

HRG

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HRG Assessment: Business Process Automation In an Unwired World

In the “always-on” unwired world:

- Customers expect immediate response and no mistakes.
- Partners expect instant notification and real-time visibility.
- Suppliers push the limits of the just-in-time supply chain,

Today’s enterprise thrives on continual change, signaled by all manner of events: a new purchase, a cancelled sale, a materials shortage. We all run in a highly competitive race, to internalize business requirements and respond effectively, as near to real-time as technology and human nature will allow.

Technology and standards advancements have in fact brought us much closer to that real-time ideal. Consider Dell Computer. Michael Dell, speaking recently about innovation, discussed the virtual nature of his company. Dell Computer sells 120,000 to 140,000 computers each day. Customer orders translate into supplier orders, in real-time. “Every 90 minutes or so [suppliers] deliver material to our factories, based on what’s just been sold.” This has enabled Dell to achieve remarkable operating performance, with inventory turns exceeding 100 times, and cost of goods that are substantially lower than Dell’s nearest competitors.

The heart of Dell’s competitive edge is its real-time approach to business operations. Events stream through Dell’s systems to suppliers, beginning with customer self-help and order entry, extending through the supply chain to customer delivery. Dell is expert at modeling business processes, converting business events into action, and enabling the information to flow where it is needed. According to Mr. Dell, “we’ve replaced physical assets with information assets.”¹

Today businesses that require increasingly faster response times should look into adopting event-driven applications as a viable solution. These applications are getting increasingly easier to build and present the opportunity to realize the benefits of better business results and reduced costs. Business process automation tools can be used to simplify the creation and modification of automated processes. Currently 70% to 80% of most IT budgets go toward support and maintenance. When viewed in this context business process automation products hold out the promise of much needed cost reduction.

Harvard Research Group believes that Sybase has built a well-integrated, standards-based process automation suite for process automation, management and monitoring. This offering represents a unique area of strength for Sybase and as such should be part of any process management vendor consideration.

¹ Comments by Michael Dell and Dr. David Tennenhouse were made at the MIT 2003 Emerging Technologies Forum, 24-25 September, 2003.

The IT organization is tasked with optimizing event management in real-time, under compressed spending limits. IT must incrementally achieve process automation, delivering near-continuous improvement, at a demonstrable ROI, leveraging a diverse array of systems and applications. While the Dell example illustrates the potential of real-time event-driven systems, it also represents a massive, enterprise-wide undertaking.

Event-Driven Process Management

Enterprise operations break down into series of events, actions and reactions guided by business logic. The enterprise must continually track, synthesize and operate on these events, so that the *right actions* can be taken at the *right time*. This is the mission for business process automation.

Consider a simple example. Suppose a brokerage firm decides to update its risk management practices. Rather than waiting for end-of-day position reports, it wants to evaluate trades by assessing risks in real-time. All trades valued above a threshold value are subjected to additional tests and approvals prior booking. Examples tests include the trader's current mix of deals, trader, counterparty or daily limits, or the buyer's risk rating.

Implementing such a business policy requires a "composite application" that links a number of existing applications. First, our event – the trade – occurs within a trading system. Process checks, such as checking a trader's current trade mix, will require information from a separate application. Counterparty risk assessments and other tests each involve yet additional applications. How can businesses organize & evolve real-time, event-driven, automated business processes?

Cost-effective construction of such automated processes requires:

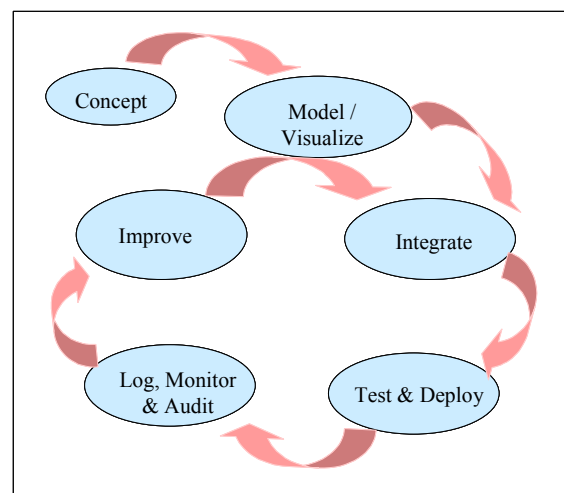
- ✓ interaction servers – web sites, mobile middleware, portals and the like.
- ✓ a process engine to orchestrate business processes, to manage complex evaluation logic.
- ✓ integration capabilities to link automated processes to existing applications.
- ✓ monitoring tools to track and assess business success in near real-time.

Automating the Business Process

Successful process automation projects begin and end with clear, agreed-upon objectives and measures of success. Contributors in IT and the line of business must collaborate to speed the development of automated processes. More often than not, they work in very different worlds, under different priorities. Clear development processes, supported by effective tools transcend these differences.

Process modeling and development. The process model serves as the unifying collaboration tool, helping both parties conceptualize processes and complete their implementation.

Figure 1. Business Process Development Cycle



The following factors influence time and cost to automate and act to improve business processes:

- *Process visualization.* A process depiction becomes the medium of collaboration. Visual design speeds review, encouraging an interactive development process. Business analyst and developer should be provided with process design collaboration tools. The quality of these tools is seen in the rate at which combined business/IT teams can innovate new automated process designs.
- *Process enrichment.* Much of the work to automate processes involves only IT. Detail logic, integration with human endpoints, links to existing systems are primarily IT tasks, but require “round trip” engineering. Tooling must enable process changes without losing previous process enrichments.
- *Model in layers.* Modeling software should provide the freedom to hide or delve into complexity to tailor the model to the technical level of the audience. This capability enables conversations between the developer and business user to focus on what the process will do, not on how it will do it. The developer, can use the same tools to dive down into each process element, expanding the logic and integrating its functions with existing systems and new touch points.
- *Rich Integration Capability.* Composite applications automate processes largely through re-use existing, here-to-fore incompatible systems. An emerging class of process automation tools combine process automation and rich integration capabilities within a shared toolset. This cuts cost and project risk by reducing the number of “moving parts” and the interfaces between them.
- *Integration with software development.* Process modeling tools help to define a team’s plan of attack, but it need not end there. The tools used should also guide the development process, serving as its logical foundation and its to-do list, while providing overall structure for the project. In our example, interfaces built to link the trader’s workstation, customer database, and risk management systems would be identified, re-used, and “dropped into” the process models where needed. This capability to re-use services, has enormous implications for speeding results and controlling maintenance costs.
- *Decoupling* Business processes require information from any number of applications. This is fine, so long as new processes are de-coupled from them, and vice versa. Project managers should establish and enforce use of an enterprise service bus or similar structure to encourage use of well-documented, standards-based interfaces between systems.

Testing and Deployment. Completed processes must tested without putting the business at risk. Tooling must decouple process designs from implementation details so as to assure cost-effective maintenance. During deployment, testing must be reliable, but also fully contained and invisible to the organization at large. Quality tools can facilitate the linking of processes to physical resources, without coupling them tightly.

Ongoing process improvement. Accumulating and analyzing event data will suggest ways processes might be improved. One real example relates to end of day closing for a major European bank, with central offices located in the UK. Accumulated experience showed that if member banks had not provided certain key data by a certain time, the risk of a closing delay was particularly high. Knowledge of this enabled the bank to tune its process, causing automatic issuance of alerts. This began an escalation process designed to ensure that all required input was actually received by close of business.

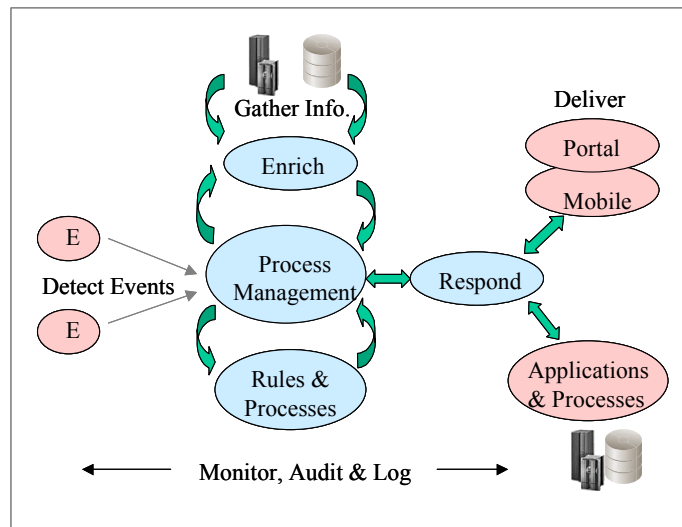
Executing the Event-Driven Business Process

In our trading example, there may be hundreds of trades in play at any time. Qualifying trades each trigger a multi-step business process. The process engine tracks each trade through multi-part processes, and must track the state of each transaction to assure that is ever lost.

As depicted in Figure 2, the process engine orchestrates a flow of processes, beginning with the discovery and capture of an event, and extending through a number of steps that lead to a response, delivered to users or other systems:

1. *Ability to easily detect, filter and route events to the right process.* A broad array of systems and applications, scattered across the enterprise, may generate business events. These could include vertical applications, messaging systems, web servers, or databases.. The process manager must use integration technology to receive events and provide an means to identify the event. Once identified, the process manager must use rules supplied by process developers to initiate or continuing the correct process and the correct instance of that process.
2. *Use of sub processes to enrich events prior to analysis.* Once initiated, a process often requires additional information from a multitude of systems. In our trading example, the initial trade event may include only the stock symbol, counterparty ID, price and time, but lacks product and counterparty details. The business process typically must initiate multiple sub-processes, generating requests of existing applications and databases to gather the for the needed information. The process engine must await the completion of each enrichment prior moving the trade to the next step.
3. *Apply process logic and rules to events.* The process engine analyzes events using a mix of business rules and process logic. In our trading example, a number of trade assessments, expressed as processes and rules, are made after a large trade has been identified. Has the trader violated any limits? A sub-process will have to check with the trader workstation and report back. What about counterparty risk? The server must invoke multiple sub-processes in a defined sequence to analyze the trade, including invoking additional external systems.
4. *Enable multi-channel response.* Business processes drive organizational action and responses in multiple forms: sending notifications, logging activity, initiating additional processes, or initiation of complex alarm and escalation processes. The process automation platform must be directly integrated with multiple human-response means, as well as other databases, B2B integration and application subsystems.
5. *Support ongoing monitoring and analysis.* Business processes may take just moments or days from start to finish. In some cases, individual events may be less relevant than their cumulative effects. Detection

Figure 2. Event-Driven Process Cycle



of money laundering, for instance, a critical aspect of Patriot Act compliance, requires the analysis of transaction patterns, in addition to individual transaction checks. Users should consider process monitoring a key capability of process automation tooling, as coupling of the tools to the monitor slashed the cost of creating monitoring facilities.

Monitoring Business Activity

Once automated, events handled by a business process can yield immediate clues as to critical events and trends. Assimilating this information, filtering it, and taking action is the mission of the business activity monitor. Hundreds of monitoring sessions may operate simultaneously, each measuring occurrences to provide information to independent audiences. One might be delivering notifications on all new sales in the Southeast to the manager's dashboard; another might monitor the number of successful orders and alert the operations manager if orders begin to fail to be fulfilled within an time limit.

The business activity monitor, unlike a data warehouse, offers the freshest possible view of the enterprise data it monitors because it extracts data directly from the business events as they occur. It also offers history by retaining event data in its repository over a period of hours or days. The result is a powerful combination of real-time and near-term historical views, critical for generating instant alarms or spotting trends.

One current example where real time event driven processing is a requirement is in the implementation and enforcement of the USA Patriot Act which requires banks to identify suspected terrorists when they attempt to open or access bank accounts, as well as providing trend analysis required to spot suspicious sequences of transactions used by money launderers. In this case, as we all witnessed on 9/11, time is of the essence and a quick well considered response is required – real time event driven process satisfies both of these requirements.

In another current example, a patient in critical care may need an operation tonight, depending on the results of seven tests. At this instant, thanks to the business activity monitor, we know that four tests have been completed and reported, while three remain to be done. Drawing on historical patterns, the monitor can go further and offer a predictive view. It is still early, just 9:00 AM; based on prior history, all tests should be completed and results returned by 2:00 PM. No problem. But if all results are not received by noon, the likelihood is that test results are being delayed, affecting quality of care. The monitor can alert critical care staff to begin the escalation process.

Real synergy can result when the business activity monitor works closely with the process engine and its development tools. When making real time event driven process management solution selection decisions users (read as IT professionals) need to demand that the tools that enable activity monitoring are directly available within the process design environment.

Information Delivery

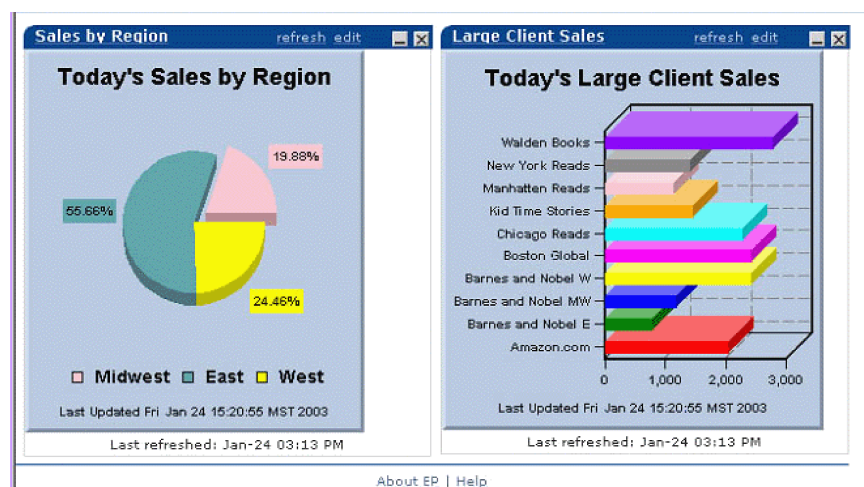
The goal of business process automation is to get enriched, filtered event information to the right place at the right time, so that critical actions occur *in time*. System to system communication is key, but at some point, people must be pulled into the loop: to make decisions, to address critical issues, or just to be informed.

Highly mobile users. Mobile workforces create challenges, and often the best opportunity for automating processes. The business process must deliver event information to the correct recipient, wherever he or she is and *on whatever device is being carried*. Delivery must be guaranteed, and required responses verified, or an escalation process engaged.

Combining mobile delivery with process automation adds huge flexibility to the unwired enterprise. If a senior executive is to be alerted, and it's a Saturday, the system could send multiple messages to the executive's wireless PDA, personal email, and/or SMS phone based on time-of day. Failure to respond in a time window could trigger other processes to seek alternate resolutions.

Dashboards should be a staple for managers in every organization, and experiencing rapid adoption. Dashboards can be used to present a personalized view of business metrics, graphically, in an appropriate metaphor. Dashboard can be made highly relevant by highlighting critical business alerts with color and flashing text.. Close integration with process engines and monitors permit direct delivery to users' PDA's, PCs or other networked devices.

Figure 2. Dashboard example – designed for a wireless PDA



For example, General Electric decided to automate as much of its business management as possible, and has implemented “digital cockpits” for senior managers across GE business units. These provide customized, graphical views of critical business operations. GE’s goal is to update critical operational data every fifteen minutes for key managers, enabling *better decisions, faster*. An interesting side effect in one division was to practically eliminate the need for a cadre of spreadsheet analysts; the digital cockpits automated their work.²

What’s New?

More of the same or does it really work as advertised? The CASE tools of the 80’s and BPR projects of the 90’s are examples of (at that time) new ground breaking solutions that were not effective because of the high IT costs experienced by the brave individuals who bought into these “Cure All” visions for the future. Today business process automation has evolved and can achieve positive ROI quickly by cutting costs, eliminating unnecessary human intervention, avoiding errors, and speeding most-appropriate organizational responses

² Discussion of GE’s digital cockpits appeared in “GE’s Drive to Real-Time Measurement” by Dave Lindorff, CIO Insight, 11 November 2002.

Advancements in business process automation technology combine with ubiquity and variety of internet access technology to create a new ability to automate business today. Among the many forces converging to realize this new capability are.

- *Business process visualization tools* that can eliminate much of today's traditional programming, allowing developers to work at a higher, more conceptual level. Process elements can be created, manipulated graphically, and re-used within visual process models. Visual process design pays immediate and long-term dividends shortening time to results and reducing the cost structure of maintenance activities.
- *Industry standards* have advanced throughout the software industry, dramatically increasing our ability to reuse software. The Java maxim, "develop once, use many" is playing out. Java in all its forms, .NET and Web Services enable applications, custom programs, and business processes to be linked and re-used through the standardization of application, platform and network interfaces and protocols.
- "*Always on*" *Internet and wireless connectivity* have compressed business cycles. Events flow through an enterprise much more quickly, with far fewer delays. At the network's edge, wireless and mobile network access make it possible for roving managers, remote consumers or widely dispersed operations to continually generate and receive business events.

Reaching toward real-time: driving performance up, latency down

The current explosion of data and real-time events business are experiencing is driving the requirement for new ways to manage these business process driven events and as we look toward the future, we are caught between opposing forces. On one hand is the demand for zero latency where the requirement for instant response will continue to increase. In today's wireless, always on world, we have lost patience with even the smallest delays. On the other hand the volume of is growing exponentially and this new richness and complexity of data poses a significant challenge as we strive to move close to zero latency responses to event driven requirements.

We can expect a massive explosion of event-driven data as more and more users go wireless, and even more specialized devices are deployed that will generate business events. Wal-Mart offers a great case in point. The world's largest company and retailer will require all of its suppliers to equip all pallets with RFID (radio frequency identification) devices by 2006. These tiny wireless devices will broadcast inventory information, giving Wal-Mart unprecedented ability to track inventory. Wal-Mart will know where its products are, where and when they were made, when perishable products, like medicines, will expire, and so on. This is a lot of data that will have to be collected and monitored somewhere.

Event discovery, assessment and response must become much, much more efficient in coming years. We need to turn the whole event discovery model upside down, and drive intelligence closer to the data. Event detection and analysis need to be as widely distributed as possible. Ultimately, event management must occur wherever this data is captured, stored and evaluated.

Increasing Importance of Web Services

Web services define a standards-based framework that enables diverse, independent applications to communicate across the Internet.³ Independent users and services will be able to connect without prior knowledge of one another, to place orders, access information services, initiate a business process, just about anything. Web services will extend the reach of business process automation beyond the enterprise, to encompass all elements of the supply chain and customer community. They will also help to further reduce development costs, as global application and network interfaces become even more standardized.

While web services will play a major role in event-driven processes, it is still early in the game. Today they are well suited to non-critical client queries or the event enrichment. Our earlier enrichment example, the gathering of additional information about a trade, could be implemented using a web service.

As standards evolve, web services standards will address key requirements for event-driven, transaction-based applications. Reliable event delivery, and asynchronous execution of multi-step processes are two of the more important capabilities to be addressed. Between now and then, business process automation will continue to utilize enterprise messaging infrastructures, increasingly in combination with web services.

When combined with the concept of enterprise service bus, web services provide a compelling management tool – the ability to link independent systems across stovepipes, without concomitant coupling of the maintenance cycles of the linked applications.

Vendor Considerations

Harvard Research Group (HRG) examined Sybase capabilities and identified a number of factors that make them particularly interesting. Overall, Sybase offers an exceptionally complete solution set, weaving together a broad array of data management, process automation and multi-channel delivery capabilities web and wireless. The entire software stack is there, and the pieces fit.

HRG believes that as enterprises move to extend and integrate applications, particularly in areas requiring multi-channel delivery, such as wireless, they need to add Sybase to the short list of vendors who should receive serious consideration for such solutions.

Event-driven applications are much easier to build today, presenting an immediate opportunity to reduce costs and achieve business results quickly. Moreover, process visualization tools also make it much easier to *modify* a business process, driving down long-term development and maintenance costs. In a world where 70% to 80% of IT budgets go toward ongoing support and maintenance, taking cost out is an absolute requirement, and business process automation delivers.

Effective, reliable event-driven process solutions should adhere to at least the following fundamental principles:

- *Non-intrusive.* The business process cannot impinge upon or interfere in any way with ongoing business applications. It must be totally transparent to other systems. (Unless, of course, the owner of a particular application participates in process design and embraces the change.)

³ For a more complete definition of Web Services, see Champion, Michael, et al, editors, “Web Services Architecture,” Working Draft 14 Nov. 2002. W3C: www.w3c.org.

- *Transactional.* The business process must adhere to the ACID properties of effective transaction-oriented systems: atomicity, consistency, isolation and durability.
- *Agile.* The business process must present information requests or process commands in terms that the target systems expect, in the prescribed format, using required protocols. It must have the agility to adapt, as target systems and their respective “norms” will vary. And the business process itself must be easily and quickly modified.
- *Highly Reliable.* Business process automation must support as much redundancy and fault tolerance as the enterprise determines a given process may require.
- *Efficient and Scalable.* Hundreds of thousands, even millions of transactions per day, require a highly efficient communication system and efficient data structures, if they are to be subjected to interpretation against business rules.
- *Secure.* The system relies upon enterprise security practices within the firewall, but must also protect message flow and data transmitted beyond the firewall.
- *Standards-based Internet, Mobile and Wireless Integration.* The solution architecture must embrace industry standards to fully leverage capabilities of Internet, mobile and wireless connectivity, as they exist today, and as they may evolve tomorrow. While there are no guarantees for the future, industry standards can lead the market by two years or more. Look for vendors that are active in standards development and emphasize architectural flexibility for future standards support.

Sybase strengths

Sybase presents a high level concept that unifies its strategy, that of the “*unwired enterprise.*” Enterprise information systems are often fragmented and stove piped, with data locked into proprietary systems and applications. “Unwiring” the enterprise really means untethering the flow of business information and events from the various underlying applications. And yes, it also means addressing the literally unwired organization as well, as needs increase for wireless communication with a highly mobile client community.

This is a powerful concept, and this is what Sybase’s business process automation capabilities deliver. With *Integration Orchestrator*, introduced in 2003, Sybase has combined traditional EAI with business process automation to support the creation and integration of virtually any sort of event-driven business process. By combining EAI and process automation, IO enables cost-effective re-use and extension of applications that have taken years to build.

Integration Orchestrator (IO) works with *BizTracker*, Sybase’s business activity monitor, to afford its customers a rich set of business process automation capabilities::

- *IO’s process visualization* tools facilitate conceptual design of the business process. These same tools are used to build the process model, and then to enrich the model to generate the business process software. Process modification can be nearly as simple as rearranging icons of the enriched model. If desired, Sybase’s *PowerDesigner* can be used during process modeling, adding a broader array of modeling capabilities; the results can then be exported to *IO* for process development.
- There is considerable synergy between the process engine (*IO*) and business activity monitor (*BizTracker*). Both utilize the same highly visual tools and development process. *IO* makes it easy to define what to monitor, implemented with a point, click and drag. Similarly, *BizTracker* can assimilate information and in turn trigger an *IO* process.

- Sybase's extensive data management heritage comes into play in a big way. *Replication Server*, Sybase's data replication solution, replicates events between databases. With *RepConnector*, *Replication Server*, can now capture business events transparently, and then communicate these to automated business processes built using IO and other automation tools.
- Sybase offers a real-time information delivery solution (*Real Time Services Package*) based on its enterprise-class relational database management offering, *Adaptive Server Enterprise (ASE) 12.51* that incorporates JMS enterprise messaging to push events directly from the database as real-time changes occur. This facility reduces business process latency and transparency, as events are captured and communicated as they occur, without changing the original application that updated the database. More important for the longer term, this pushes event handling into the database, enhancing performance and simplifying the solution.

Sybase also offers a complete array of multi-channel delivery capabilities:

- Sybase's *EA Server* is a complete application server, hosting a variety of web- and standards-based applications.
- *Enterprise Portal* provides users with a personalized, integrated and organized view of applications and information. This can include easily customized information dashboards.
- Extensive capabilities for delivering mobile information services to mobile and wireless users. *M-Business Server* and *SQL Anywhere* provide mobile access to information regardless of network connectivity.
- Sybase is the leading supplier of mobile device delivery capabilities, with its *iAnywhere* offering. *iAnywhere's* mBusiness Server provides "always available" capability provides automatic information delivery through synchronization whenever the mobile device is "connected" either wirelessly or wired.

Sybase integrates an enormous breadth of products and capabilities. While prospective customers will find distinct advantages to such an integrated solution, it is equally important that the vendor maximizes customer choice through the support of open standards. Sybase has taken a strong leadership position here as well.

Conclusion

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Harvard Research Group is an information technology market research and consulting company. The company provides highly focused market research and consulting services to vendors and users of computer hardware, software, and services. For more information please contact Harvard Research Group:

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