Panaya
Making ERP Easy

Business Driven Software Architecture

Yossi Cohen
Founder & CEO

1 July 2007

Agenda

- About me and Panaya
- The business strategy and its derived software architecture
- Decisions on programming language, OS, development environment
- Grid, UI, Security and Testing

Yossi Cohen , CEO, 40

- 20+ years of experience in enterprise SW
- Alexandria (99-03) – Founder & CEO
  - Tool & services for reengineering legacy DB apps
  - Acquired (02) by BluePhoenix (Nasdaq:BPHX)
  - Customers: Merrill Lynch, Solomon Smith & Barney, CitiBank, Daimler-Crysler, New York State, Tfahot, Mivtahim, Discount
- Predicate (94-99) – Founder & CEO
  - Complex migration and integration projects
- Air Force, Formula, Jacada (85-93) – Engineer
- BSC (cum laude), MSC (summa cum Laude) & PHD (last stages) in CS from Tel-Aviv Univ.
  - Focus on program flow analysis, database flow analysis & program comprehension
  - MSC basis for Alexandria

Panaya's background

- Founded - January 2006
- Founder – Yossi Cohen
  - Expert in "artificial programmers"
  - Two previous successful startups in domain
- A round - $5M
  - Benchmark Capital – eBay, Juniper Networks, Red Hat, mySql
  - Gemini – Precise, Saifun, Verisity
- Location – Raanana, IL
- Team - 25

The Dream

- Goal
  - Leverage my unique know-how in building “artificial programmers”
  - Build a $1,000,000,000 company
  - Grow fast to be big
- Decision
  - Focus on huge ERP market
  - Test generation market does not qualifies

The business challenges

- Challenges
  - Software companies grow slowly and therefore have low multipliers
    - → Hard to become $1B company
    - → Hard to grow fast
    - → VCs believe it's "the end of software"
    - → no financing available
- Decision
  - A no barrier to buy marketing strategy

No barrier to buy strategy

- Barriers
  - I don’t want this software
  - Installing & using new software is a mess
  - It’s too expensive/I don’t have the budget/I’m (the CIO) too busy
- Strategy: eliminate any reason customers might have against buying our solution
  - Huge value proposition → Make ERP Easy
  - No pain → no installation; no learning curve
  - Inexpensive → no direct sales force;

The Problem Panaya Addresses

30,000 configuration screens

+

60,000 functional screens

+

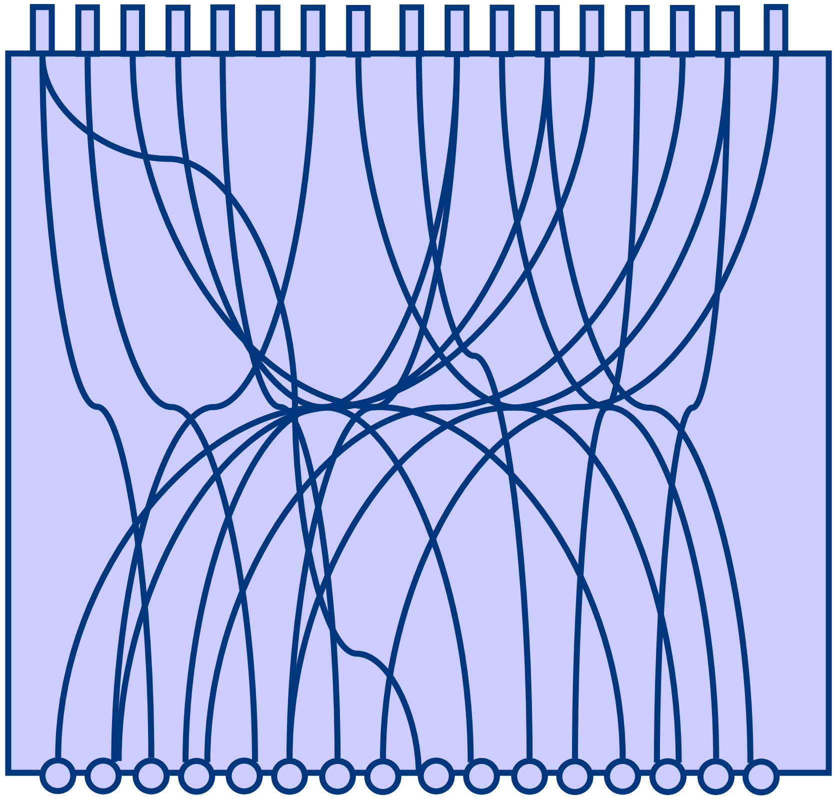
120M lines of spaghetti code

=

Nobody understands all the internal workings of SAP

X

The Questions Panaya Addresses



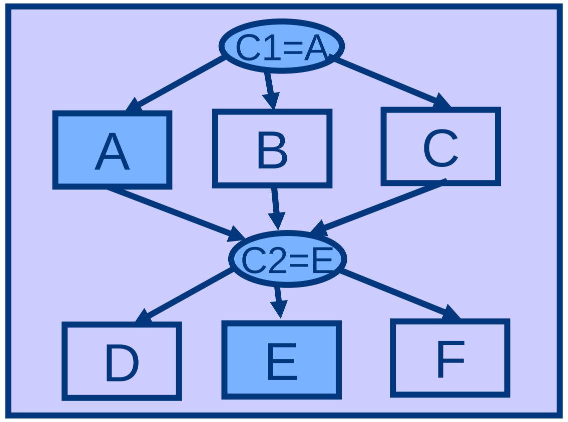
- What happens when a configuration changes?
- What should be tested at the end of a project?
- What causes an error or invalid output?
- How should a business process be customized?

Impact Analysis for SAP

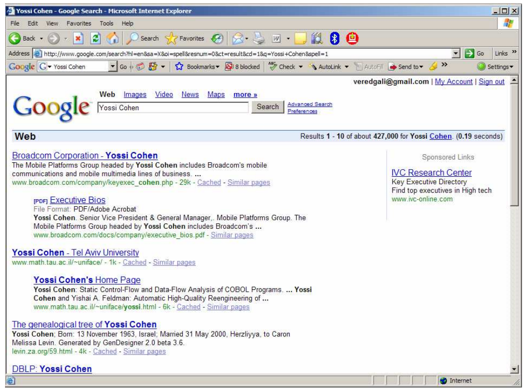
Panaya's on-demand software identifies which SAP modules and their transactions will be affected by your customization changes **before** you test or transport the changes to production.

Panaya's Solution Highlights

Code & Configuration Analysis



Impact Rank – Prioritized Results


Yossi Cohen - Google Search - Microsoft Internet Explorer
File Edit View Favorites Tools Help
Back Search Favorites
Address http://www.google.com/search?hl=en&sa=X&oi=spell&resnum=0&ct=result&cd=1&q=Yossi+Cohen&spell=1 Go Links
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The genealogical tree of **Yossi Cohen**
Yossi Cohen; Born: 13 November 1963, Israel; Married 31 May 2000, Herzliyya, to Caron Melissa Levin. Generated by GenDesigner 2.0 beta 3.6.
levin.za.org/59.html - 4k - Cached - Similar pages

DBLP: **Yossi Cohen**

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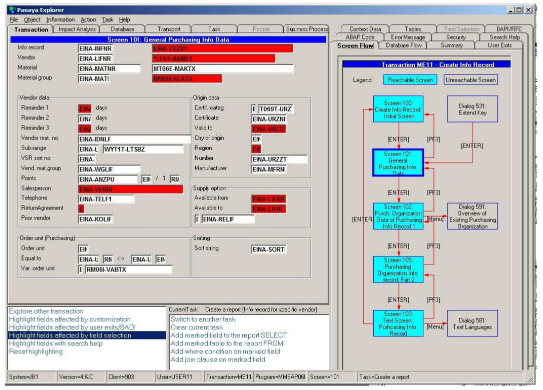
Human Interaction Language


Panaya Explorer
File Object Information Action Task Help
Transaction Impact Analysis Database Transport Task People Business Process
Context Data Tables Field Selection BAPI/RFC
ABAP Code Error Message Security Search Help
Screen Flow Database Flow Summary User Exits
Transaction ME11 - Create Info Record
Legend: Reachable Screen Unreachable Screen
Screen 100: Create Info Record: Initial Screen
Dialog 531: Extend Key
Screen 101: General Purchasing Info Data
Screen 102: Purch. Organization Data of Purchasing Info Record 1
Dialog 591: Overview of Existing Purchasing Organization
Screen 105: Purchasing Organization Info record: Part 2
Screen 103: Text Screen: Purhcasing Info Record
Dialog 581: Text Languages
[ENTER]
[PF3]
[Menu]

Screen 101: General Purchasing Info Data

Info record	EINA-INFNR	EINA-TXZ01
Vendor	EINA-LIFNR	*LFA1-NAME1
Material	EINA-MATNR	MT06E-MAKTX
Material group	EINA-MATI	RM06I-KLATX

Vendor data

Reminder 1	EINA	days
Reminder 2	EINA	days
Reminder 3	EINA	days
Vendor mat. no.	EINA-IDNLF	
Sub-range	EINA-L	WYT1T-LTSBZ
VSR sort no.	EINA-	
Vend. mat.group	EINA-WGLIF	
Points	EINA-ANZPU	EIN / 1 RM
Salesperson	EINA-VERKF	
Telephone	EINA-TELF1	
ReturnAgreement	E	
Prior vendor	EINA-KOLIF	

Origin data

Certif. categ.	E	T069T-URZ
Certificate	EINA-URZNI	
Valid to	EINA-URZD	
Ctry of origin	EIN	
Region	EIN	
Number	EINA-URZZT	
Manufacturer	EINA-MFRNI	

Supply option

Available from	EINA-LIFAB
Available to	EINA-LIFBI
E	EINA-RELIF

Order unit (Purchasing)

Order unit	EIN
Equal to	EINA-U RM <-> EINA-U EIN
Var. order unit	E RM06I-VABTX

Sorting

Sort string	EINA-SORTI

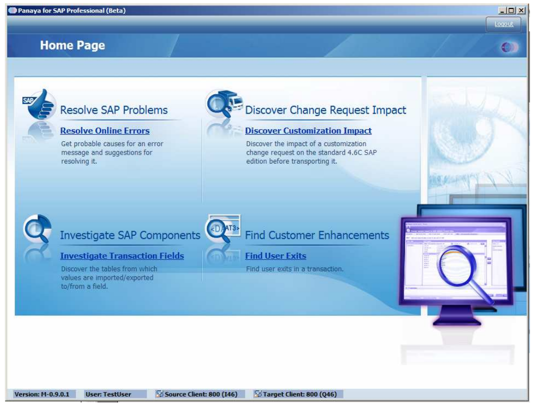
Explore other transaction
Highlight fields affected by customization
Highlight fields affected by user exits/BADI
Highlight fields affected by field selection
Highlight fields with search help
Reset highlighting

CurrentTask: Create a report [Info record for specific vendor]

Switch to another task
Clear current task
Add marked field to the report SELECT
Add marked table to the report FROM
Add where condition on marked field
Add join clause on marked field

System=JB1 | Version=4.6.C | Client=903 | User=USER11 | Transaction=ME11 | Program=MMSAP06I | Screen=101 | Task=Create a report

On-Demand



Resolve SAP Problems
Resolve Online Errors
Get probable causes for an error message and suggestions for resolving it.

Discover Change Request Impact
Discover Customization Impact
Discover the impact of a customization change request on the standard 4.6C SAP edition before transporting it.

Investigate SAP Components
Investigate Transaction Fields
Discover the tables from which values are imported/exported to/from a field.

Find Customer Enhancements
Find User Exits
Find user exits in a transaction.

Version: M-0.9.0.1 | User: TestUser | Source Client: 800 (I46) | Target Client: 800 (Q46)

Huge value proposition

- SAP SW vs. Configuration Work Ratio - \$1:\$8
- SAP SW revenue in ‘06 – \$8B (out of \$12B)
  - Total market size ~ \$65B
- Expected improvement by Panaya: 20% - 40%
  - Annual customers saving - \$13B-\$26B
- Panaya’s annual market \$3B-\$6B
  - Assuming Panaya’s revenue is 25% of saving

Competitive barrier through research

- Challenge
  - Market is to huge and problem is to important to be left to a small startup by the giants
  - SAP, IBM and Mercury/HP already tried (and failed) to address it
  - Must build a high technological barrier
- Decision
  - Will heavily rely on research and push its boundaries, especially in scalability
- Hindsight – it’s a very risky move

Building a research team

- Challenge
  - True research is bad for products – both results and timeline are unpredictable;
  - Cannot plan budgets, work plans and revenue
- Decision
  - Recruit 5 PhDs, 2 MSc students, one professor
  - Dedicate a long R&D time for the initial product development
  - After version 1.0, separate research from development

No pain → On-demand architecture

- On-demand = internet based product
  - Aka Software as a Service (SaaS)
- No installation is required
- No upgrade is required
- Zero time to value
- Free trial
- SAP on the internet for experiments

No learning curve – UI in focus

- Rich WEB UI
- Wizard based UI – a single simple decision in any step
- Documentation is embedded in the UI
- Use video to explain
- Free trial
- SAP on the internet for experiments

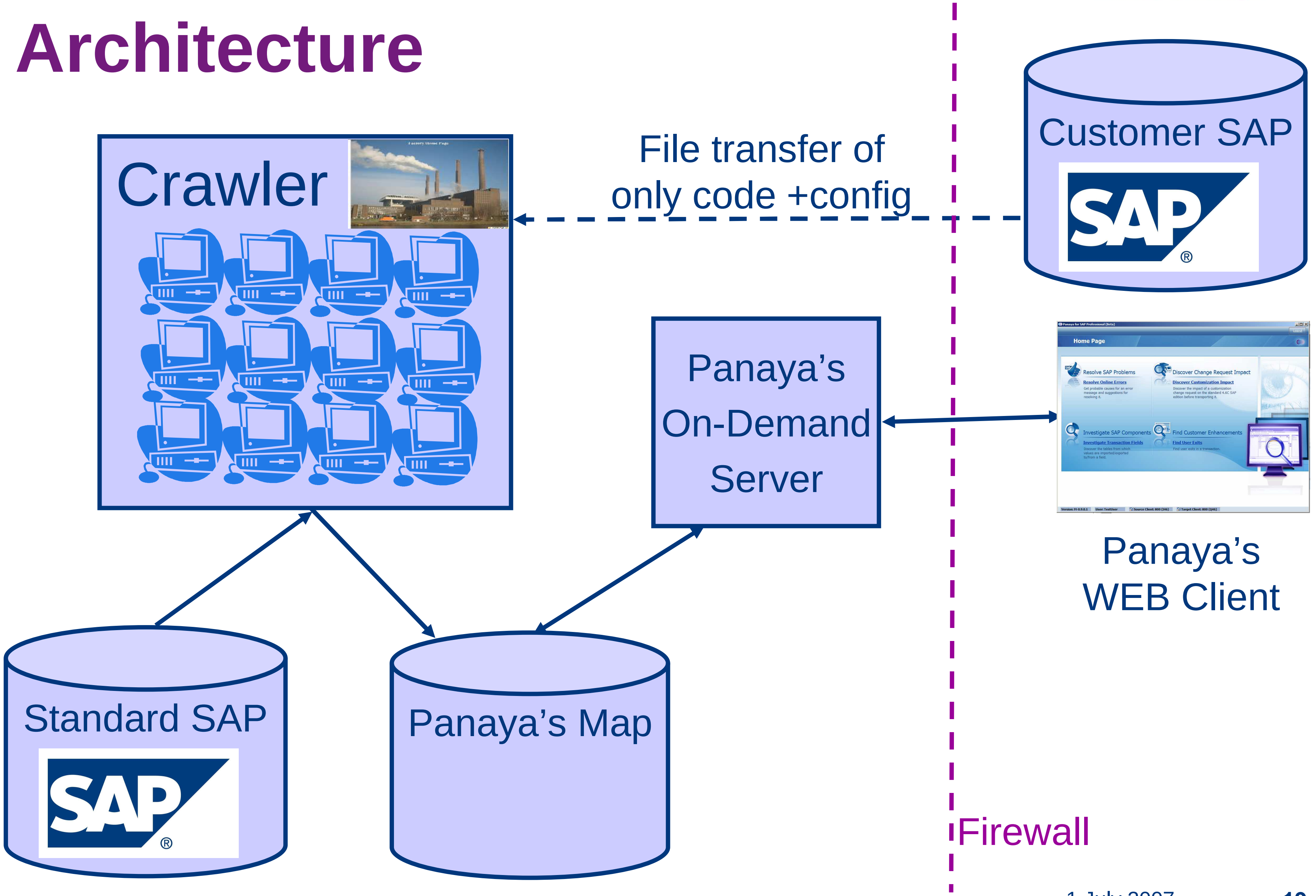
Inexpensive Solution

- Goal
  - Reduce the cost of development and sales
  - Reduce the size of sales – \$100 vs. \$100,000 and \$1000 vs. \$1,000,000
  - Address low level people and not CIOs
  - Volume sales
- Solution
  - On-demand software reduces cost → single version, single platform, no professional services, no field sales, short sales cycles
  - WEB shop & tele-sales - No field sales force
  - Subscription based pricing

It’s the security stupid

- Challenge
  - SAP is inside the org
  - Panaya is outside the org
  - We need cotinually to get info. from SAP
  - Connectivity is a security breach
- Solution
  - Pre-analysis
  - ETL = extract, transfer & load
  - Copy & paste

Architecture


Crawler
File transfer of only code +config
Customer SAP
SAP
Panaya's On-Demand Server
Home Page
Resolve SAP Problems
Discover Change Request Impact
Investigate SAP Components
Find Customer Enhancements
Panaya's WEB Client
Standard SAP
SAP
Panaya's Map
Firewall

The Crawler

- Challenges
    - The program analysis algorithms are time, CPU and memory consumers
        - 2 quad-core CPUs and 16GB, 32GB, 48GB
        - Some analyses take few days
        - There are 60,000 programs to analyze
- Conclusion
    - Analysis algorithms must be highly parallel
    - Should be divided among many computers
    - Should be divided among many threads on the same machine

Parallelism

- Main candidate for parallelism: grid
    - Constraint – must be open source
- Challenges
    - All open source grids are “academic” research level work
    - Examined grids do not provide the required functionality
- Conclusion
    - Use Java App Servers Clusters
    - Build manageability functionality on top of it
- Hindsight – decision was a mistake
    - We ended up developing a home grown grid
    - Non core activity – takes 1-1.5 person constantly

The programming language

- Dilemma - Dot NET (c#) vs Java
  - Dot NET – more productive environment; better UI
  - Java – standard for enterprise solutions; cross platform; “open source” = “free”
- Decision
  - Java – since it is cross platform
- Hindsight
  - Java is slow and memory consuming
  - Many be C++ is more appropriate for us

The development environment

- Use Java open source set of tools
  - Eclipe
  - Maven
  - SVN
  - JBoss
  - mySql
  - Bugzilla
- Buy from Tikal a Visual Studio like integration

The OS

- Windows vs. Linux
- Windows
  - More productive development environment
  - Must have for office apps
  - Do not want heterogeneous OS env
- Linux
  - “Open source” – “less expensive”
  - Better servers?
- Decision – Windows
- Hindsight – a mistake, Linux is much faster
  - We currently switch the crawler to Linux
  - It is easy since Java is relatively portable

The UI

- Challenge
  - Reduce Panaya's HR resources involved in the sales cycle – specifically for training
  - Allow fast adoption due to a terrific user experience
  - UI should be easy to use and self explained
- Decision
  - Wizard based UI
  - One decision on every step
  - Have UI designers from day one
  - Rich WEB UI – Java based
- Hindsight – customers like the UI

Web Services Architecture

- Insight
  - Panaya is not only an application, but also a platform
- Challenge
  - Build an architecture which other can build additional apps on top of our repository and our app
- Decision
  - Web Services architecture

Testing

- Challenge
  - People cannot describe its expected result
  - SAP is too huge to allow for detailed testing of the whole set of results
  - What is the profile of the testing group leader
- Solution (partial)
  - Huge amount of unit tests – but they are relatively limited: we usually fail in the integration
  - Testing must be highly automatic
  - Develop a huge (but small vs SAP) SW system to test Panaya
  - Use people to test the “cognitive experience”