CSE 403

Enterprise Software
(Past, present, and future)

Announcements

- 12/03 release?
  - Send TA and instructor information via email -- release notes, status report
- Final on 12/07
- 12/08 release:
  - Release, release notes, ~~presentation~~ due on 12/08 at 11:59p
  - Okay if presentation deck isn't in until 12/09 at 11:59p
- Presentations on 12/10, 8:30a-10:20a in ARCH 160
- See Wednesday's lecture slides for details

Schedule of presentations

- 8:30: Tile to the Top
- 8:45: Event Hub
- 9:00: Bulletin
- 9:30: Instafeed
- 9:45: Full House
- 10:00 Change My Mood

Final logistics

- Closed book, closed notes, no electronic devices
- Bring a pencil
- True/False but with an explanation
- Short answer
- Maybe one long form question
- 10:30-11:20, ARCH 160

Major topics

- Teams
- Lifecycle
- Requirements
- Architecture
- Design
- Testing
- Women in technology
- Version control
- Deployment
- Testing
- Scale/Megascale
- Careers
- Customers and Users (AARRR!: a pirate's approach)
- Feedback
- Enterprise software
- Lean startup

Key concepts

- Divide and conquer
- Abstraction
- Modules
- Coupling and cohesion
- Parallelism
- Cost-benefit analysis
- Feedback
- Scale
- Examples in software, your project, and in real life

Extension == small slip?

- Lots of pressure
- Notoriously underestimate how much additional time you need
- Still need to re-plan
- Disturbs the established pace/harmonic
- Screws up next releases
- Doesn’t solve the problem?
- Opportunity cost

CSE 403

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(Past, present, and future)

Enterprise software

- This quarter, we've focussed on consumer web applications
- To contrast, let's deep dive into *Enterprise Software*

Enterprise software

Enterprise software is software used in organizations, such as in a business or government, [1] as opposed to software used by individuals. Enterprise software is an integral part of a (computer based) Information System.

Enterprise software

- Software used by businesses (users are typically *employees at work*)
- Financial and accounting, payroll, human resources, customer relationship management, sales tools, manufacturing tools, supply chain management, partner management, etc.
- Fundamental to the key operations of businesses
- Productivity tools (MS Office, mail) oftentimes not considered enterprise software
- Exchange (back end mail), collaboration tools are often considered enterprise software
- "Mission critical" and key to the success and operations of a business

Enterprise software

ORACLE®

SAP®

Salesforce

Magnet

Used by:

BOEING®

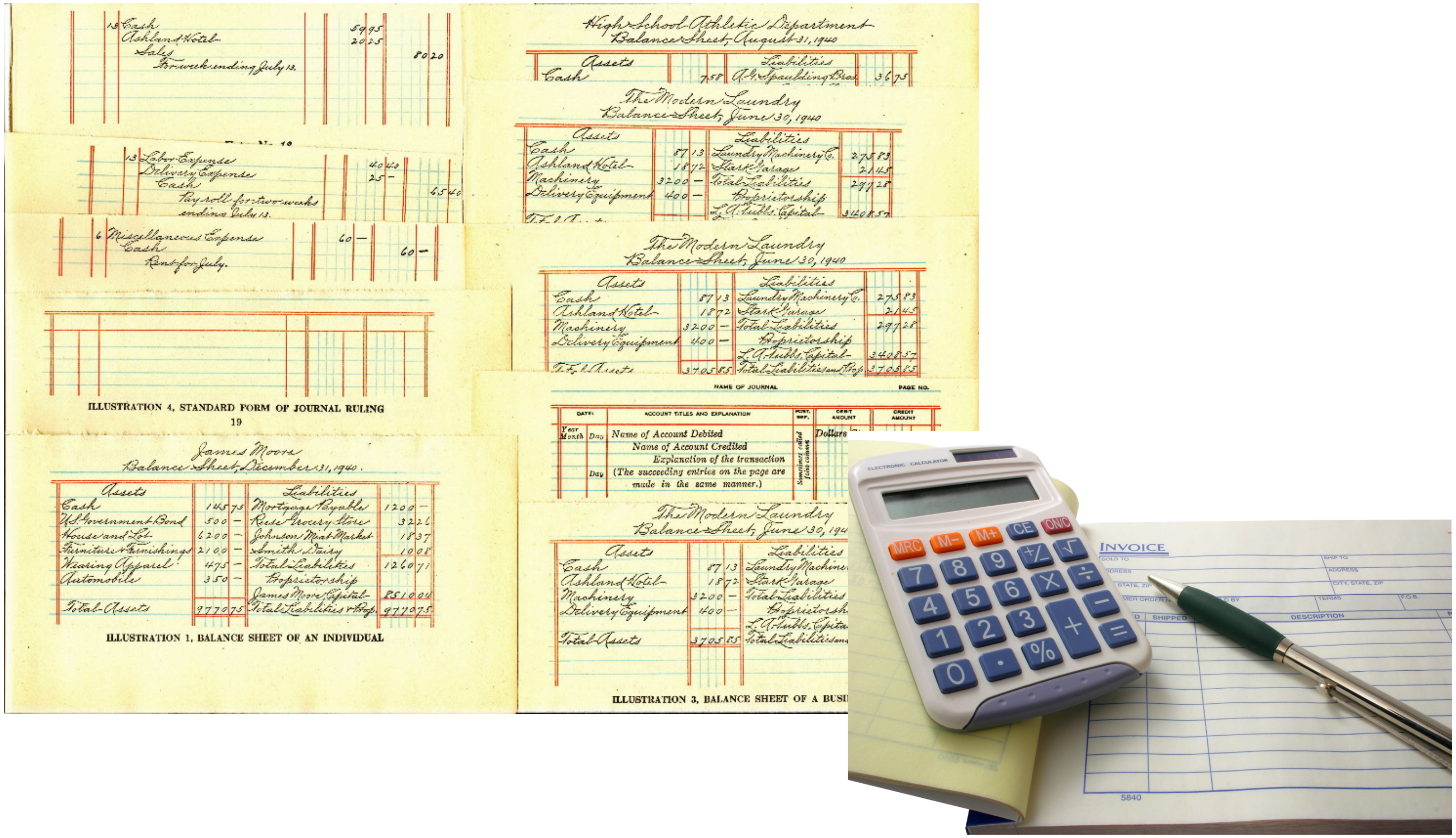
THE HOME DEPOT®

UNIVERSITY · OF · WASHINGTON · 1861 · LVX · SIT

WELLS FARGO

The history of enterprise software

Pre-software



13 Cash		59 95	
Ashland Hotel		20 25	
Sales			80 20
For week ending July 13.			

13 Labor Expense		40 40	
Delivery Expense		25 —	
Cash			65 40
Pay roll for two weeks ending July 13.			

6 Miscellaneous Expense		60 —	
Cash			60 —
Rent for July.			

ILLUSTRATION 4, STANDARD FORM OF JOURNAL RULING

19

James Moore
Balance Sheet, December 31, 1940.

Assets		Liabilities	
Cash	145 75	Mortgage Payable	1200 —
U.S. Government Bond	500 —	Reese Grocery Store	32 26
House and Lot	6200 —	Johnson Meat Market	18 37
Furniture & Furnishings	2100 —	Smith Dairy	10 08
Wearing Apparel	475 —	Total Liabilities	1260 71
Automobile	350 —	Proprietorship	
		James Moore, Capital	8510 04
Total Assets	9770 75	Total Liabilities & Prop.	9770 75

ILLUSTRATION 1, BALANCE SHEET OF AN INDIVIDUAL

High School Athletic Department
Balance Sheet, August 31, 1940

Assets		Liabilities	
Cash	7 58	A. G. Spaulding Bros.	36 75

The Modern Laundry
Balance Sheet, June 30, 1940

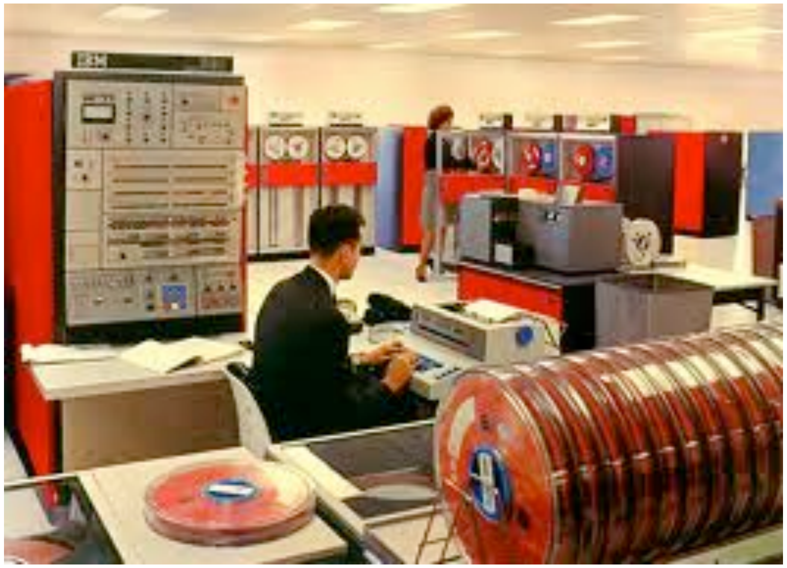
Assets		Liabilities	
Cash	87 13	Laundry Machinery Co.	275 83
Ashland Hotel	18 72	Stark Garage	21 45
Machinery	3200 —	Total Liabilities	297 28
Delivery Equipment	400 —	Proprietorship	
		L. A. Tubbs, Capital	3408 57
Total Assets	3705 85	Total Liabilities and Prop.	3705 85

NAME OF JOURNAL PAGE NO.

DATE		ACCOUNT TITLES AND EXPLANATION	POST. REF.	DEBIT AMOUNT	CREDIT AMOUNT
Year Month	Day	Name of Account Debited	Sometimes called folio column	Dollars	
		Name of Account Credited			
		Explanation of the transaction			
	Day	(The succeeding entries on the page are made in the same manner.)			

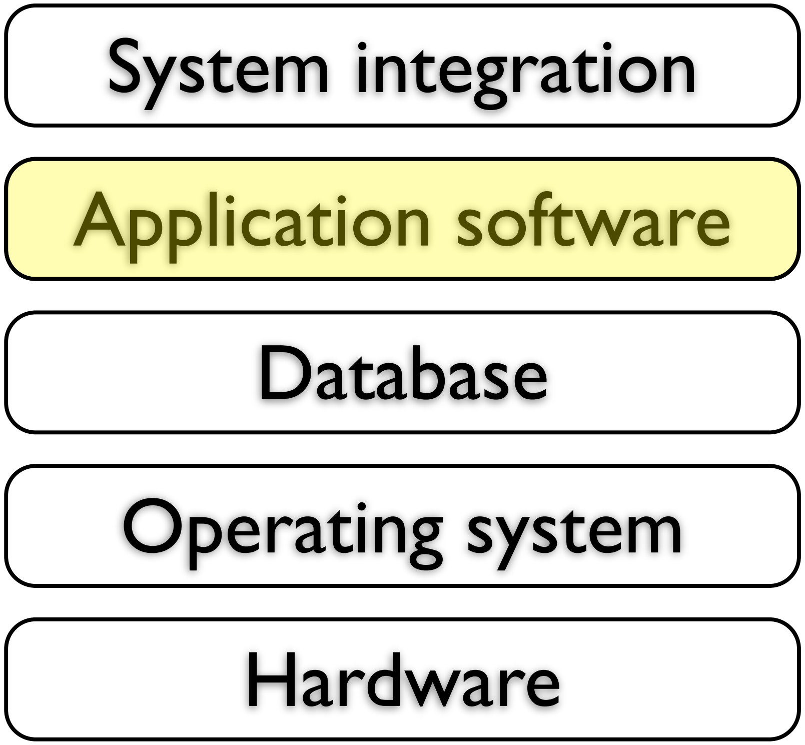
ILLUSTRATION 3, BALANCE SHEET OF A BUSI

Custom software (IBM)



IBM®

Enterprise software: a loosely coupled stack



System integration

Application software

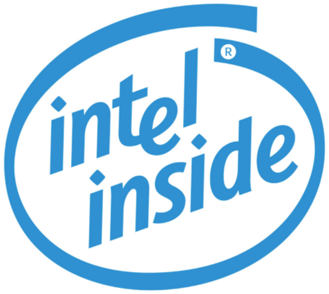
Database

Operating system

Hardware

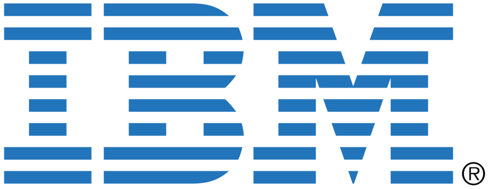
Hardware

Sun
microsystems


intel®
inside

hp
HEWLETT®
PACKARD

digital


IBM®

Operating systems

Microsoft®
Sun microsystem
Linux™
IBM®
dig
HEWLETT®
PACKARD

Databases

SYBASE®

IBM®

ORACLE®

Microsoft®

INFORMIX

Applications

PEOPLE Soft

COMMERCE ONE®

BROADVISION
Personalizing e-Business™

SIEBEL®

ORACLE®

VIGNETTE®

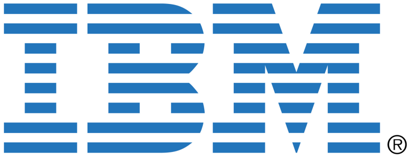
bea

ARIBA®

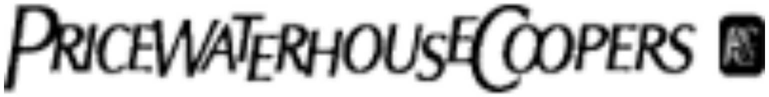
SAP®

System integrators

ANDERSEN
CONSULTING



hp
HEWLETT®
PACKARD



Enterprise software layer cake

Integrators	ORACLE · ANDERSEN CONSULTING · m · EDS · hp HEWLETT PACKARD · PRICEWATERHOUSECOOPERS · IBM
Applications	ORACLE · PEOPLE Soft · ARIBA · BROADVISION Personalizing e-Business · COMMERCE ONE · VIGNETTE · bea · SIEBEL · IBM
Database	ORACLE · SYBASE · INFORMIX · IBM
Operating System	Sun microsystems · hp HEWLETT PACKARD · Microsoft · Linux · IBM
Hardware	Sun microsystems · hp HEWLETT PACKARD · intel inside · IBM

Enterprise software (1994-2001)

PEOPLE Soft	$20B
COMMERCE ONE	$20B
BROADVISION Personalizing e-Business	$25B
SIEBEL	$100B
ORACLE	$175B
VIGNETTE	$5B
bea	$20B
ARIBA	$40B
SAP	$100B

The promise of enterprise software

- Buy software, not consulting services
- “Runs out of the box”
- Little customization required
- Much cheaper -- buy software once, don’t have to pay the ongoing people cost
- Still had to pay for upgrades and support but that would a fraction of the cost of maintaining custom software

Building enterprise software

- Software is complicated
- Requirements are difficult to specify
- Must generalize for business operations that are very specific, finicky, and paranoid
- Must be able to integrate with lots of other software
- Enterprises upgrade software at their own pace, necessitating supporting older versions and patches for a long time
- Application companies could bundle up all the pieices or integrators could hook things up piecemeal
- Lots of moving parts, procedures, dependencies, coupling

Approach taken

- Traditional waterfall model approach
- Requirements gathered "from the field" or made up by engineers
- Have to ship developer tools
- Bundle other 3rd party software as well; software licensing can be complicated (including open source/gnu gpl issues)
- Mostly in C++ (then Java)
- Long development cycles
- Has to support many platforms that might be used by the customer
- Cloud didn't exists, so had to be deployable on customer premises

Promise not realized

- Couldn’t deliver out of the box solution
- The 80-20 “lie” -- spend should be 80% software, 20% services/integration
- Customer didn’t know what they wanted
- CEO/CIO’s bought the vision, but unimplementable
- Lots of consulting work still required
- Very expensive and complicated
- So much custom work, the packaged software was unusable or negligible in the final deployment

Success or Failure?

PEOPLE Soft $20B

COMMERCE ONE® $20B

BROADVISION® Personalizing e-Business™ $25B

SIEBEL® $100B

ORACLE® $175B

VIGNETTE® $5B

bea $20B

ARIBA® $40B

SAP® $100B

Success or Failure?

Used by:

ORACLE®

SAP®

salesforce

BOEING®

THE HOME DEPOT®

FORTUNE 500

WELLS FARGO

UNIVERSITY · OF · WASHINGTON · 1861 ·
LVX · · SIT

Not much has changed in 10 years, except...

Early adopter of the cloud...before the consumer side

Stagnant for 10 years

- Missed the social media revolution
- Missed the move to the cloud (except for SalesForce)
- Missed "Web 2.0"
- ....but today, there's an enterprise renaissance
- What we've learned on the consumer side is being deployed on the business side
- Businesses now dominant data centers
- 1,000+ business node clusters now being deployed

The CIO is no longer "king (queen)"

- Individuals are empowered
- Bring Your Own Devices
- IT organizations are too expensive and slow moving
- Infrastructure is in the cloud
- Business unit demands are rapidly changing

Where is enterprise software going?

- Incorporating stuff we’ve seen on the consumer side
- Social engagement
- Big data/big computation
- Mobile
- Individual empowerment
- Self reliance, personal “federation”

Open playing field for the renaissance underway

- What's the process going to be?
- How are the teams going to be organized?
- How will requirements be specified?
- What's the architecture going to look like?
- What's the storage technology?
- How will it be deployed?

All the choices we've discussed in this class are open!

Thoughts

- Still want to allow for customization
- Want to provide a baseline of software
- "Out of the box" software is still a dream -- consulting/professional services will still be required
- Hopes and promises of "big data"
- Agile, continuous development, with more flexible *release* process?

Huge opportunity and lots of excitement...

Software is eating the world.