290T: The Business of Software

Homework 6 – Hardware/Software Bundling & Network Appliance Case

1) Give an example of a bundle/unbundle product packaging decision (presumably to maximize the revenue opportunity) and either

- **Rationalize the decision or**
- **Propose an alternative strategy and defend it**

Your argument should include some of the following considerations:

- **Customer-related issues:**
  - **Customer requirements**
    - **Which solution (bundled/unbundled) will be easier to use?**
    - **Migratability → SW solution**
    - **Customer desire for platform ownership → unbundled SW for existing platform**
    - **Customer desire for turnkey solution → bundled HW/SW solution**
  - **Customer buying behaviors – will they pay more for the solution if bundled with HW?**
  - **Platform availability – does a platform for running your software already exist? How stable is it? Can you control it? Can you depend on it?**
- **Product development and deployment issues (i.e. your own company's issues)**
  - **Ease of solution development – will it be easier to develop a bundled HW/SW solution? Or unbundled SW solution?**
  - **Capital costs**
    - **How much capital to develop and distribute the bundled solution?**
    - **How much capital to develop the unbundled solution?**
  - **Distribution issues**
    - **Can you sell a bundled solution?**
    - **Can you manage the inventory issues of a bundled solution?**

Egan Lau

Intuit Quickbooks POS. It is a point of sales system bundling Quickbooks Financial software and hardware Peripheral selling for $1,898.95 with 90 Day Support.
http://quickbooks.intuit.com/commerce/catalog/product.jhtml?prodId=prod22010

Customer requirements

- Customer desire for turnkey solution because it can turn their PC into a full blown POS system. It was not simple to buy the Peripherals and software separately. Quickbooks probably has a better brand name than many other POS software.
- Customer buying behaviors - The customers are primarily small retailers. They lacks technical expertise to deal with complex POS systems nor

integrate software and peripherals softly. they are price sensitive, so
Intuit highlights its low price.

- Platform availability - Some obscure mail order companies perhaps exist to provide similar integrated solutions. The Intuit/Quickbooks brand can provide more trust on the promise of "no integration hassles."

Product development and deployment issues

- Ease of solution development - Very easy. The peripherals are simply off the shelf components. The start-up development costs should not be high.

Distribution issues

- Intuit sells it directly online or via telephone and also via 3rd parties (sell price: $50 less).
- These POS peripherals are small items like credit card scanners and barcode readers. Managing their inventory is no more challenging than managing the shrink wrapped software package inventories.

Tom Chang

Video Gaming System (i.e. Xbox, PS 2)

a. Customer related issues

  i. Customer requirements

    1. Primarily customer desire for a wide selection of games – therefore preference to have unbundled hw/sw solution with independent game developers

  ii. Customer buying behaviors – history of low priced gaming consoles since Atari – customers used to <1K price points.

  iii. Platform unavailability – existing PC environments lack video/sound capabilities

b. Product development issues

  i. Ease of solution development – single platform for game development. Proprietary development platform licensed to game developers.

  ii. Capital costs

    1. Sufficient demand to raise capital for hardware and software (games) inventory

  iii. Distribution issues

    1. Highly fickle customer base and highly seasonal product (xmas) requires careful inventory planning

Brian Park

1) **Online downloadable video games** (purchase, download, and play online) is an example of unbundled product packaging.

Customer-related issues:

· Gaming started as hardware / software bundles (e.g., arcade games), but is evolving to an unbundled software model.

· Customers are not just buying one video game, but dozens. They prefer variety and flexibility and price is an important factor.

· Customers are used to paying separately for game software because they purchased game titles separately for their game consoles (PS2).

· Customers are becoming more comfortable with downloading, playing and purchasing games over the internet. There is a huge installed base of internet users who are more comfortable with ecommerce and who have computers that are equipped to play high performance games.

Product development and deployment issues:

· It is much cheaper to develop online video games (as compared to the physical arcade games), because you only need to develop the software for the game and can rely on customers owning the hardware necessary to play the games.

· It is much cheaper to distribute video game software online (the cost is almost zero) as opposed to having to ship bulky hardware / software solutions.

· It requires much less capital to develop a video game for distribution online because you only need to focus on developing the game, not the infrastructure necessary to support and play the game.

Satrajit Chatterjee

Example: **Google Search Appliance**

Rationalizing the decision:

1. Customer requirements

   Motivating factor: customer desire for turn-key solution

   * Plug the box in and it sets itself up
     * No software to install
     * No interoperability/co-existence with other software issues
   * Dedicated search hardware -- costs less than general purpose HW at similar performance levels
   * Cheap and easy to provide advanced services like automatic fail-over
   * Need more {capacity, availability} - plug in another box

2. Company issues (development and deployment)

   1. Much, much easier to develop and tune software
      * since we control environment
      * I do not have to write install scripts that deal with gazillion different environments
   2. Easier and cheaper to support customer problems
      * since every customer uses the exact same hardware and configuration (i.e. I do not have to keep track of patch lists for 30 different OS versions)
      * Economies of scale w.r.t to configuration issues
      * Can just replace box in case of problem
   3. Doesn't cost much to develop the extra HW/OS related bits
      * Leverages Linux
   4. Can charge more than just software alone

      (Google $28K for the entry level box with 2 year support included)

5. In some sense by selling HW it also raises barriers to entry
   * Because of higher capital cost and inventory management issues
     a garage start-up would find it harder to beat them in this
     segment
       - Key point being that the customer prefers a turn-key solution

Analysis of Google's strategy:

- Extremely successful. Sales this year *increased* 200%
- Spawned competitor adopting this approach: Thunderstone.com
- Won some customers from the SW only approach of Verity
  Verity Ultraseek (acquired from Inktomi) sells for about $18K

Phil Li

Sun plans to bundle all its infrastructure software products into what it calls the **Java Enterprise System** -- at a fixed price of $100 per employee per year. The Solaris OS already includes directory and application server. The JES will incorporate portal, instant message, e-mail, clustering, and possibly some storage-management and integration products as well.

- Customer-related issues
Most existing Sun customers today run server software from a mix of vendors. One could argue that by encouraging new customers to deploy JES in its entirity, Sun would be alleviating some customer integration pain. However, the magnitude of this benefit is unclear, and existing customers have already put in the sunk cost of integration.

- Customer buying behaviors
Low price and buying convenience is a bigger draw for JES than integration benefits. Customers no longer have to negotiate complex pricing deals based on processor counts and headcount on each particular piece of software.

While Sun position JES to be the "MS Office" of server software, it is different from Microsoft in that its bread-and-butter is really in hardware. Hardware is presumably NOT included in any bundle because JES is reasonably complex and run on a vast array of environments. A truly out-of-the-box, generic solution seems way off.

- Product development and deployment issues
The deployment of JES will not require large immediate development or distribution changes. However, if server software bundles really do get "standardized" and commoditized, Sun will likely shift even more from direct sales to VARs.

Leo de Luna

1) Palm PDAs bundled with Palm OS is the rational strategy

Customer-related issues

- Customer requirements – A bundled solution enables ease-of-use and out-of-the-box functionality, i.e. a turnkey solution. A self-installed OS requirement would represent a significant barrier to consumer adoption.
- Customer buying behaviors – Customers have expectation of turnkey solution and will not pay for Price = $HW + $SW, instead expect Price < $HW + $SW. However, $399-$599 is still a high price to pay for a device. Ideally, consumers needed to be conditioned to the price point and view purchase as any other consumer electronic device.
- Platform unavailability – Palm needed a vehicle to showcase and expand the market for its OS. Similarly, needed OS to enable its devices. Also, control was an issue as Palm would not want to be susceptible to hold-up costs if SW was developed by 3rd party. Over time, Palm OS has become the mobile platform.

Palm's product development and deployment issues

- Ease of solution development – Must allocate resources to develop SW but gives greater control of product development, e.g. feature set, timing of introduction, versioning, etc.
- Capital Costs – Sufficient market potential to raise capital. Received support from 3Com.
- Distribution issues – Consumers typically not focused on OS so sell bundled solution as per other consumer electronic devices.

Will Plishker

Peribit's Sequence Reducer (SR)

- Consumer requirements
    - Bundled is easier to use
    - Desire for turnkey -> just plug it to either end of WAN pipe
    - "no operator intervention necessary"
    - all boxes are centrally managed
    - uptime is key since SR sits on network edge
- Customer buying behaviors – Network infrastructure people used to buying routers, nats, etc. as boxes
- Product development issues
    - Easier to develop turnkey solution
        - SW does not have to be portable
        - uptime reliability may be quoted without qualification
        - quoted performance does not have to be qualified
        - interoperability between SRs on different platforms
- Capital cost – large market with significant WAN BW costs seems to support cost of hardware devel + inventory management
- Distribution – Network infrastructure buyers are used to buying bundles (routers, nat boxes, etc)

David Gelbart

1) Here is an old product description pulled off the Internet

The **TELEtranslator** is: a newly-released data processing device which provides INSTANT SPANISH CAPTIONS for English-language television programs on satellite TV, cable TV, videos and laser discs available in North America.

The impressions I have (some guesswork involved):

- this was introduced in the late 1990's and then disappeared due to failure in the marketplace
- this was a box that sat between a TV and the cable outlet or antenna
- it translated English close captions into Spanish using machine translation, and the translated captions were then displayed on the TV

Marketplace failure is interesting considering that there seems to be a large potential market among Spanish-speakers in America and in Latin America. I believe the machine translation was competently implemented (although imperfect) so perhaps the the marketplace failure had a lot to do with improper bundling.

I agree that the software (close caption translation) component of this should have been bundled, not sold as a PC application, for the following reasons:

1) Would have needed to supply add-on PC hardware for the video interface anyway.
2) This application goes with the television; it could be a hassle connecting the PC to the TV especially if they were in separate rooms.
3) Not all prospective customers have PCs.
4) If a customer had a PC, it might not have a comfortable amount of RAM or CPU power. Also, due to processing requirements, the family members not watching TV might be prevented from using the PC while the application is running.

But I disagree with the way the bundling was done. I feel they should have bundled this into a TV set, not sold it as a separate box! A separate box has to have hardware to extract the hidden English captions in the original video signal and to generate Spanish captions in its output signal (either hidden or as a video overlay), and it has to have some kind of television channel changer feature and associated tunable TV receiver to select what channel it is translating captions for. All of this hardware would have been already present had this application been bundled into a TV set with close captioning support. The extra hardware in the separate box must have added significant extra cost. That is important because I think this application is a vitamin, not a painkiller, for most of the potential customers.

Making an entire television would have added a lot of complexity for the small company that produced the TELEtranslator. Furthermore they would have been competing with large, experienced TV manufacturers. This may have been why they chose the flawed bundling approach that they did. I think the right solution would have been partnership with an established TV manufacturer.

Scott Hafeman

Chose to bundle an Embedded Software Development Tool with the hardware being sold

Customer Requirements:

- Reliable end product and development tool
- Short development time
- Fast end-product performance
- Robust troubleshooting/debugging environment

- Desire detailed, accurately documented support of the intricacies of both the SW and HW product

Buying Behavior:
- Typically purchase from one vendor across chips
- One stop shopping preferred
- Purchasing pattern: M development circuit boards + N SW kits, K packaged modules (K >> M or N)
- Likely pay more if bundled since the developers had the most knowledge about the hardware platform

Platform Revision:
- Bundled HW/SW offers immediate access to legacy, current and emerging hardware platforms on which to develop software
- HW platform stability can be internally tested before software development begins
- SW department can obtain some leverage in the hardware decision-making process by developing tools to debug early versions of hardware
- Immediate feedback on effect of HW architecture issues in software => can influence future chip features
- The hardware is dependable: contingent only on major shifts in the corporate asset allocation and fundamental line of business

Product Development:
- Bundled HW/SW offers immediate access to legacy, current and emerging hardware platforms on which to develop software
- Easier interaction among HW/SW teams, can diagnose errors in code download, boot loader or instruction-set
- SW group has prior access to new HW architecture designs and paradigms, can plan their SW product development accordingly
- Relatively low capital costs in acquiring prototypes and test circuit boards
- Reliability can be designed into the SW architecture (dependent on HW) and save internal development time => in turn winning external customer satisfaction

Product Deployment:
- Hardware sales are typically negotiated in batches, simply add SW to the up-front sales agenda
- Both (un)bundled would require field tech support, in bundled case they're already trained and knowledgeable
- A third party should be sought to do the packaging for the product and documentation

Other answers

- Sun's NFS file server - the Sun workstation hardware is bundled with Unix
- National Instruments (Austin, TX) decision to offer bundled software-hardware packages in computer vision (NI Compact Vision System) and digitizers (NI Scopes)
- unbundling of software from hardware in Embedded systems domain
- Microsoft Windows XP is an unbundled product
- Matlab as an example of an unbundled product packaging

Common ‘errors’

Some of the students gave examples of ‘non-decisions’. The point of the question was to think about a product where the main value add is the software. For example, a common answer was portable mp3 players. I couldn’t imagine anyone on the initial iPod team thinking “Should we just sell mp3 software or should we bundle it with a player?” With a portable mp3 player, the hardware/form factor is the main value add. In fact, the iPod has very little software running on it (the codec and DAC are both Wolfson components).

Niraj Shah

There’s a whole slew of low-end network equipment companies/products that face this bundling decision: Mazu Networks, Peribit, Vernier Networks to name a few. Take Mazu Networks, for example. Their product is a distributed denial of service (DDoS) prevention box. The main value is in the software that detects DDoS attacks and drops those packets before they can overload the network downstream. They package the software with a server and sell a turnkey solution. Their main reasons:

- Ease of use – plug & play
- Customers used to buying network equipment in a box, not on a CD
- Ability to control platform – when a DDoS attack occurs, they need more compute power. May not be able to get this compute power is application is running on a shared machine
- SW development easier – one platform, limited number of peripherals

Other examples:

- Diebold computerized voting machines (http://www.diebold.com/dieboldes/accuvote_ts.htm): main reason for bundling is ease of use, control of platform

2) Which of these considerations led Network Appliance to sell a bundled solution?

Ravi Shanmugam

Of the considerations mentioned on the slide, the following played the biggest role in Network Appliance’s decision:

Ease of use by customers. The key point NetApp used to differentiate its product from Sun workstations was that it was like a “toaster,” an appliance that could simply be plugged into a network and get up and running quickly (in minutes, as opposed to overnight for Sun workstations). Likewise, the device was dedicated for a single use, which also simplified things for consumers. The “toaster” concept naturally loans itself to HW/SW bundling.

Platform availability - lack of an existing platform that met their needs. Given that NetApp had goals of drastically reducing cost and complexity while improving performance, they could not meet those goals by bundling new HW with existing SW or vice-versa.

In particular, the decision to eliminate the UNIX OS from the simplified, bundled SW had the following additional advantages that relate to the “considerations”:

Reduced cost of development.

Reduced cost of support.

Competitive differentiation (from Sun, which was beholden to UNIX)

Additional marketing reach – the case indicates that the decision allows NetApp to market to VARs that didn’t support UNIX.