

Creating Efficient Business Processes with CEBP

*The next stage in the evolution
of business applications*

Robin Bloor, Partner





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■ 330 Bear Hill Road, Suite 230 ■ Waltham, MA 02451 ■ Tel: 781-890-7185 ■
www.hurwitz.com

Introduction & Summary

Communications Enabled Business Processes (CEBP) is an important innovation in the automation of human communications within business applications. Until now, such automation has largely been confined to providing Call Center systems and to unified communications products that target the productivity of individual users by integrating the use of voice communications, instant messaging, email and other collaborative capabilities.

CEBP goes much further than this, enabling the communications and workflow aspects of a business process to be integrated with the underlying software applications that serve the business process. The importance of CEBP is in its ability to automate and manage the many ad hoc activities that are part and parcel of a business process.

In this paper we discuss CEBP from a business applications perspective, focusing on three distinct evolutionary steps for business software:

- The traditional environment of legacy business applications.
- The more modern and increasingly popular Service Oriented Architecture (SOA) environment.
- The newly emergent Event Driven Architecture (EDA) environment.

CEBP solutions can deliver value in all three environments. They leverage both Service Oriented and Event Driven Architecture to provide business processes with the ability not only to detect important events, but also to respond by initiating communications that help expedite the organizational response. Leveraging SOA principles, CEBP solutions can take full advantage of a SOA environment, but can also be integrated with existing business processes and legacy applications.

As detailed in this paper, SOA encourages the design of business software that aligns with and directly serves business processes, enabling an evolutionary approach to automating business processes.

CEBP is a new harness that can be added to a SOA or legacy environment, to allow the real-time identification and automated communications response to “events” that are not captured or recognized by most business applications, or are not responded to quickly, such as short term sales trends or buying patterns.

The value of CEBP in all these environments is that it provides what has hitherto been a missing component. *Within all these environments CEBP enables the design and evolution of the whole business process.* CEBP provides an approach

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to building business systems that mirrors the Japanese manufacturing discipline of Kaizen (continuous improvement). It allows managers and staff that are involved in a business process to participate in its design, removing costs or improving quality with each successive evolution of the business process.

The Nature of Business Processes

Business processes involve people. Even a process that is almost fully automated, such as the working of an automated teller machine (ATM), needs the customer to enter information and receive cash, and it needs maintenance staff to fill the ATM with cash and keep the whole ATM network in working order.

Since commercial computers began, automation has been the primary goal of software and its ability to automate a huge variety of tasks has exceeded even the most optimistic predictions. However, its usual role has been to automate tasks or groups of related tasks. *It has rarely been used to automate whole business processes.* This is not a criticism of IT; it is an observation of what has happened over many decades of its evolution. No one in IT would dispute the fact that, until fairly recently, software developers have built so-called silo applications.

Business Processes in the World of Siloed Applications

We illustrate how business processes run within siloed environments in Figure 1 below.

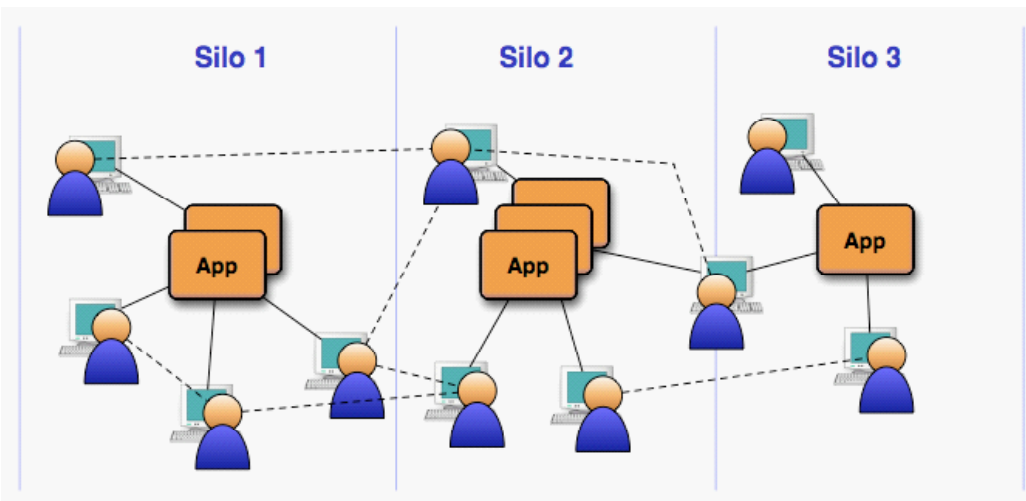


Figure 1. Business Processes and Siloed Applications

In the diagram we show connections from PCs to applications as solid lines and interactions between people involved in the process as dotted lines. The diagram might, for example, represent a procurement process, including all the software involved

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in placing an order, checking the order fulfillment status, estimating shipment dates, receiving the goods and paying for them. The typical reality, even with such a common business process, is that the software used, whether built in-house or bought in, does not fit the business need exactly. This is generally the case even when an “enterprise suite” of software packages (i.e. an ERP suite) is deployed. As shown, in a siloed environment the necessary connections between people typically go well beyond the connections supported by individual applications.

The people who are engaged in the business process naturally compensate for the areas where the software doesn’t fully support the process. Typically they do this in two ways:

- a) They regularly communicate with other staff involved in the business process, in order to resolve day-to-day problems or exceptional situations that arise.
- b) If they are able to do so, they will often build small ad hoc applications to supplement the main applications, using spreadsheets or PC database products. Such “unofficial” applications may involve the ad hoc use of email and other collaboration software.

In many instances such ad hoc activity by staff is the oil that allows the whole machine to run smoothly rather than grind to a halt.

There are two reasons why business processes usually operate in this way:

1. Typically, software applications are not easy to change and cannot be changed quickly. As a consequence, when it is necessary to change a business process, the alteration will often be implemented by adjusting the manual activities and surrounding ad hoc procedures built by the staff involved in the process.
2. Until very recently, person-to-person communications were poorly automated or not automated at all. Applications rarely (if ever) cater for the communications activities that are a necessary part of the business processes they serve. It was as if nobody even considered the role of communications.

Therefore the people involved in a specific business process usually manually incorporate the communications tools they need; such as telephones, email, chat, file sharing, conferencing capabilities and so on. The convergence between computing and communications technologies occurring at the software level is now removing the technology barriers to automating communications within business processes.

Business Processes and Service Oriented Architecture

Since the mid-1990s the software industry has evolved a new architecture that does not lead to the development of siloed applications. Instead the software aligns with and to some extent mirrors the business processes that it serves. This goes by the name of Service Oriented Architecture (SOA).

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The way that a SOA works, from a technical perspective, is complex, but it can be understood reasonably easily without resorting to descriptions of the underlying technology and how it operates. *With SOA one no longer thinks in terms of applications, but in terms of software components that provide well defined and easily understood services to support a business process.* However, implementing SOA does not mean rebuilding everything. The existing silo applications can be adjusted to work within a SOA. They can be provided with interfaces that enable them to function as “reusable” components that provide services.

You can get an understanding of what SOA enables, both through its underlying architecture and through BPM (Business Process Modeling) tools, by comparing the evolution of manufacturing to the evolution of computer systems, as outlined in the table:

	Manufacturing Industry		Computer Systems	
1.	Power to automate manual tasks	James Watt (steam power)	Power to automate intellectual tasks	The computer
2.	Use of standard components	Eli Whitney	Use of standard software components	Web Services, XML
3.	Distribution of power throughout a factory	Tesla, Edison (Electricity)	Distributed computing power	The PC, networking and the Web
4.	The assembly line	Henry Ford	Software integration and workflow	SOA and BPM

Summarizing this parallel we see that Web Services and XML deliver standard reusable components, BPM enables the production line, and SOA in its entirety delivers it all, including the manufacturing plant and the supply chain connections.

The business benefits that SOA can deliver are those of integration and more effective customization. Poor integration and very little or no customization are typical problems of the siloed application environment. SOA resolves these problems and through BPM provides a means of modeling and designing business processes so that activity flows from one person to another. From a business perspective SOA is as revolutionary as the use of standard components and the introduction of the assembly line were in their time.

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What SOA does not do, without taking a further step, is integrate communications and collaborative capabilities. However, because of the way that SOA works, if automated communications software is a feature of the SOA environment and available as a set of Web Services, then business processes can be designed to take advantage of it. CEBP provides this further piece of the jigsaw puzzle, allowing SOA to resolve all the major problems of the siloed application world.

Business Processes and the Event Driven Architecture

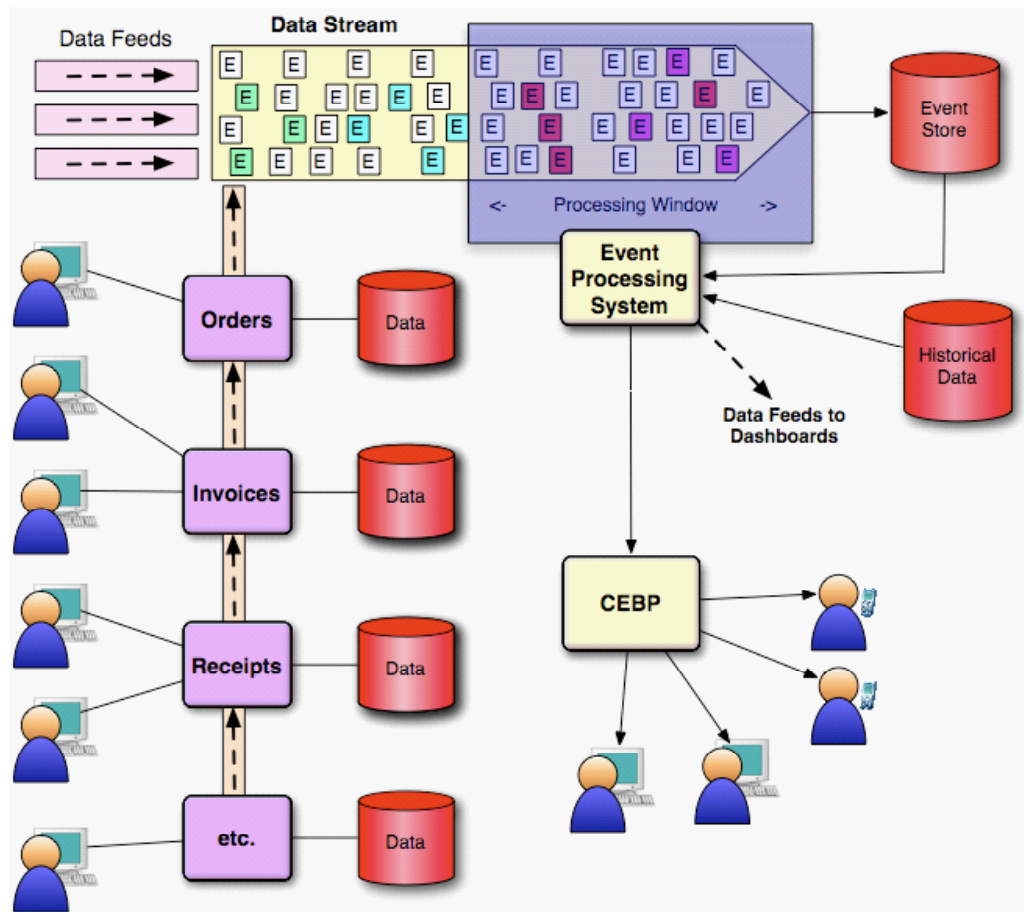
It would be nice to think of SOA as the “end-game” – to believe that once enterprise-wide SOA environments have been built, the evolution of business software will come to a graceful halt. However, this is not the case – increasing computer performance and new technology innovation is now giving rise to the concept of Event Driven Architecture (EDA), which in its initial stages has been described in different terms, such as EP (Event Processing); CEP (Complex Event Processing) and ESP (Event Stream Processing). EDA provides additional agility and, most importantly, timeliness within the SOA paradigm. However it does not require SOA in order to be implemented, EDA can also be used to augment a siloed architecture.

Since the dawn of on-line computing, software applications were written to process business transactions one at a time with the data from such transactions (orders, invoices, payments or whatever) stored in databases and then usually made available to be analyzed (in aggregation) by Business Intelligence systems.

Business Intelligence enables organizations to gain insights into their operation so that they can manage their activities better. But these systems always run at a lag to transactional systems. It can sometimes take days or even weeks to analyze transactional data and spot important trends that are contained in the data. EDA has many areas of application, but perhaps the most important one is in the area of enabling real-time Business Intelligence, where it is able to spot trends or identify important thresholds immediately rather than hours or days later. This is illustrated in Figure 2 on the following page.

The diagram shows a series of on-line applications (orders, invoicing, etc.) running in a siloed arrangement but with an additional function added to each business application. Each one is feeding real-time data about its transactions into a merged event stream. Also other information feeds from external systems are feeding into the event stream.

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Figure 2. An Event Driven Architecture

The Event Processing system processes the event stream. This is done in a “moving window” that has its width defined either by time (e.g. all the transactions that arrived in the past minute) or by number (e.g. the most recent 100 transactions). As time passes, new events enter and others leave and the contents of the window are continuously processed.

The events in the window can be processed in many different ways. In the above diagram, we show it looking for specific groups of transactions that are linked together in some way (indicated in the diagram by colors). However, it could be looking for anything in the data stream. It might, for example, be aggregating different transactions to control a real-time indicator on a dashboard. It might be performing algorithmic calculations to determine financial exposure or monitoring the status of a power plant. What distinguishes Event Processing from other software is not what data it is applied



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to – it can be applied to any event stream – it is the fact that multiple event records are processed simultaneously, with the system looking for specific patterns in the data that identify events or trends that need to be responded to immediately.

Event Processing can be very sophisticated, consisting of multiple streams being analyzed to detect different events; one stream might focus on sales activity, another on logistics and another on corporate risk. In each stream the system might be trying to spot several different kinds of event. There is a whole multitude of possible applications, ranging from spotting simple correlations to identifying broad patterns of behavior, that can only be detected by aggregating information from multiple sources. An Event Processing system can be thought of as an engine that finds needles in haystacks – or alternatively finds 3 pieces of a broken needle in the haystack and puts them together as the ‘needle’.

A common outcome of Event Processing activities is that specific conditions are detected which need to be acted upon by someone. This is indicated in the diagram (Figure 2) where some threshold condition is met (for example, the amount of credit granted by the company has exceeded a set threshold, or sales demand is close to exceeding the ability to meet it) and consequential activity is triggered by connecting directly to a CEBP system which can provide a sophisticated alerting and response capability. In effect, discovering that a particular situation has arisen triggers the business process and alerts and engages the people who can deal with it.

Business Processes and Avaya CEBP

We have briefly discussed three key steps in the evolution of business applications: the old world of siloed applications, the more modern SOA environment and the relatively new EDA environment. The Avaya Solution for Communications Enabled Business Processes (CEBP) can provide integrated communications functionality in all three contexts, and this section explores how this solution can be applied.

In the vast majority of business processes, person-to-person communications are poorly automated or not automated at all. CEBP provides the missing automation. Its impact becomes clear if we examine examples of where CEBP can be used effectively. To illustrate its breadth of applicability, three quite different business process scenarios have been chosen.

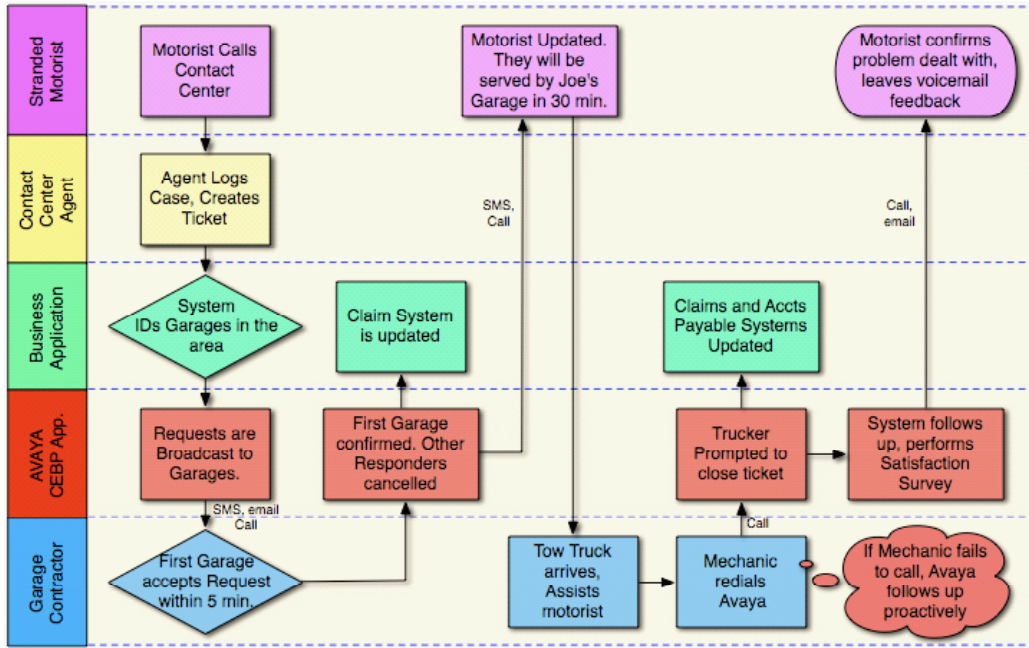
1. The Stranded Motorist

The process that CEBP participates in here is: providing assistance to a stranded motorist. The process itself is well understood and, from the point of view of the provider, no change is made here to the activities involved. All the changes made are in the way that the communications process is handled. The aim of changing the way the

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process worked was to improve the responsiveness of the service and, hence, increase customer satisfaction.



The effect of CEBP is to drive the communications within the business process, proactively prompting the individuals involved when necessary.

Figure 3. Example 1 - The Stranded Motorist

Figure 3 above illustrates the flow of activity using the simple notation of square boxes representing activity and diamonds representing decisions. The illustration divides the activity between the various participants, both people and systems. As can be seen, the whole process involves the interplay between the stranded motorist, a Call Center and a Garage that contracts to assist the motorist. The only two systems involved are Claim System and the CEBP system.

Prior to CEBP being added to the process, there were variable delays in communications between the call center agents and the garage staff involved in the rescue and inconsistent communications to the motorist, whose major concern is almost always time - i.e. when will the problem be dealt with.

The effect of CEBP is to drive the communications within the business process, proactively prompting the individuals involved when necessary. For example, as indicated by the “thought bubble” if the garage mechanic does not call in on schedule, then CEBP contacts the mechanic proactively, verifies status and escalates if necessary. (Note that we have not provided all the details and possible paths in the business process here, we have just provided enough to give you an idea.)

Here the outcome of using CEBP was not just improved customer satisfaction and a consequent improvement in customer retention, but also reduced costs because, on average, fewer people were involved in each incident (fewer handoffs were necessary).

2. A Mortgage Application

Our second example, shown in Figure 4 on the following page, is about closing out a mortgage application, with the primary aims being to decrease the time while simultaneously improving the closure rate. The primary problem in this business process is that, even in this digital age, the process is manually intensive because of the paperwork. There are process dependencies that require signatures within specific times and the approvals process can also cause delays.

Here the CEBP system is used to drive the process by automatically issuing notifications, alerts and if necessary, reminders. Note by the way, in this and all other examples, how the CEBP system can select different ways to issue notifications and alerts: SMS, email or direct call.

In the example, the goals of better closure rates and a faster process were met. However the CEBP system also improved staff productivity and led to better customer retention. This effect, incidentally, is common with the use of CEBP. CEBP nearly always increases the speed of the business process it is applied to, and increasing the speed of a business process usually delivers other beneficial side-effects beyond the primary goal.

3. Tracking the Competition

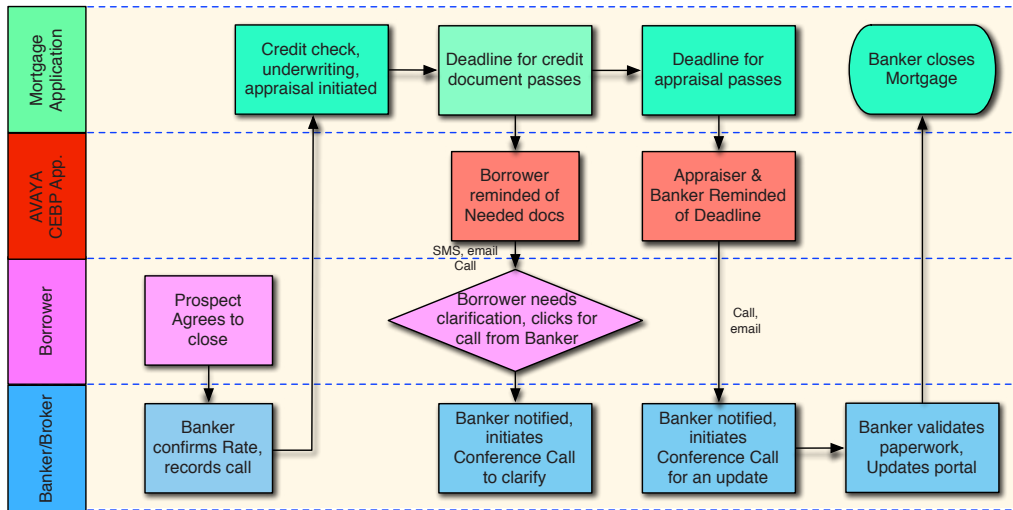
In this final example, also shown in Figure 4, the business process is tracking the behavior of competitive companies and responding to it. The aim is to use the CEBP system to improve responsiveness and assist in strategic decision making.

The problem with the existing process was two-fold. First, there was a delay in notifying executives of significant market events and secondly the process of communicating amongst executives and responding (if possible) was haphazard. The goal, therefore, was to enable better communications and planning. The actual illustration we give here is one of a variety of possible scenarios that the CEBP system assists with: a significant product announcement from a competitor.

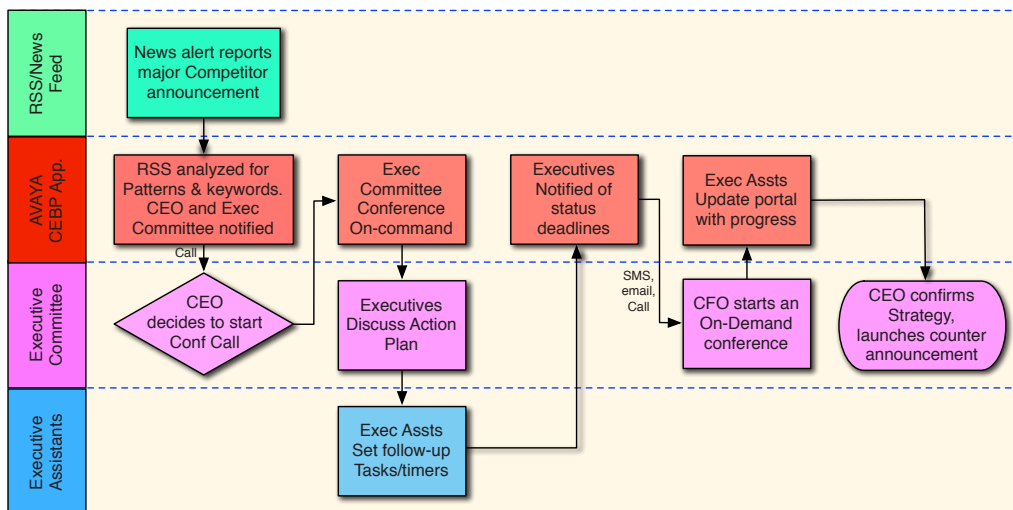
In this scenario the CEBP system analyzes external RSS information feeds and identifies a competitor announcement, passing it to executives. The CEO decides to initiate an immediate conference to discuss the announcement and ultimately the executives decide to respond with a counter announcement and work proceeds to organize this. The important point to understand here is that the team needs to

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Mortgage Application



Executive Response to Competitor

The CEBP system improved the speed of awareness of market events and ensured that information reached key executives in a much more timely manner.

Figure 4. Examples 2 and 3

move fast enough to make an effective response. Without the CEBP system, a timely response would probably not be possible.

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also plays a part in tracking the action plan. Ultimately the outcome was improved competitiveness.

Avaya CEBP Capabilities

The Avaya CEBP solution is a holistic combination of software, consulting, and support services tailored to the specific needs of a customer's business process. Based on Service Oriented Architecture (SOA) principles, the software solution orchestrates capabilities across a range of communications resources into composite communications Web Services that are designed for easy integration with existing business applications and processes. These include:

- **Advisory.** Contact a set of users and deliver a message via phone, email or text messaging with users confirming receipt of the information.
- **Notify & Respond.** Notify a set of users, with the users responding via voice interactions or web portal, and capture responses to trigger additional workflows.
- **Notify & Conference.** Notify a set of users of an event and invite them to join an instant voice conference with the rest of the team.
- **Notify with Task List.** Assign tasks to a set of users via their preferred communications channel and track progress with further notifications and information gathering as appropriate.

These high-level Web Services can be called directly from any other software.

In the siloed environments, more programming effort may be required to program the associated calls and organize the workflows. However, the additional effort is not at all prohibitive and consequently, the Avaya CEBP solution can be deployed in siloed environments.

In SOA environments, Avaya's CEBP naturally fits in as a readily available set of components. In most situations this will become an important integrated capability to Business Process Modeling (BPM) software, providing real-time closed loop communications services for reuse by BPM architects.

For the emerging Event Driven Architectures, Avaya provides its own integrated Event Processing capabilities (originally known as "iSpheres") as an optional component of its CEBP software. Because Avaya's CEBP has been built as a set of services, it is also able to integrate with other event generating systems.

CEBP and Continuous Improvement

We explained the importance of SOA by drawing a parallel between the evolution of the manufacturing industry and the evolution of software construction, coming to the conclusion that what SOA added was two critical elements: a practical way to standardize software components and the ability to manage workflows between applications and people.

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If we continue this parallel, it reveals how the construction of business systems is likely to further evolve. Manufacturing has come a long way since the introduction of the production line, with much advancement due to the brilliance of W Edwards Deming, whose principles gradually became the foundation of the Japanese manufacturing industry.

“Kaizen” which means “continuous improvement” is the culmination of Deming’s influence on manufacturing. It is also likely to dominate the development of business solutions. Until the advents of SOA and CEBP the continuous evolutionary design of business processes was not feasible. As we noted, business applications are often made workable by staff adding to them, using the communications technologies available to them (email, chat, telephone) and ad hoc software capabilities (spreadsheets and PC databases). The evolutionary design of business processes simply never occurred.

Together, CEBP and SOA have the potential to change that as enablers for continuous improvement. SOA provides a software architecture that enables changes to business software to be made in a more flexible manner. CEBP provides close integration between business processes and communications that enables the engagement of the right people to be flexibly changed.

The opportunity now exists to provide staff with the ability to contribute directly to the on-going design of the business processes that they participate in. Given the way that computer systems have traditionally been implemented in most companies this may seem ambitious, but in truth it is not such a radical idea, and is already the way that the most successful manufacturing companies operate.

In organizations that are adopting CEBP, Avaya has already begun to witness business processes being designed in an evolutionary manner. The initial design usually seeks simply to integrate communications activity within the business process, but subsequently staff involved in the business process start to identify ways of improving and evolving the business process. Because altering process flows with CEBP does not involve sophisticated technical programming, new ideas can be tried with less effort.

Conclusion

Communications Enabled Business Processes (CEBP) help enterprises enhance operational efficiency, worker productivity and customer satisfaction by streamlining human engagement in critical business processes. These solutions integrate with business process applications to predict and sense events, then respond by managing real-time multi-channel communication with process users and decision-makers. This

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speeds response times, reduces human delays, and frees workers from managing communications details so they can focus on making decisions and resolving issues before they impact customers. This creates a more agile enterprise.

CEBP can be seen as the next stage in the evolution of business applications, building on and integrating with the advances of Service Oriented and Event Driven Architectures to enable the design of the *whole business process*, including all the communications and people elements. And the long term opportunity for CEBP goes even further – it has the potential to become a driving force in the continuous improvement of the organization.

CEBP can be seen as the next stage in the evolution of business applications...

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