

Accelerated Application Delivery

SAP runs AccAD – Insights on Example Landscape



SAP NetWeaver Product Management

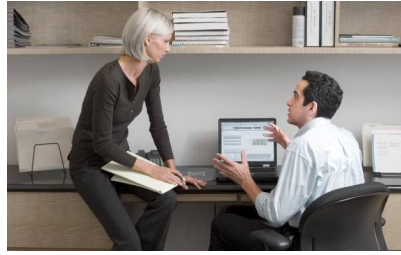
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Agenda



1. **Overview**
2. Detailed AccAD Landscape
3. Performance Improvements
4. Challenges
5. Summary

History AccAD @ SAP Corporate Portal



2006	January	First tests with ADoW 1.x for portal test landscape
	August	Security Assessment with "Security Innovation"
	September	Security issues were fixed Productive Portal accelerated
2007	Year-round	Additional CFEs installed, full coverage in APJ First tests: CRM test landscape
	December	Productive CRM accelerated
	Year-round	Under evaluation: BI & Wiki
2008	March	Live for additional applications: Business Objects (SSM)
	Summer	Upgrade to version 2.1

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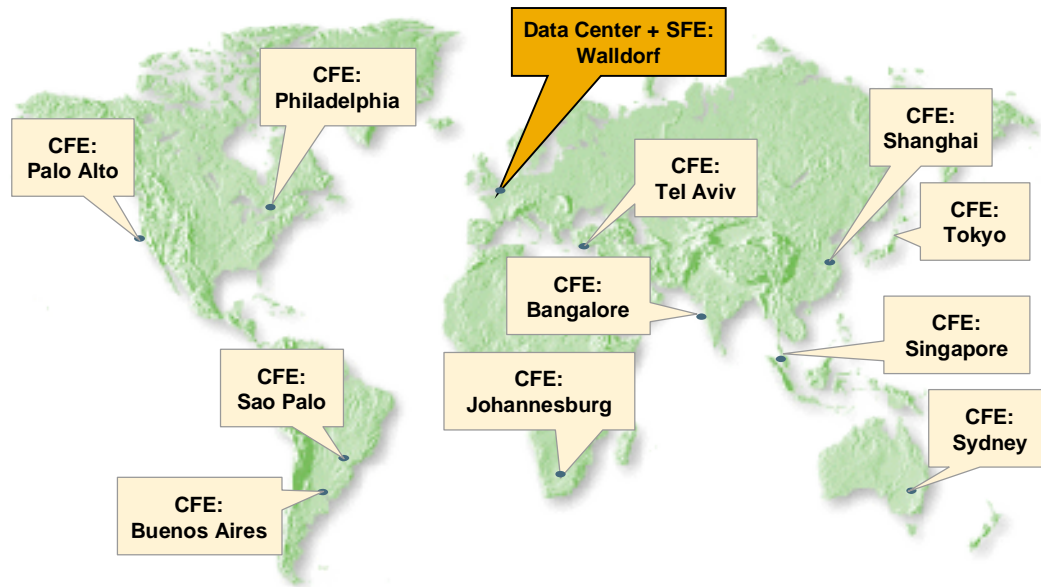
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This slide illustrates the history that Accelerated Application Delivery already has within SAP. In order to provide access to the SAP Corporate Portal to all users worldwide, first evaluations started beginning of 2006 for the portal test landscape. With the help of an external security assessment the landscape was evaluated and some security issues were found that were fixed few weeks later. Thus in September the productive portal was accelerated.

In 2007 then additional Client Front-Ends were installed and in Asia Pacific / Japan full coverage was reached (all end users are able to use AccAD to access the portal). First tests were conducted on accelerating the CRM test landscape, which went productive in December 2007.

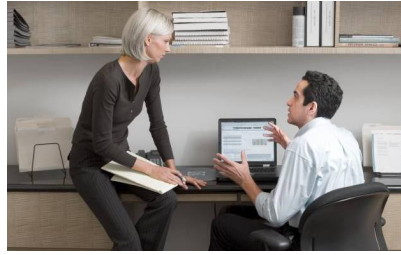
Now in 2008 the potential for Business Intelligence and Wikis are under evaluation. In March AccAD started to accelerate another application: SAP Business Objects (also known as SSM – SAP Strategic Management) - a tool used for executive management planning. In Summer 2008 the upgrade to version Accelerated Application Delivery 2.1 took place.

- Successful implementation for SAP Corporate Portal since autumn 2006
- Provides fast access to the portal and CRM for approximately 20,000 users every week
- Additional sites cascaded



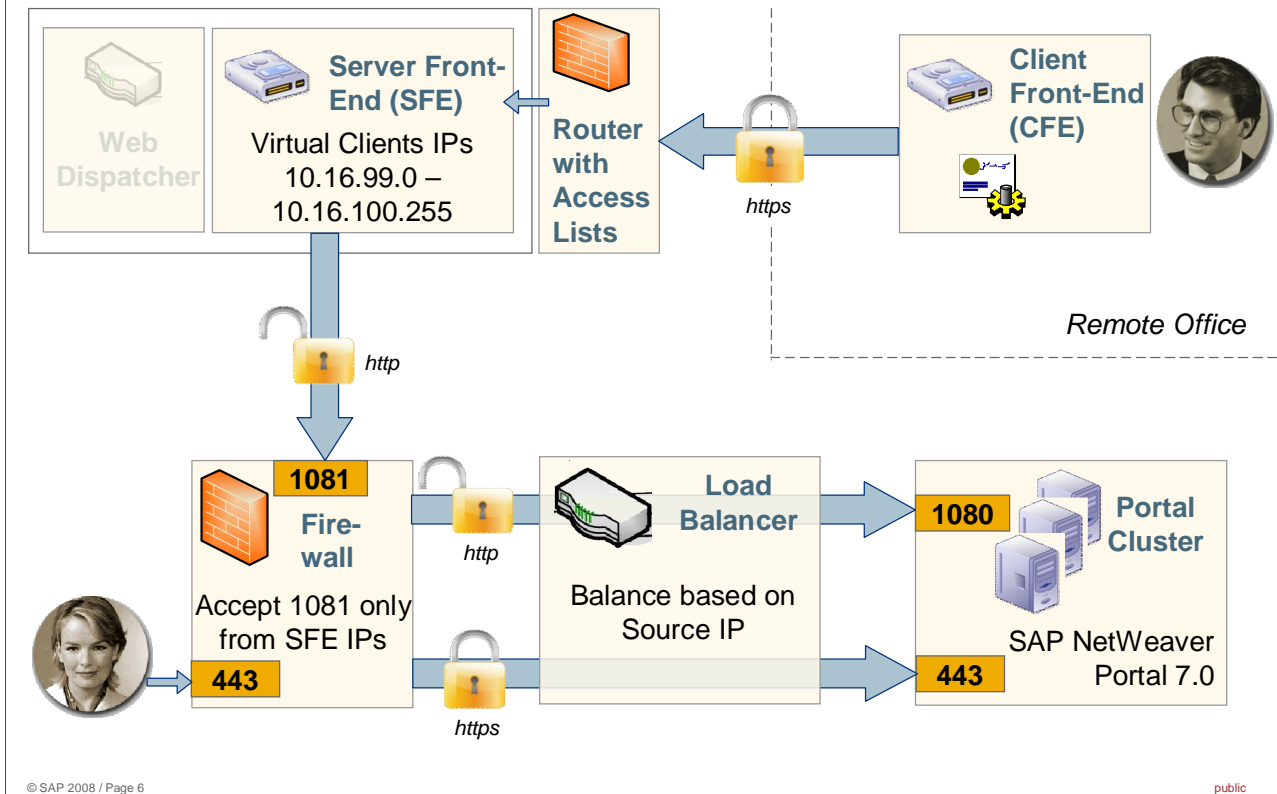
For the SAP Corporate Portal AccAD is productive since autumn 2006 and nowadays provides access for approximately 20,000 users every week. Currently 11 Client Front-Ends in different regions are set up and connected to the Server Front-End located in Walldorf / Germany. Moreover, additional sites are cascaded, e.g. all users in Japan use CFE in Tokio and thus can leverage the near-by client front-end. Thus in Asia Pacific / Japan already full coverage for SAP employees is achieved. Worldwide additional sites are implemented depending on the demands.

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AccAD Landscape - SAP Corporate Portal



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One specialty is that for accessing the SAP Corporate Portal client certificates are used, and thus the illustrated landscape setup is required.

In the remote offices client front-ends are set up, that check the validity of the client certificates. Thus in later stages the SFE and Application Server have to trust the CFE. The communication between CFE and SFE is encrypted. A router with access lists operates as a firewall and checks the IP addresses of the CFE to allow access to the SFE. Currently AccAD certificates are not used for this purpose.

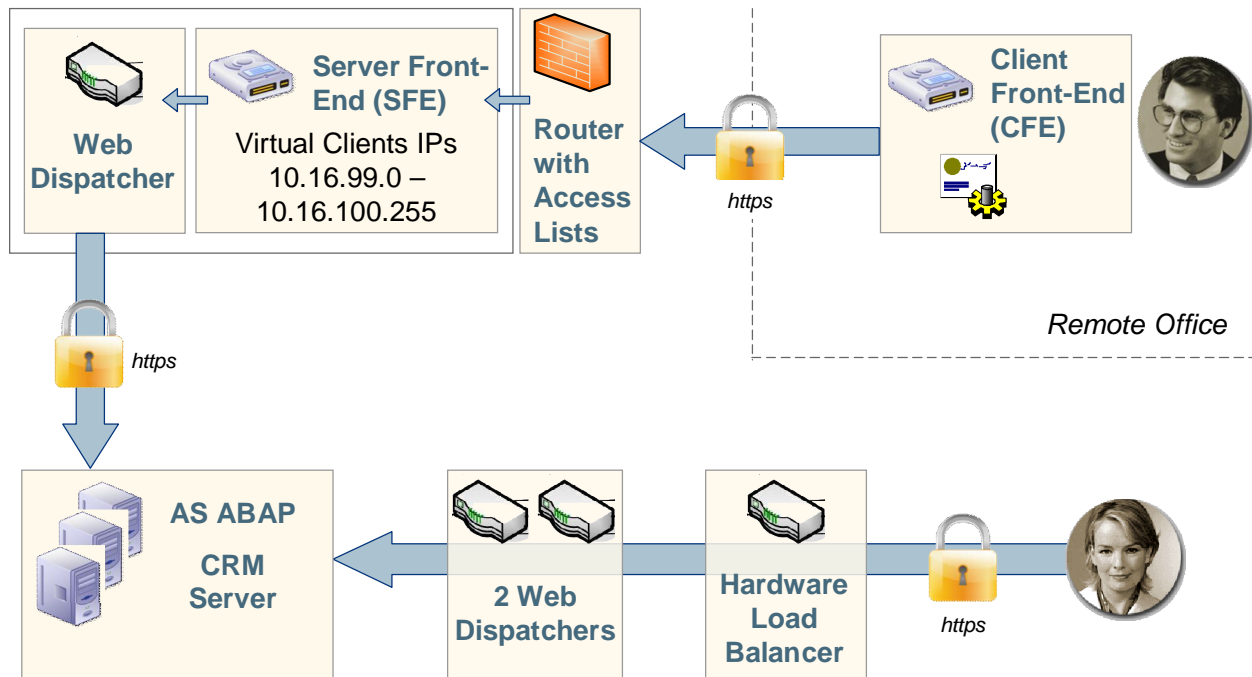
The SFE then forwards the client certificates in the header to the firewall via port 1081 (not encrypted: http). This transmission of the certificates is relatively insecure and a potential point of attack for identity spoofing. Therefore normal users are not allowed to connect to port 1081 and only the SFE IPs are accepted, thus no spoofing is possible from external users. Direct access from users within the LAN happens via HTTPS and port 443.

The firewall forwards the requests to the Load Balancer, which based on source IPs manages the access to the portal cluster. This is the reason why several virtual IPs are required on the SFE – in order to enable source IP based load balancing. Moreover, the load balancer transfers the network port 1081 to 1080 for communication with the Application Server (PNAT).

Then the J2EE Server (portal) allows direct access via HTTPS (port 443) and checks the client certificates of the LAN users. For access via the SFE this step does not take place and the certificates are accepted in the header not encrypted in https. As a remark: In order to enable this behavior, this requires specific settings in the Application Server:

1. HTTP on port 1080 has to be allowed
2. In Visual Administrator the property „AcceptClientCertWithoutSSL“ has to be set to „true“ (under Server → Services → http Provider)

AccAD Landscape - CRM



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The setup in comparison to the portal setup is slightly different since Web Dispatchers are used for managing the access to CRM. However, of course the same landscape of CFEs and SFEs is leveraged for accelerating CRM and similarly planned for SSM (SAP Strategic Management).

On the Server Front-End a Web Dispatcher is deployed as well. The SFE then forwards the client certificates in the header via http to the Web Dispatcher in the same machine. The Web Dispatcher then re-encrypts the communication to https and performs load balancing to the backend system. Between the Load Balancer on the SFE and the AS ABAP there is a separate trust certificate issued.

LAN users that access CRM directly, are sent to a hardware load balancer that forwards the request to 2 redundant Web Dispatchers, that then take over the load balancing to the Application Server ABAP. Again here the whole communication is secured over https.

Example Hardware Setup



CFE in Bangalore > 4,000 Portal users

HP ProLiant DL380 G5 Server

- Intel Xeon Duo-Core / Quad Core Processor
- 8 GB memory

CFE in Tokyo ~ 2,000 Portal users

HP ProLiant DL385 G2 Server

- AMD Opteron Processor
- 8 GB memory

2 SFEs in Walldorf ~ 15,000 & 5,000 Portal users

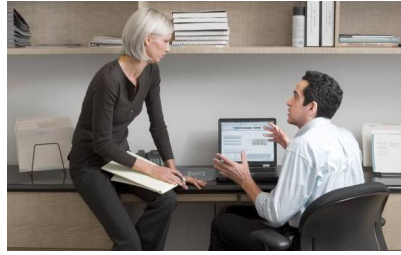
HP ProLiant DL385 G1 Server

- AMD Opteron Processor
- 8 GB memory

→ No hardware issues so far (quite uncritical)

Here you can see the current hardware setup for 2 exemplified Client Front-Ends and 2 Server Front-Ends in Walldorf. The sizing in the SAP landscape follows the general sizing recommendations of the AccAD documentation and up to now no hardware issues were encountered.

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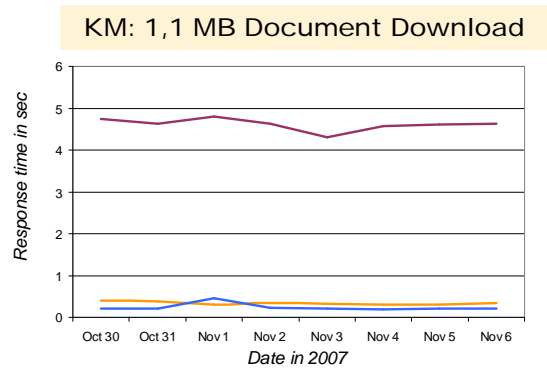
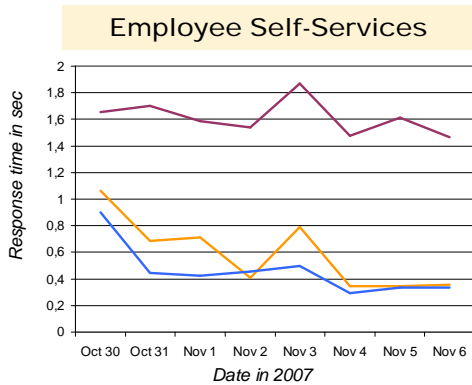
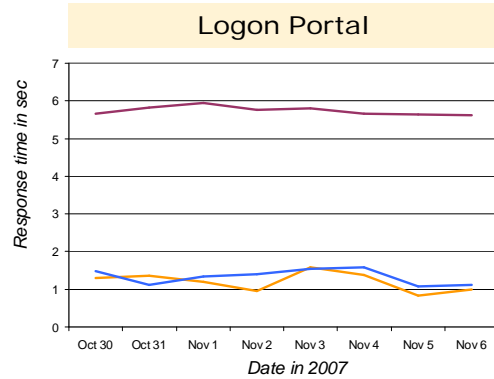
Performance Improvements with AccAD for Portal – Example Palo Alto



Statistics from November 2007

Average response times in seconds for portal (SAP NetWeaver Portal 7.0 SPS 12)

- Direct access Palo Alto – Data Center
- Access via AccAD
- LAN Access in Walldorf



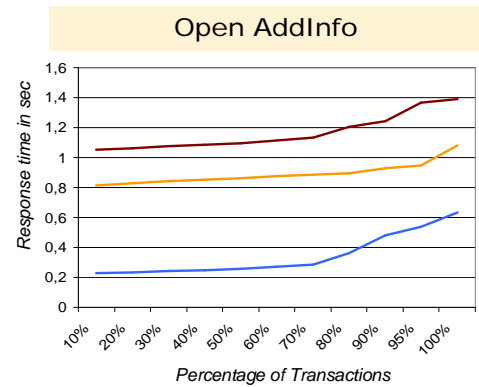
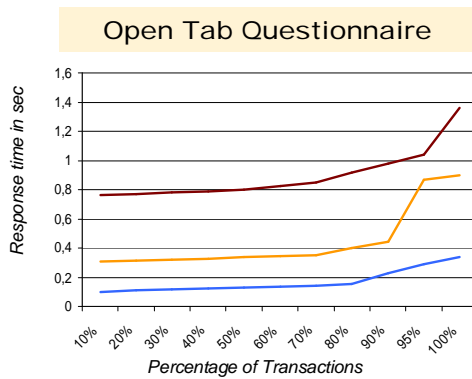
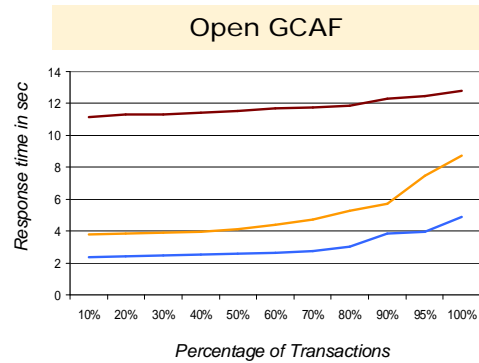
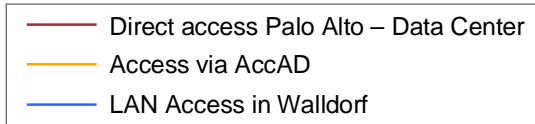
Here you can see within 3 exemplified scenarios the performance improvements that were achieved end of 2007 when working with SAP Corporate Portal from Palo Alto. We measured the average Logon Time to the portal, using Employee Self-Services and the download of a document in Knowledge Management. For downloading the KM document, the KM specific caching logic cannot yet be leveraged in the SAP Corporate Portal implementation, since the portal is still operated on SPS 12 and the caching feature is only available on SAP NetWeaver 7.0 SPS 13 and above. You can see that the results when using Accelerated Application Delivery are very close to the local access within Walldorf and that there is a huge difference if the data center is accessed directly from Palo Alto (without AccAD).

Performance Improvements with AccAD for CRM – Example Palo Alto



Statistics from June 2008

Average response times in seconds for CRM transactions



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Here are some of the performance improvements achieved with AccAD when accessing CRM transactions from Palo Alto. The statistics are from June 2008.

The information shown is from the key transactions within CRM – GCAF is the acronym for Global Contract Approval Form. Here an account executive created a contract and now initiates the SAP internal and SoX audited process of approving that contract. Here is a short explanation of the scenarios that were measured.

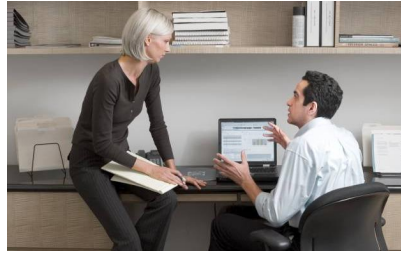
Open GCAF: This is the landing page, all the context and authorizations are loaded.

Open Tab Questionnaire: From the landing page you can navigate to this tab to fill or complete the structural data with respect to the contract; typically along these data reporting is structured

Open AddInfo: Depending on the contract type a variety of mandatory and optional fields have to be filled in and can be viewed here.

As you can see, here AccAD provides more performant access to the CRM system in comparison to directly accessing the application from Palo Alto. The percentage statistics illustrate how much of the transactions respond in a certain time, e.g. for Open GCAF 50 % of the transactions with AccAD respond in 4 seconds or faster, for 100 % of the transactions the response is available the latest after 8.5 seconds. The improvements are not as significant as in the portal use cases due to different reasons: The communication is secured overall (even reencrypted between SFE and Application Server) – and more encryption always leads to less performance improvements. Moreover, up to now there is no application aware acceleration for CRM, but it leverages the generic acceleration capabilities only (caching and compression).

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Challenge	Mitigation
Discussions with IT security <ul style="list-style-type: none"> ■ Integration of SSO certificate authentication to backend system ■ Caching of data on CFEs 	External security audit
Find proper traffic redirection setup	“AccAD integrated managed DNS proxy” – AccAD acts as DNS server
AccAD is Cross Topic between network and application administration	Network administrators learned basics of application administration and considerations

Here the major challenges that were encountered in this early AccAD implementation project are listed and how they were mitigated.

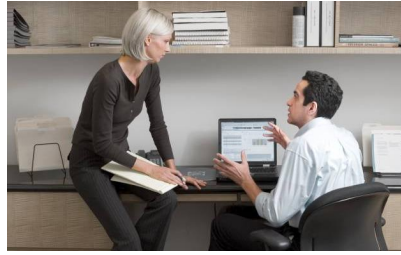
1. A major issue were the discussions with IT security and the concerns regarding the AccAD setup. Major points were the setup with the SSO certificates that are passed to the backend via AccAD and the caching of data on the client front-ends. In order to overcome this issue, SAP decided to go for an external audit by Security Innovation. They checked various points of attack, such as: Is the data on CFEs is secure or can an admin read it? Is AccAD „hackeable“ thus can it be hacked from outside with hacker tools? Minor issues were found and then fixed by AccAD development team in 2006.

A related topic was whether https communication takes place between SFE and backend – which of course leads to some reduction of the performance improvements. The security groups would prefer to see secured communication in all parts of the communication, however different decisions were made for the different applications - basically depending on number of users and criticality of the content. Thus CRM and SSM are relatively confidential applications used by few users – here the communication between SFE and Application Server is based on https. The portal is not considered as critical and confidential and all SAP employees working with it – here http communication takes place then.

2. It was challenging to find a good mode of traffic redirection for the previously illustrated setups. The currently chosen setup is to use the AccAD integrated managed DNS proxy: There AccAD acts as DNS server and sends it's own address - user connects to CFE instead of directly calling the backend. With this landscape, the DHCP setup needed to be changed for every user in order to connect to CFE instead of DNS server. In the early stages not all requests were answered correctly, but this was fixed by AccAD development. However in general this setup is difficult for large networks. The overall solution was possible since the discussions between the network group and the DNS administrator happened within one organizational unit.

3. In general AccAD is a solution that somehow crosses the borders between applications and network. Classically in many organizations (like SAP) there is almost no overlap in knowledge and those areas are split to different organizations. There is a some synchronization effort required in order to run and optimize AccAD implementations. In the SAP case, the network administrators learned some basic application administration and considerations in order to drive the setup as well as the discussions.

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Accelerated Application Delivery provides rapid access for approx 20,000 end users worldwide within SAP to

- SAP Corporate Portal
- CRM
- SAP Business Objects (SSM)

The global response times for those applications are enhanced considerably

Additional applications to be accelerated are on the roadmap and under evaluation

Overall, one can say that since 2006 Accelerated Application Delivery provides rapid access to webbased applications within SAP. Currently approximately 20,000 users in different SAP locations benefit from the technology when using the SAP Corporate Portal, Customer Relationship Management (CRM) and SAP Business Objects / SAP Strategic Management (SSM). Within the setup the global response times for those applications has been enhanced considerably and usually around near-LAN speed. This helped to increase the end user acceptance and usage of the systems like the SAP Corporate Portal. Additional applications like BI and Wikis are currently under evaluation and on the roadmap of being served by AccAD.

Thank you!





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