

Three key questions



The future of mobile operating systems

David Wood, Research, Symbian, 4th Feb 2008

The future of mobile operating systems

1

Do operating systems matter?
Isn't value moving to services and to
application environments?

2

Is mobile sufficiently different?
Won't *mainstream operating
systems* dominate the future?

3

What does the industry most want
from *future* mobile operating systems
in order *to enable a vibrant market*?

Answers – summary

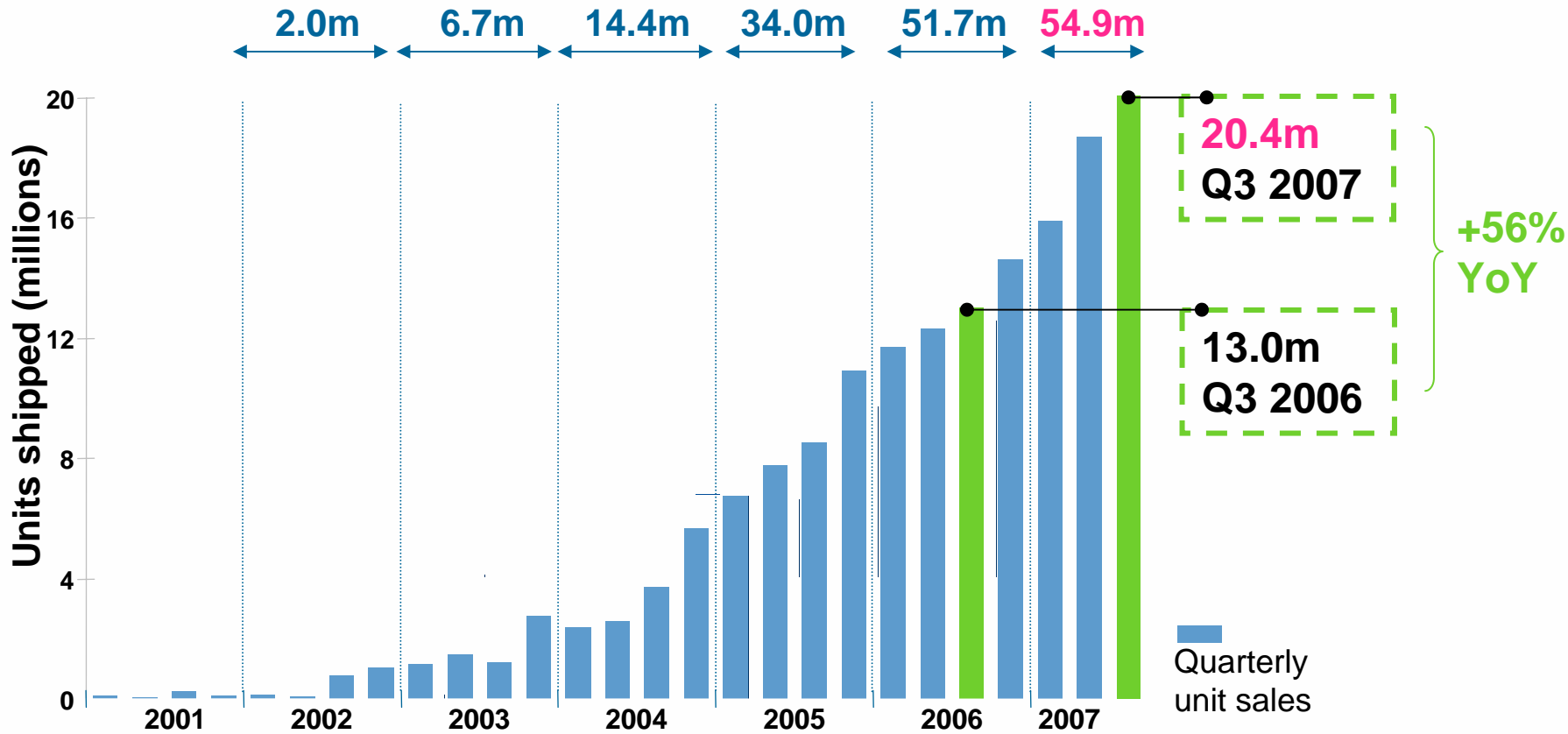
If the problem area is truly hard,
don't expect a commodity answer

Since future mobile software platforms have
to solve some truly hard challenges,
don't expect a commodity operating system

There will continue to be *significant value* in
a successful mobile operating system

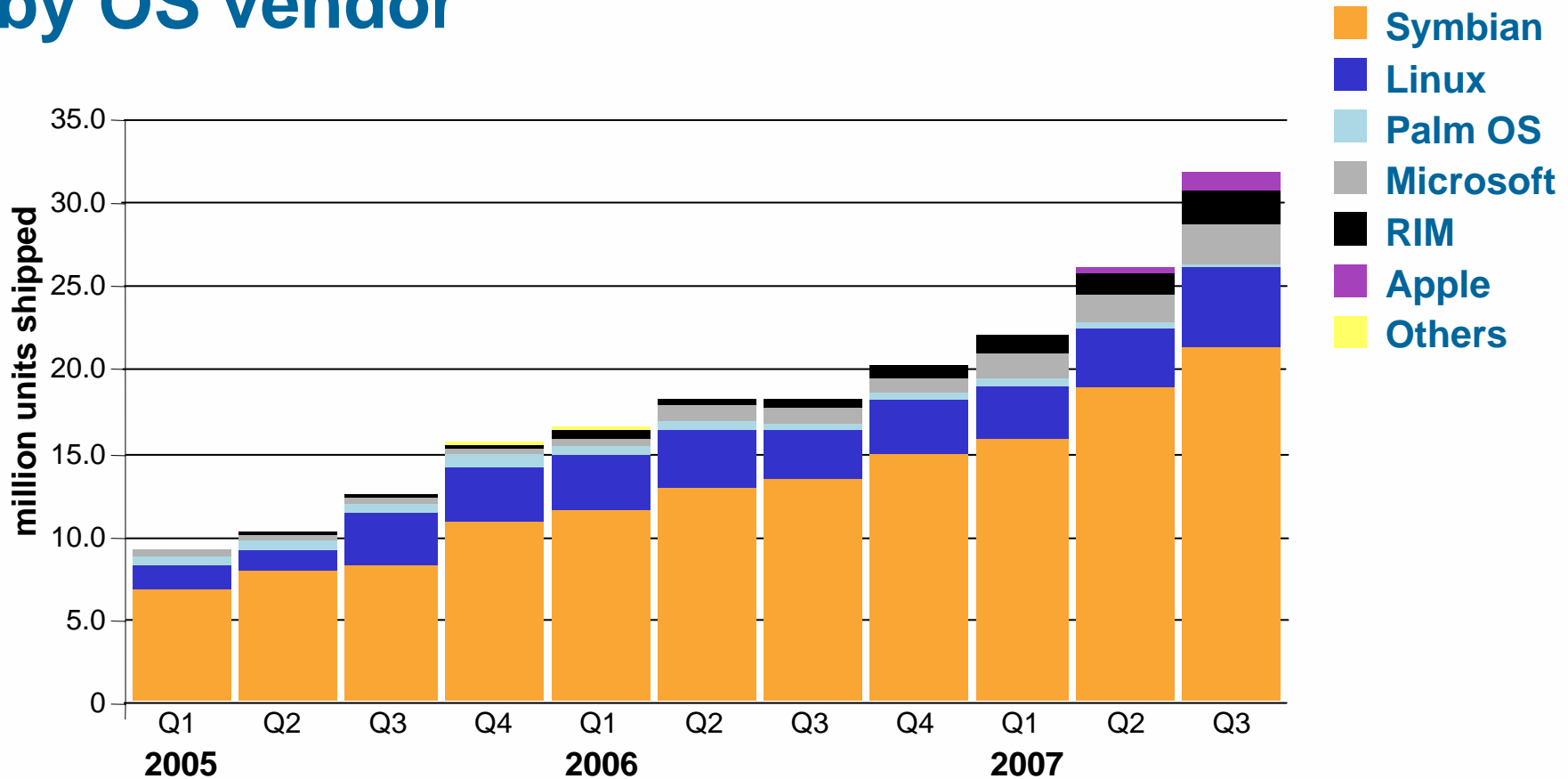
We're only at the beginning of
smartphone evolution:
the best is still to come

Symbian smartphones shipped up to Q3 2007



165 million cumulative units shipped at the end of Q3 2007

Quarterly Worldwide Smartphone Unit Sales by OS vendor

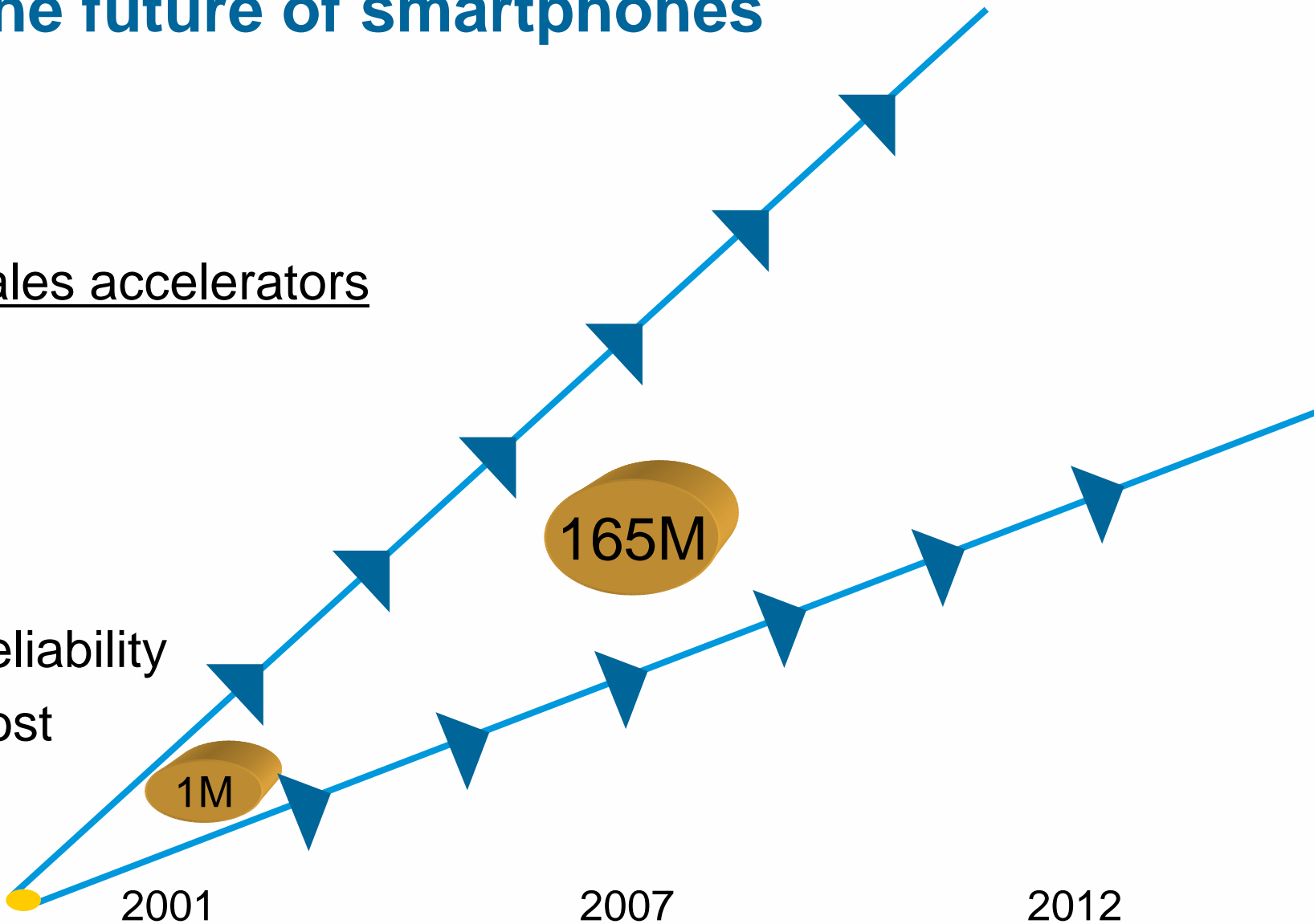


Source: Canalys; Symbian analysis

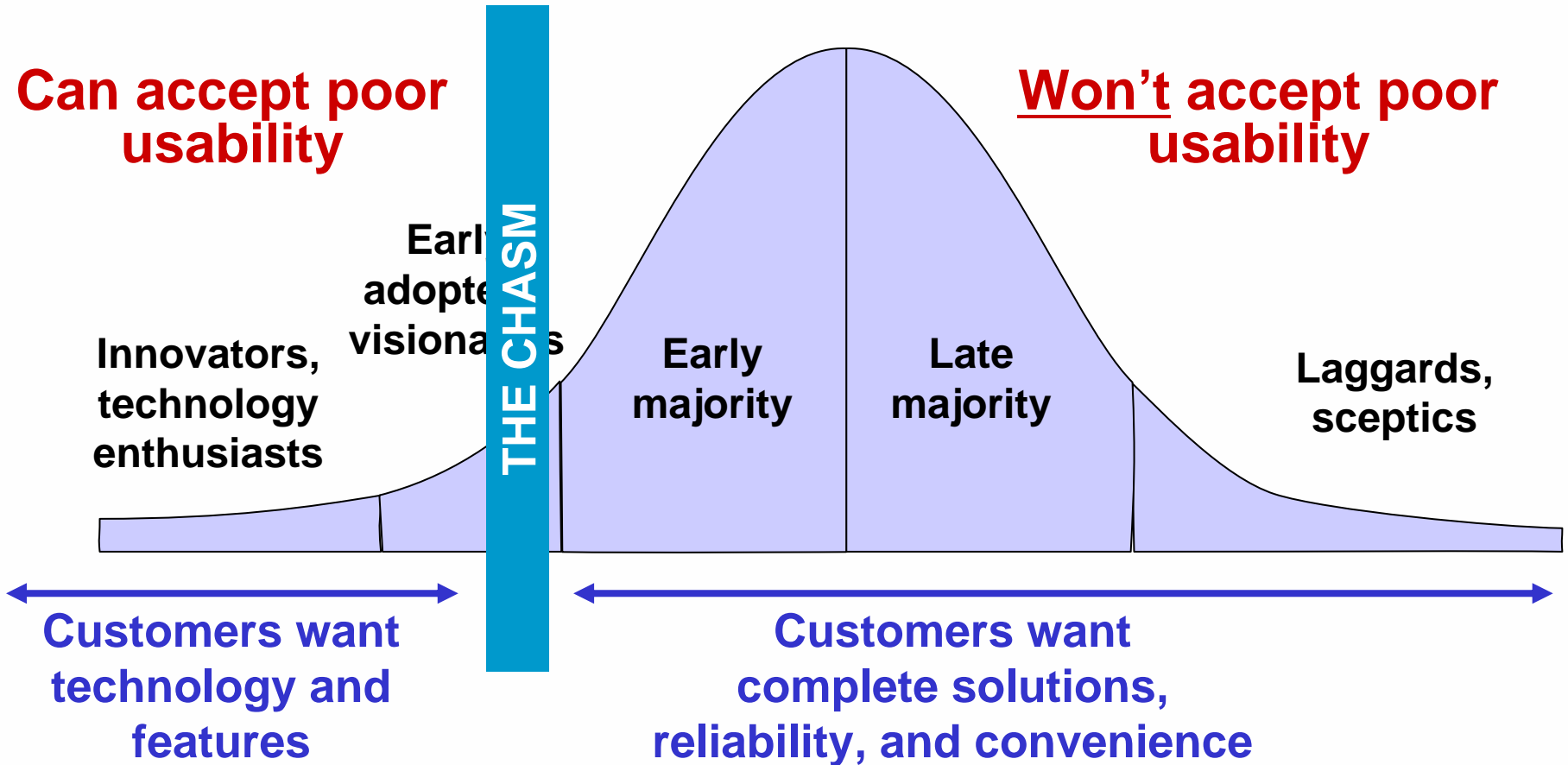
The future of smartphones

Sales accelerators

Reliability
Cost



Technology adoption life-cycle



(source: Geoffrey Moore)

The future of smartphones

The most used software on the planet

Sales accelerators

Ecosystem

Valued services

Word-of-mouth

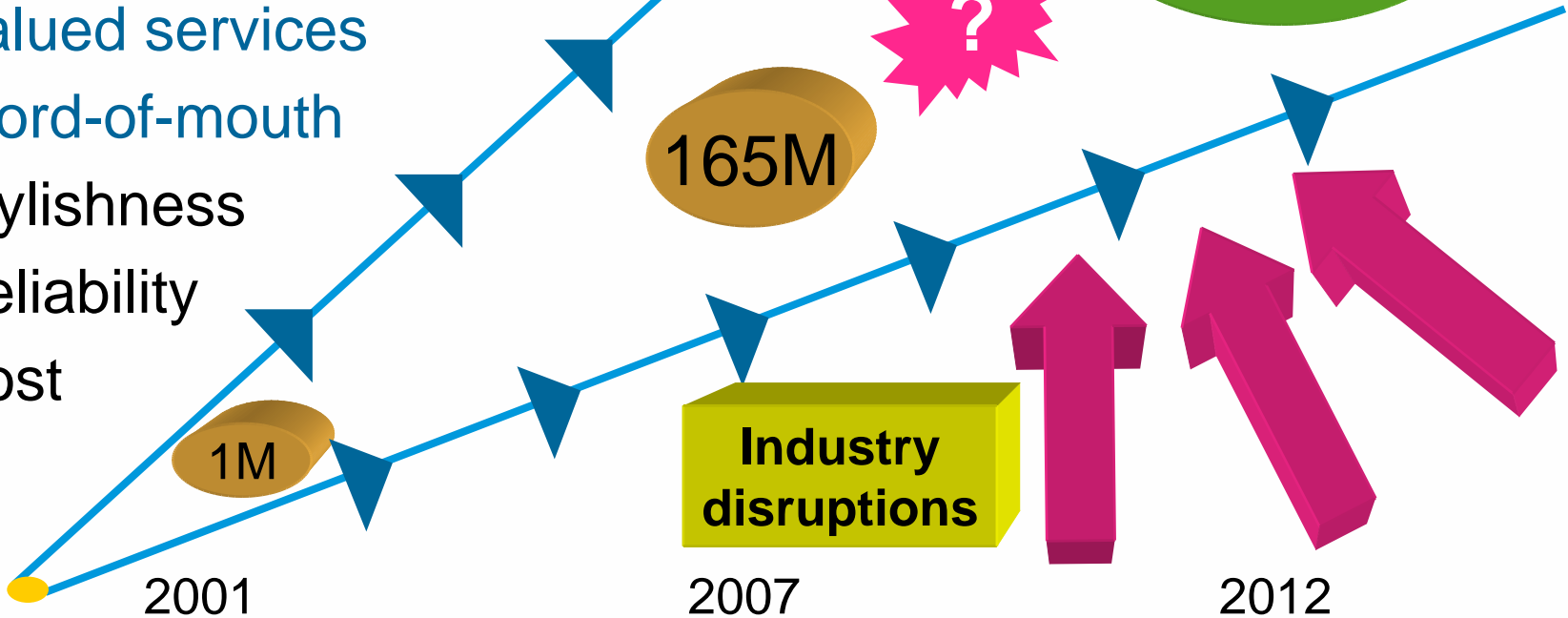
Stylishness

Reliability

Cost

The mainstream of phones

1B+



The thesis of value migration

1

Do operating systems matter?
Isn't value moving to services and to
application environments?

Open source is a fundamentally better way of creating software (?)

Open source is bound to lead to software becoming free (?)

Expect vendors to sell, instead:
hardware, services, tools, custom solutions, advertising (?)

The days of platform software having value are limited (?)

Limitations of open source methods

Fragmentation is easy

Integration is hard!

Mobile Linux fragments faster than it unifies

It's always quicker to release a device-specific solution than to put that functionality into the (re-usable) platform and then to a device

Intense fast-moving market competition

Suppliers often dislike code changes made by competitors

Suppliers dislike helping their competitors

Too much source code to easily understand

An aside – on truly hard problems

How do you factor a 75-digit number?

A

A 2007 supercomputer,
IBM's Blue Gene/L

Running an
algorithm from 1977

Around ten years

B

A 1977 computer,
Apple II

Running an
algorithm from 2007

Around three years

Some problems are truly hard
The right algorithms can make a great deal of difference

Calculation courtesy of Geordie Rose, CTO of D-Wave

What's truly hard about a smartphone OS

Integrating c. 10 M lines of code – fast; 1000+ different devices

All-IP wireless broadband and multiple bearer management

Supporting multiple configurations and extensions – without fragmenting the platform

Real-time services: Networking, storage, display, multimedia

Providing all this power, on limited hardware, without bamboozling users

Without jitter – even though there are multiple apps running at the same time

Providing all this power – fast – without draining batteries too quickly

Internet-speed rich end-user programmability (Mobile Web 2.0)

Balancing openness (convenient access to underlying APIs) and security

What do end users want from a mobile OS

Integrating c. 10 M lines of code – fast; 1000+ different devices

All-IP wireless broadband and multiple bearer management

Supporting multiple configurations and extensions – without fragmenting the platform

Real-time services: Networking, storage, display, multimedia

Providing all this power, on limited hardware, without bamboozling users

Without jitter – even though there are multiple apps running at the same time

Providing all this power – fast – without draining batteries too quickly

Internet-speed rich end-user programmability (Mobile Web 2.0)

Balancing openness (convenient access to underlying APIs) and security

What do end users want from a mobile OS

Not to be unduly aware of it:
It should be reliable, running swiftly
and unobtrusively in the background

It should be safe – without
risk to user data (or
corporate/network systems)

It should support application
environments, without unduly
hindering or penalising them

It should support choice:
The vision of the OS is to enable the various different
visions of the players who are nearer to customers

What do end users want from a mobile OS

Integrating c. 10 M lines of code – fast; 1000+ different devices

All-IP wireless broadband and multiple bearer management

Supporting multiple configurations and extensions – without fragmenting the platform

Real-time services: Networking, storage, display, multimedia

Providing all this power, on limited hardware, without bamboozling users

Without jitter – even though there are multiple apps running at the same time

Providing all this power – fast – without draining batteries too quickly

Internet-speed rich end-user programmability (Mobile Web 2.0)

Balancing openness (convenient access to underlying APIs) and security

Coping with fast-paced software change & integration

1. There must be a company responsible for the integration
 - ... **Independent** and **trustworthy**
 - ... Motivated by large-scale customer satisfaction (volume sales)
2. Keep market leading -> invest in the platform
 - ... Each new release improves both quality and functionality
3. Apply world class software development processes
 - ... Architecture, decomposition, API design, system design, etc
4. **Lean** focus on “stop the line” quality
 - ... Apply learnings from Toyota – optimise the value flow
5. **Agile** focus on “embrace change” and incremental projects
 - ... Agile/Lean is powerful motivator for developers
6. The heart of successful Agile/Lean is **customer intimacy**

2

Is mobile sufficiently different?
Won't *mainstream operating systems* dominate the future?

Andrew S. Tanenbaum
“*Modern Operating Systems*”
Third Edition, January 2008
1000+ pages
Includes 3 case studies...

Linux

Microsoft Vista

Symbian
OS