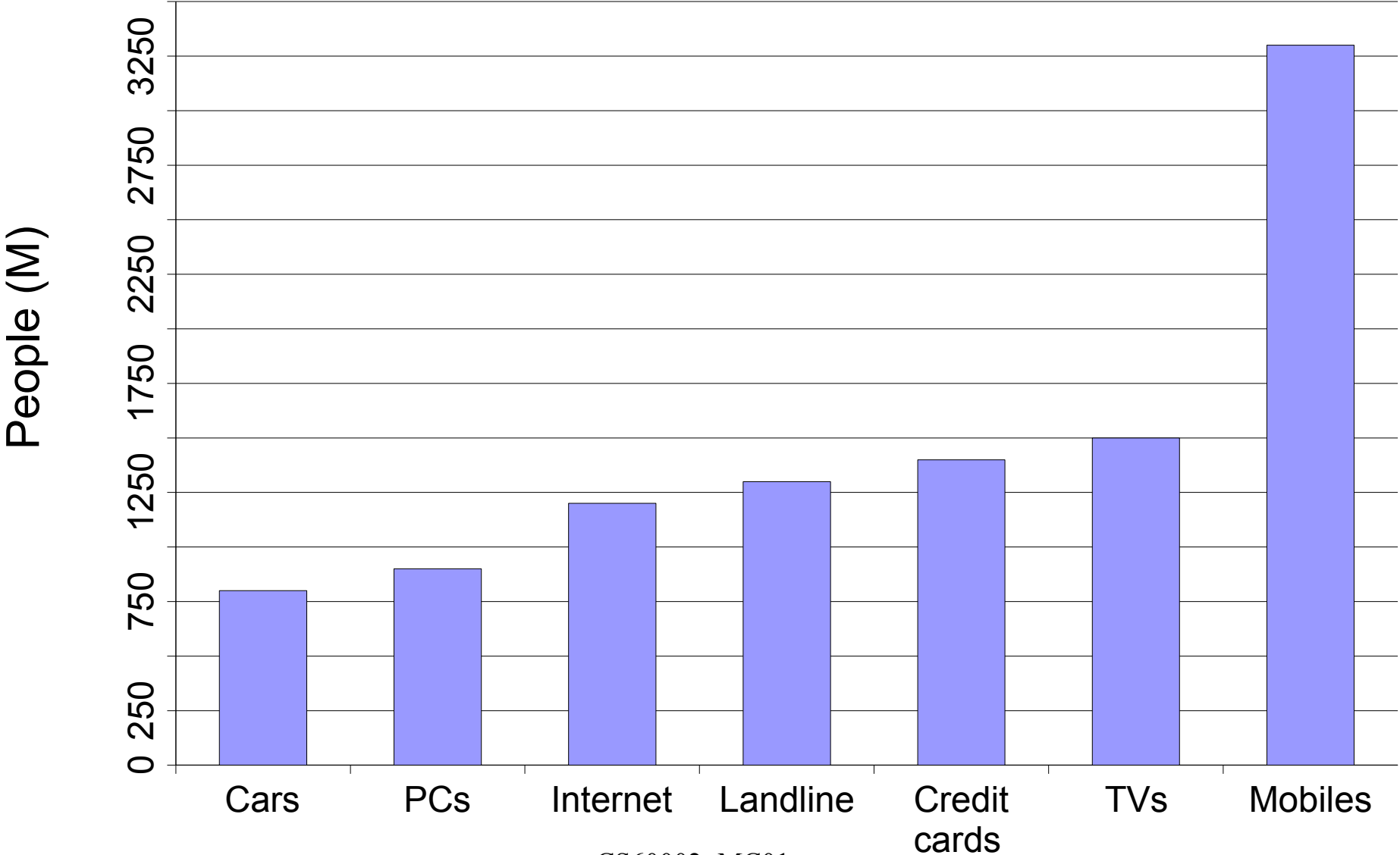
- Lecture 1 (this one):
 - A birds-eye view of three usage scenarios
 - Dive down to identify some areas of interest
- Lectures 2-10:
 - Discuss these areas of interest
 - Identify topics for further reading and research
- Lectures 11 & 12
 - Presentation of Student Papers

Student Papers?

- Optional
 - A short (~10 page) paper and a 15 min presentation
 - You get to choose the topic
 - Please do this only if you like the topic
- Grading
 - Same weight as class tests (20%)
 - Three options
 - 1) Do both (paper & class test) and then choose
 - 2) Do only the class test
 - 3) Do only the paper

Ready?
Here we go!

Mobiles by the numbers



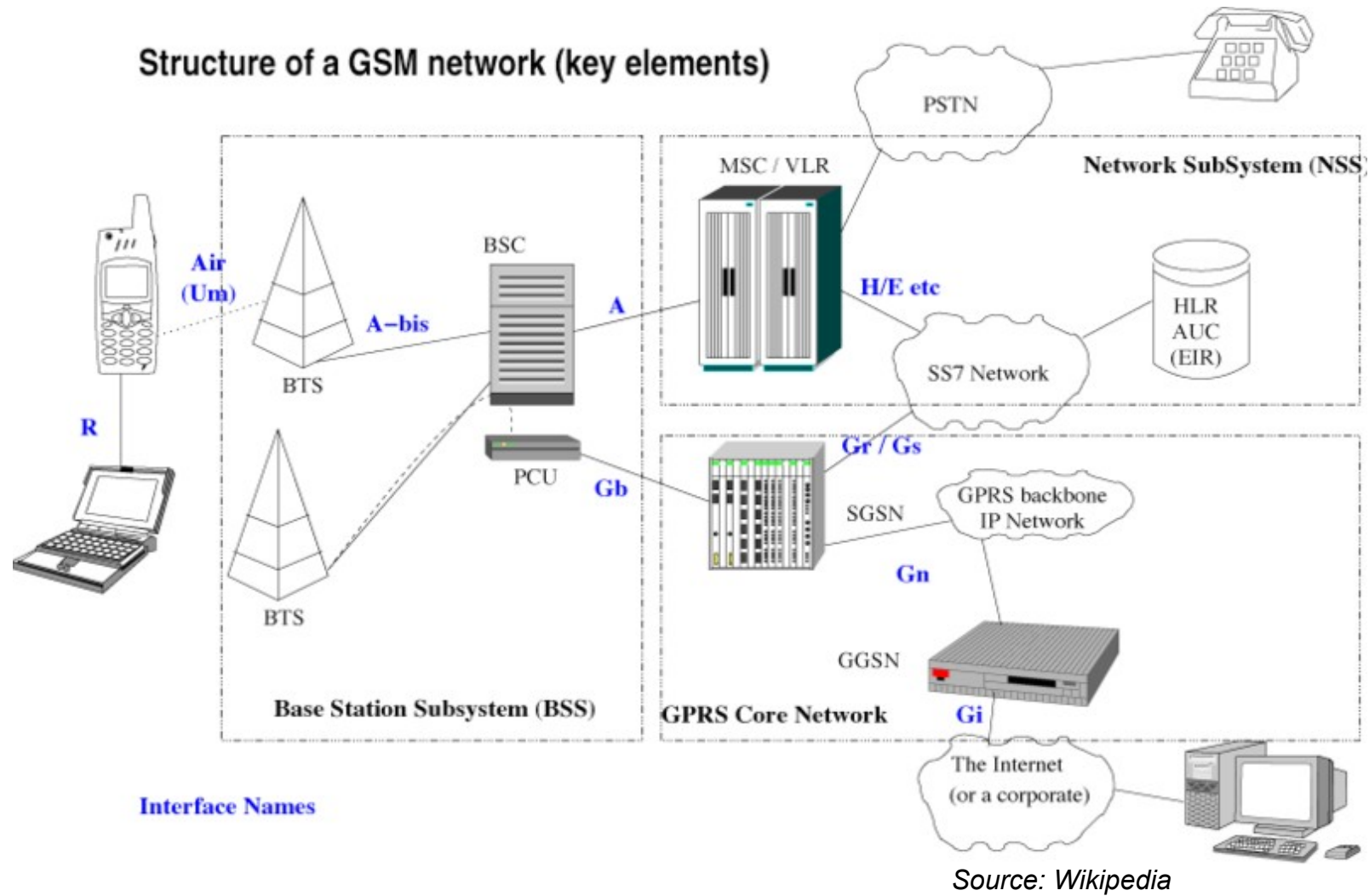
Mobile Computing

- A new breed of computing
 - Already popular, and still growing
- New set of rules
 - Consumers drive innovation, not corporations
 - Communication is primary driver, not computation
 - Highly restrictive UI
 - Storage is cheap, bandwidth is not
- The real constraint
 - Human attention span

Three usage cases

- Goal: A top-down introduction
 - Familiar, everyday usage cases
 - Identify some of the moving parts
 - See how the whole thing fits together
- The usage cases
 - 1) You get a phone call from your mom
 - 2) Your BlackBerry receives an email
 - 3) You sync your contacts & calendar to Outlook

#1: Phone call from mom



PSTN Public Switching Telephone Network

MSC Mobile Switch Center Large, distributed app to enable mobiles to roam

VLR Visiting Location Register Stores information about where the SIM currently is located

HLR Home Location Register Stores subscription information about the SIM

IMSI ? Unique key for the SIM card

MSISDN ? Think of it as the phone number for your mobile

AUC Authentication Center Authenticates your SIM card

EIR ? Blocked devices list

SS7 Signalling System #7 Old protocol used to set-up & tear down calls

BSC Base Station Controller Controls multiple (10~100) Base Transceiver Stations

BTS Base Transceiver Station Sends and receives signals from mobiles within a cell

GPRS General Packet Radio Ser\Wireless data protocol

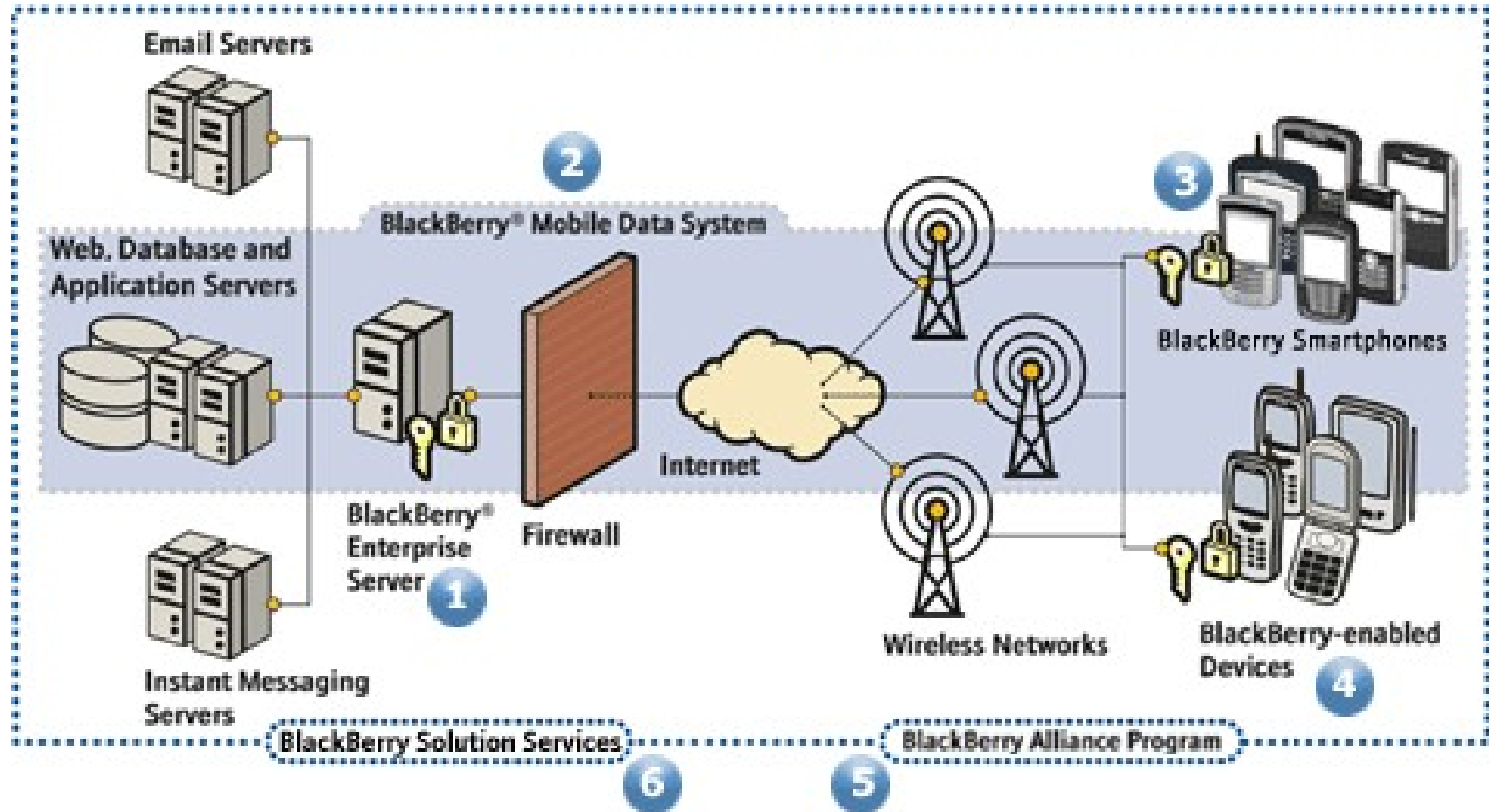
SGSN Servicing GPRS Support NRoutes data connections from mobiles currently in vicinity

GGSN Gateway GPRS Support NEnables roaming data connections

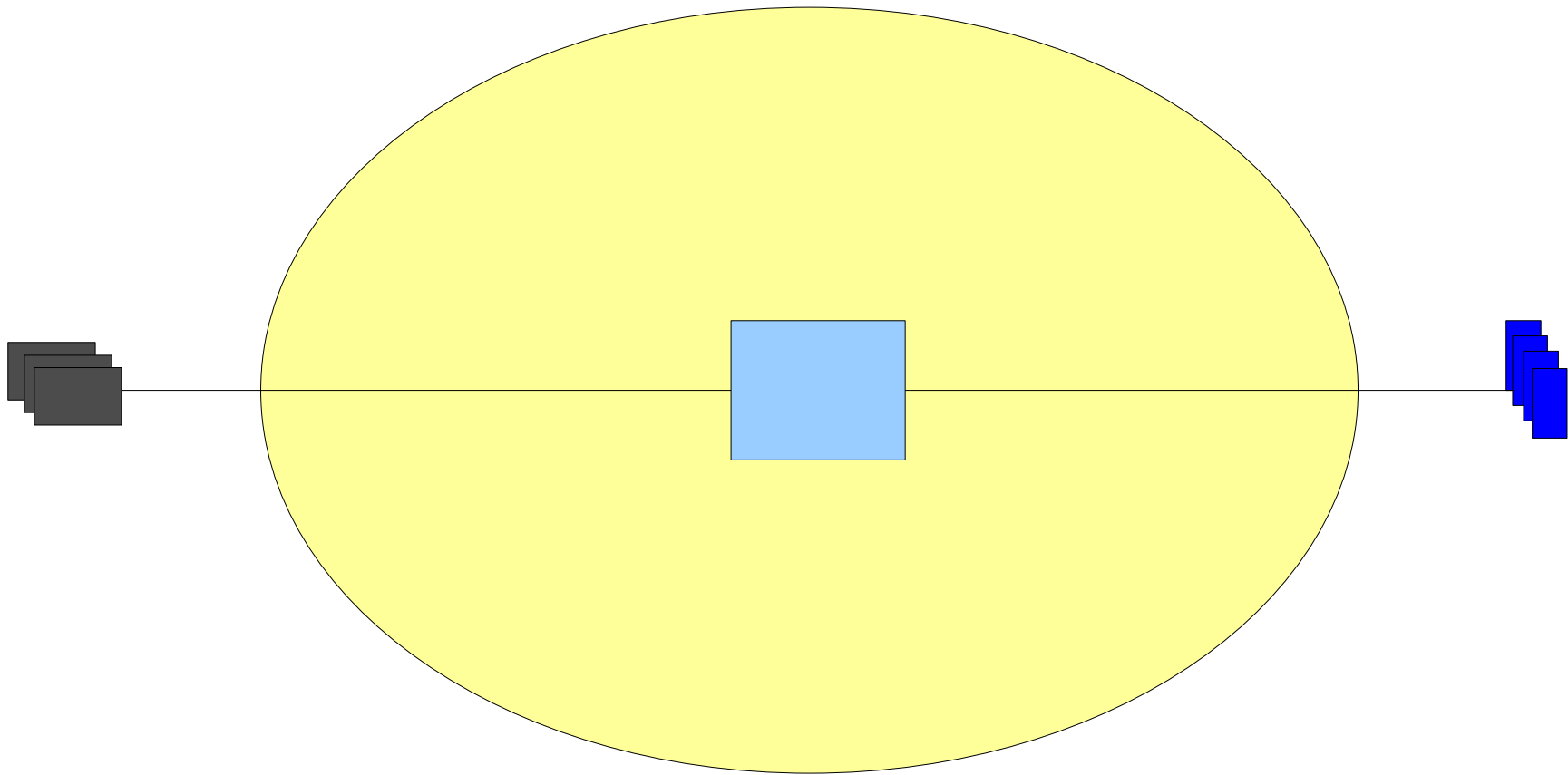
PCU Packet Control Unit Offloads wireless data processing from BSC

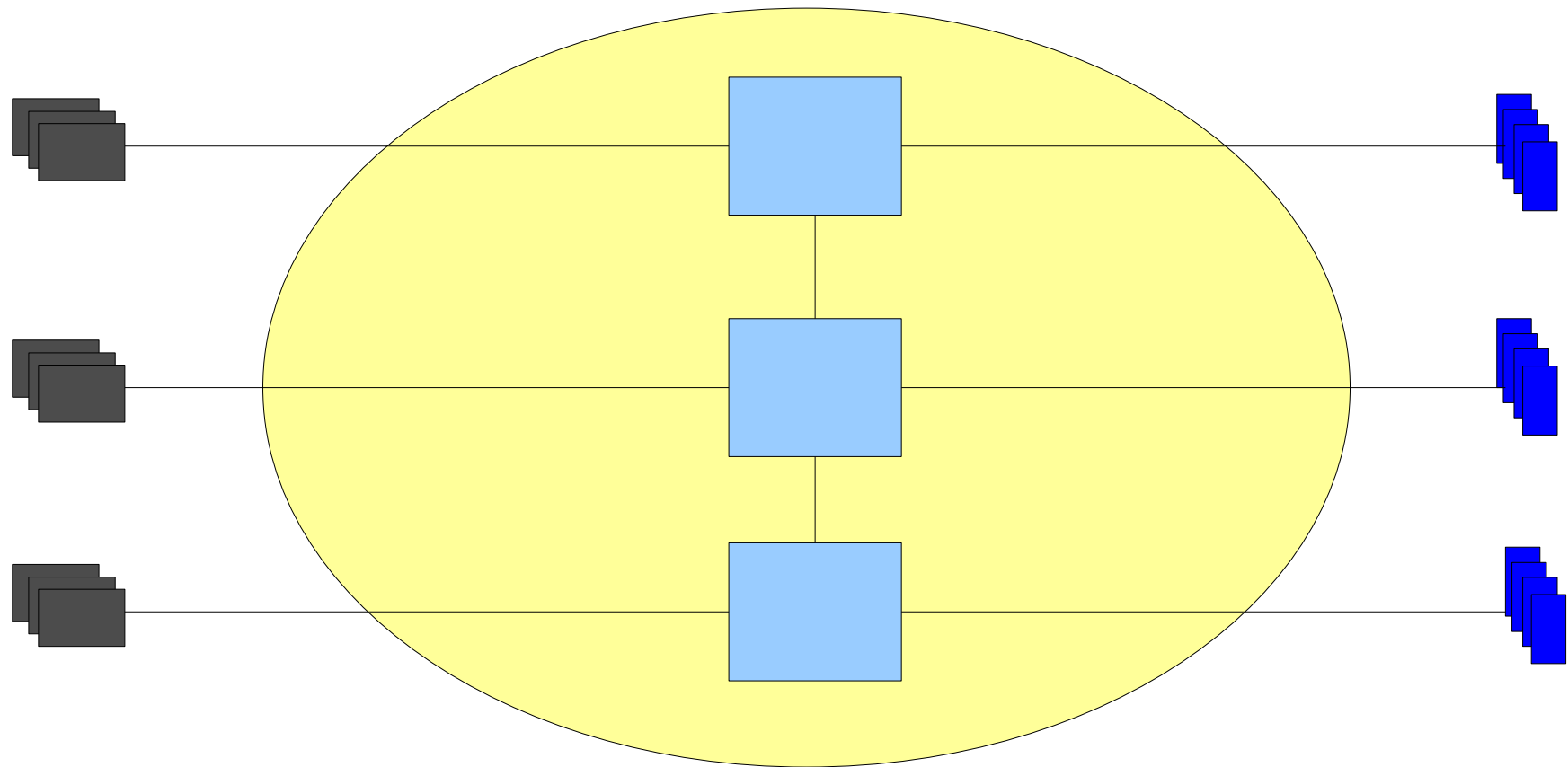
APN Access Point Network Connects GPRS clients to Internet. Think of it as DHCP+NAT.

#2: BlackBerry receives email

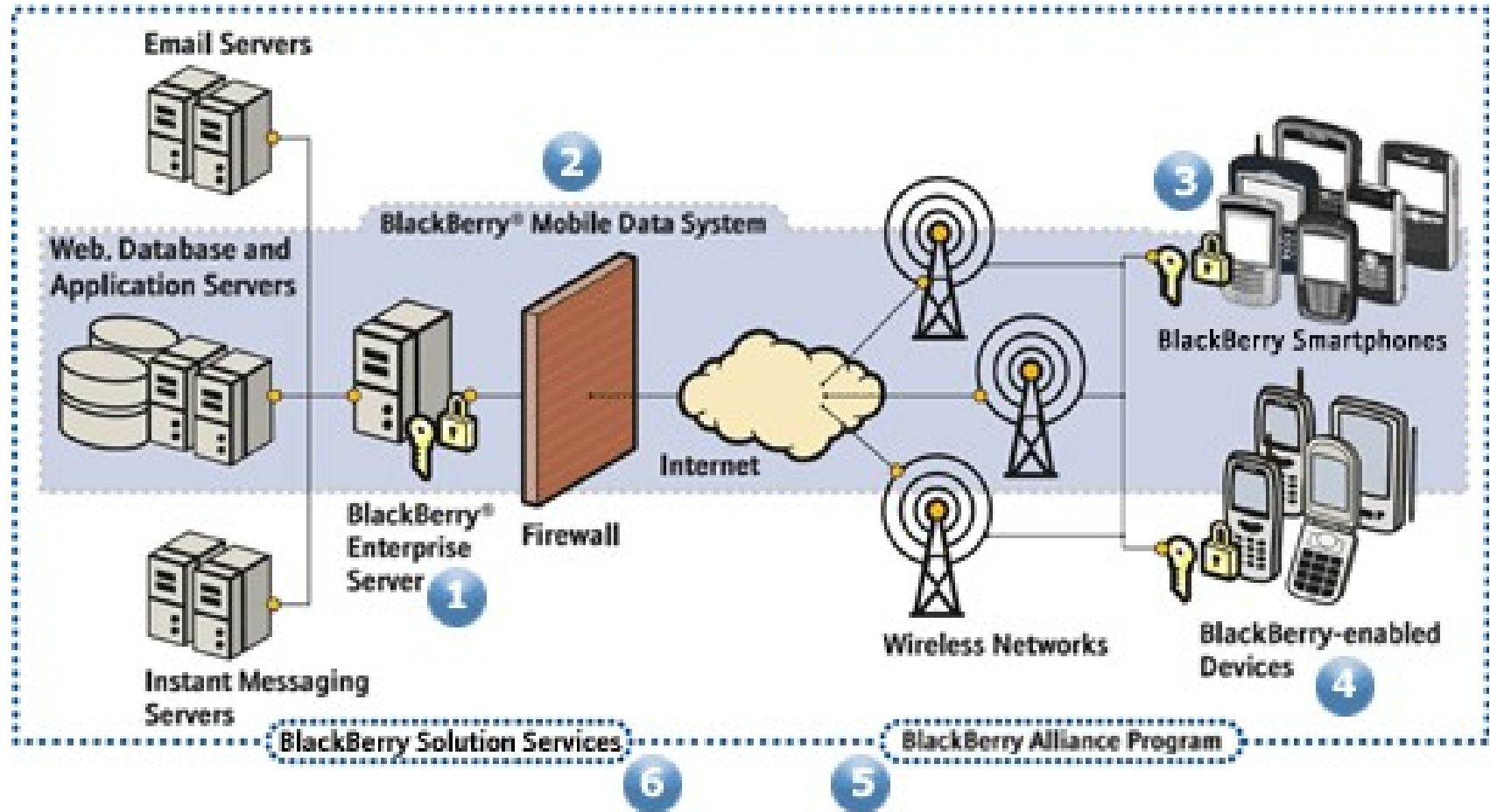


Source: BlackBerry.com





#3: Sync contacts & calendar



Source: BlackBerry.com

Parts we will discuss

- Device databases
 - Flash, OR/direct
- Synchronization
 - Algorithms
- Push/notifications
 - Scale to MM
- Handheld design
 - CPU, RTOS, battery
- Core Mobile Apps
 - Email/IM, PDA, browse
- IP Protocols
 - IMS, SIMPLE/XMPP
- Broadcast
 - Algorithms
- Device Management
 - Software & Config

Parts we will not get to discuss

- 3GPP and 3GPP2 Protocols
 - GSM/GPRS/EDGE, CDMA/1x/EVDO, UMTS
- Location-based services
 - GPS, <http://www.google.com/gmm/mylocation.html>
- Mobile Commerce
 - Mobile payment
- Dual-mode operation
 - e.g., GSM+WiFi and handoff
- ...