AUTOMATED SCALEABLE COMPOSITION WITH 3B2 PRODUCTION MANAGER

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1 Executive summary

By automating your publishing processes you can as much as double your Productivity, enabling you to shorten production times and deliver increased production capability.

Standard automation combined with a scalable system like 3B2-PM can enhance these savings even further. This article explains the fundamental features of 3B2-PM which facilitate the above gains and details the unique and valuable features that have enabled publishing companies around the world to streamline their business activities.

In summary you have the opportunity to see how this works in practice with a focused view on the Open University's (one of the largest educational establishments in the world) drive to automated and flexible publishing.

2 Orientation

2.1 Advent and publishing solutions

Advent publishing systems have been providing quality publishing software and solutions since 1986 to some of the top players in many industries including: Boeing, Canadian Senate, Bertelsmann and GlaxoSmithKline amongst others. The 3B2 publishing system is widely regarded to be the best all round high end publishing system available on the market today and 3B2 coupled with the Production Manager technology, combine to create a powerful publishing capability that is unsurpassed in other systems of this nature.

2.2 The Objective

It became apparent to Advent through its own observations and talking to customers, that many requirements of high volume, blackbox focused customers were not being suitably met by the systems available on the market.

The notable shortfalls included:

- No easy scaleability of the configuration.
- No failure detection within the blackbox environment.
- No recovery service.
- No remote access to system controls.

The objective for Advent therefore, was to provide a stable and flexible solution to these problems while expanding the potential power of the solution for future requirements.

> "We noted more and more that the publishing community needed additional functionality to their blackbox solutions, to give some fail-safe functionality, reliability and resilience. Essential components of any application that a business depends upon for its success."
>
> *Jurgen Haas*
> *Technical Director Advent 3B2*

2.3 The Importance

The importance of having these abilities in a blackbox environment is clear, but their benefit is highlighted further when you consider the following example scenarios:

- Take a fixed setup of 3 machines running multiple different jobs, but in comes a large volume job you need to publish by the next day, so you have to configure the setup/templates on each machine for this job and run overnight. During the night 2 of the machines have errors that cause the jobs to be aborted. Without constant monitoring the problems would not have been detected putting the deadline out of reach!
- Three offices in different locations, each having a number composition machines running different jobs. But you now want to have all of these hardware resources available and control them from a central remote location.
- An office wants to use all the hardware available in the team, but all the machines are of differing specification varying greatly in power so you are not sure how to load each machine.

☞ There are multiple publication lines all running concurrently, but you would like to have different priority Job queues and be able to distribute the various jobs within these queues according to current conditions.

☞ "Just speed is not good enough when looking after publishing customers. Software applications in this industry need to be flexible, responsive and add value to production cycles"

Michael O'Neill
Director of Sales and Marketing, Advent 3B2

3 Providing the solution

3.1 3B2-Production Manager

3B2 Production Manager or 3B2-PM is a scaleable composition service that was developed to run with 3B2 on Windows 2000/XP and provide the following functionality:

☞ Fully automatic 3B2 composition on a Windows 2000/XP platform running as a service.

☞ Fully functional heartbeat detection mechanisms to give fast failure detection.

☞ Provide above functionality whilst maintaining reliability, robustness and generic operation.

The system has two main components:

☞ 3B2-PM – The central 3B2-PM installation which includes the Scheduler, Listeners, Loggers and Monitor system components.

☞ ACA – DCOM agent wrapping an OCX version of 3B2 which is initiated by the Scheduler

3.2 The Operation

3B2-PM provides a fail-safe automatic composition and publishing environment while dramatically increasing production speed.

It is designed to automatically dispatch composition jobs to remote agents for processing. An agent is a local or remote instance of the OCX version of 3B2 wrapped inside an application that communicates with the 3B2-PM Scheduler.

3.3 3B2-PM Technology

To understand the workings of the 3B2-PM system, it helps if you think of it in terms of its basic components.

3.3.1 The Job Queue

Composition jobs are added to the queue by the system's Listeners. As Agents become available jobs are taken off the queue for processing by 3B2.

3.3.2 The Listeners

The inputs are known as Listeners, they listen for the arrival of new composition jobs. How they listen for a job depends on which type of Listener they are, you could have several to choose from. The role of the Listener is to receive and package this data and then to queue it for processing.

3.3.2.1 File Listener

Essentially directory scanning for input data.

3.3.2.2 Socket Listener

Opens a data connection to the listener and talks directly to it. This can be through any socket type you wish, like over the internet for example.

3.3.3 The Scheduler

The primary responsibility of the Scheduler is to make decisions about when to remove jobs from the job queue and which Agents to give them to.

3.3.4 Priority Agents

Listeners queue composition jobs at different priority levels (controlled by their configuration) and Agents accept jobs of different priority levels. These priority settings allow certain composition jobs to be passed to certain Agents, while other jobs either have to wait their turn because they are not as important, or have to wait for an appropriate Agent to become available.

3.3.5 The Agents

3B2–PM Agents are instances of a special application which tightly wraps the OCX form of 3B2. They can run on many different computers on a network and thereby distribute the load of processing 3B2 composition jobs.

3.3.6 The Composition Jobs

3B2 composition jobs are collections of macros (3B2 instructions) which are sent to 3B2 by the Agent application according to the content of the job.

3.3.7 The Loggers

These are not essential to 3B2–PM system, but can be used to keep a record of the activity of the system in various forms ready for a later date to assist with troubleshooting or optimisation.

3.3.8 The Monitor

This application can be used to monitor the status of the various parts of the system from the Scheduler computer or another terminal connected to it by network or the internet.

3.3.9 Failure Detection

The failure detection is provided by constant communication between the 3B2–PM components to ensure each part is still running effectively.

3.3.9.1 Heartbeat & Recovery

3B2 OCX pings (a single heartbeat) the agent wrapping it on certain events from within the specific template during composition, which communicates to the agent if 3B2 is running well or not. In turn the Scheduler pings the agent to check the status of the 3B2 it is wrapping. The Various message types below can be acted upon:

Message type	Resulting action options
Good	All is OK job is running or has run successfully
Fail	In a typical situation this would mean the job has finished, but it failed e.g. the document is 5 pages long and the target was 10 so something failed or had problems. This job(s) can therefore be re-run in the system.
Dead	The default action for 'dead' agents is to terminate the process. The error message type comes in one of two flavours: 3B2 related errors – in this case the agent 'can' be reused/recovered if required. Or Hardware/network or another reason for total loss of communication.

3.4 Flexible Configurations

The 3B2–PM can be installed standalone on a single computer or networked on several computers. Generally machines that run 3B2–PM Schedulers and/or 3B2–PM Agents are exclusively for use by 3B2–PM and as such these computers are referred to as the 3B2–PM network.

3.4.1   Typical Setup

The following diagram represents just one of the many configuration options that can be provided with the 3B2-PM system. In this instance we have a central 3B2-PM server and three ACA machines. We also see here the use of a web socket to view the system logs, it could also be adapted to add input data to the queues and/or retrieve the output files if required.
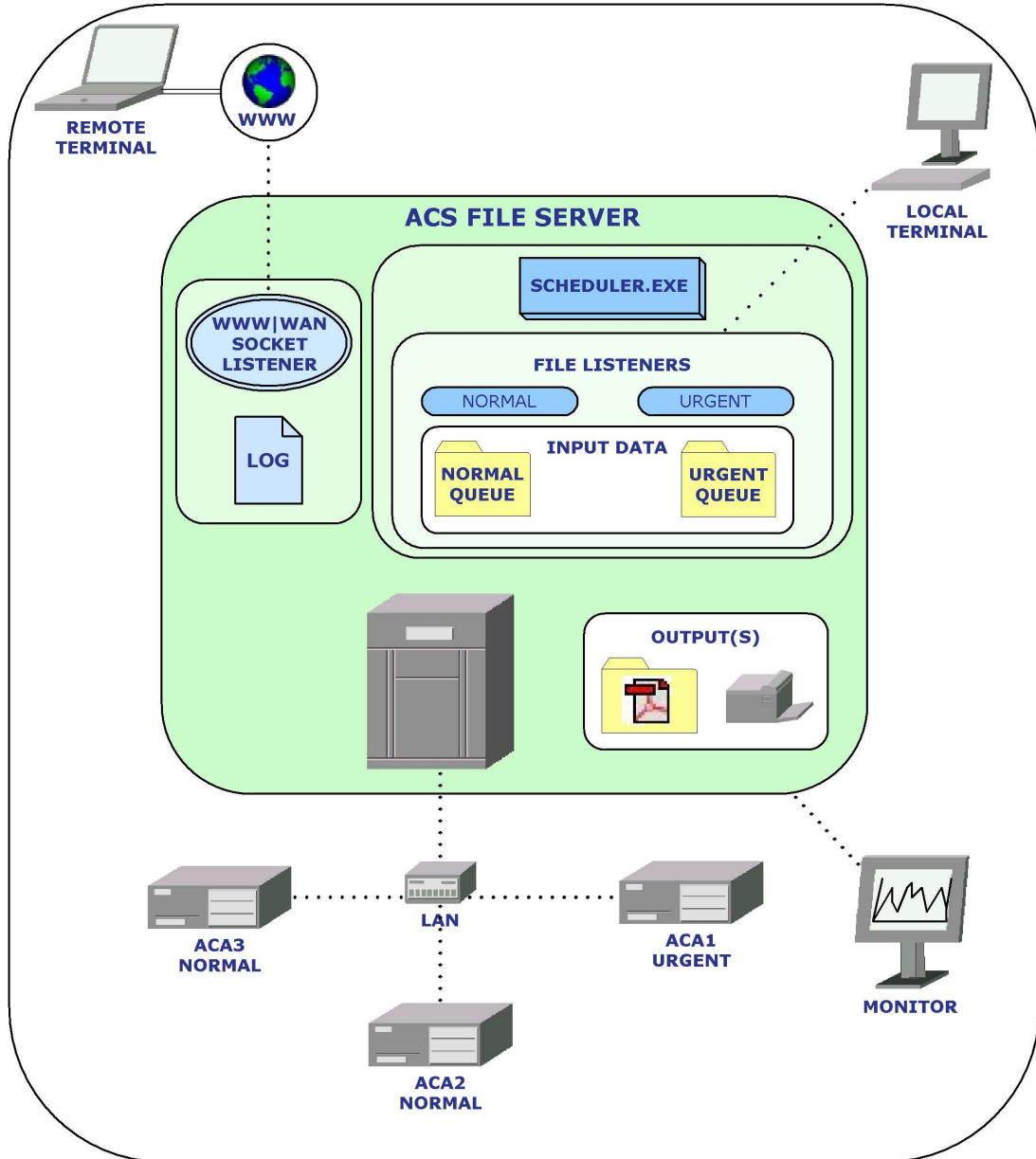
3.4.2   Your Configuration

Establishing the best configuration for you is important and Advent will be happy to work with you in establishing the best system setup to suit your needs.

3.4.2.1   Config and Setup Time

Typically the installation and software configuration time required for 3B2-PM is minimal. With ALL customer site installations so far the core 3B2-PM system has been operational within one day.

4 The Business Case

4.1 Users

If you seek any degree of automation for your publishing solution(s), from book or journal production to multi million page technical documents for complicated products, then 3B2–PM can help you. The unique scaleable quality that 3B2–PM provides gives you the capability to expand and contract its environment as your needs require.

4.2 Top of the Advent Solution Tree

Traditionally with a interactive version of 3B2 you would compose, edit and output individual publications to your desired format as a manual operation.

Using a 3B2 batch server allows you to upgrade to blackbox solution by providing a fully automated environment. The data input, composition and output from 3B2 can be all be processed without user intervention.

3B2 Production Manager builds a another level on top of this. It works in conjunction with 3B2 server (OCX) ACA installations, monitoring the all of the agents (or the whole 3B2–PM 'rig') for failed or crashed agents while also monitoring efficiency of task distribution, keeping the whole process working as efficiently as the 3B2–PM rig will permit.

4.3 Competitive Edge

At the base line, 3B2–PM will give you some major advantages over stand–alone systems:

☞ Increase production speed.
☞ Increase production efficiency.
☞ Provide a fail–safe production environment.
☞ Provide a flexible/scaleable production environment.
☞ Decrease manual intervention.

Being scaleable, 3B2–PM has the ability to massively reduce composition time by making the most efficient use of the 3B2–PM server and its agents and can even process multiple task queues all with different priorities of production.

Manual intervention in a publishing workflow impacts on many areas. 3B2–PM gives you a fail–safe environment by monitoring, killing and in some cases restarting the agents under its control, thereby dramatically reducing or eliminating manual intervention.

☞ An automated, resilient, fast and scalable system. This is the type of technology that can transform a publishers business model.

George Punton
CEO Advent 3B2

4.4 Return on Investment

The decision to move forward with a new or improved solution is often bound by budgetary requirements, the expected costs and benefits of the solution. The Return on Investment (ROI) is often necessary to demonstrate the justification for the system purchase. Prior to sale and implementation Advent will work with you to identify the key issues impacting the production environment and tailor the solution accordingly.

The actual ROI achieved varies on the environment and other key factors such as integration and utilisation rates. The opportunity for complete automation, faster production cycles and higher quality can easily justify investment.

4.5 Conclusion

In conclusion an automated scaleable and fail–safe production environment can ultimately produce significant ROI for you. The 3B2–PM solution developed by Advent Publishing Systems, has been tried and tested and been proven to give its customers huge improvements in its target areas.

The advantages emphasised throughout this section and in the case studies in the following section, highlight the bottom line when we talk about the 3B2-PM environment,'it saves time and money'.

Ask any business manager what he needs to do, and one or all of : reduce costs, improve time to market, increase quality or increase a competitive edge, will be on the list.

5 3B2-PM in Action

5.1 The Open University UK

Open University installs Advent 3B2 Production Manager solution

Organisation Open University (OU)

Location - UK

Industry Sector education

5.1.1 The problem

Printed learning materials still represent a considerable proportion of the Open Universitys educational output. However it was becoming clearer to them that the production process didnt provide the flexibility that was required in a multiple-media environment and provide the fast response times necessary to serve students needs.

The current project aims to provide :

- ☞ An automatic pagination system with 3B2 at its core
- ☞ Increased flexibility in print production for specific courses
- ☞ Instant previews for authors and editors as they create materials

5.1.2 Implementation

The Open University in Milton Keynes has an ongoing programme, named CURVE (CoUrse Reuse & Versioning), to develop and support the re-use of course materials for a variety of purposes. The aim of the programme is to give the university a more flexible and responsive media output solution.

As part of the development of the CURVE programme the OU has installed an Advent 3B2 Production Manager solution to increase the flexibility and significantly reduce the cost of the large volume of complex academic bookwork it produces every year. For editors and authors the intention is to make the pagination process largely invisible to them and allow them to concentrate purely on authoring and output.

Having used Advent 3B2 in a stand-alone conventional composing operation since 1996, the Open University is now looking to introduce a completely different approach to workflow and pagination. Existing design and composing staff are being retrained to develop the necessary page styles and templates required to allow automatic pagination to take place.

Currently they produce one third of their 120,000 pages per year on their manual 3B2 system, but now they are looking to automate much more, in excess of 70 per cent, of their pagination production using the 3B2 Production Manager.

It also allows them to increase the amount of material they produce to a higher, more consistent level of typographic quality. They will be able to publish more innovative student focused material. The OU is already experienced in cross-media production and now they will be able to produce a wider variety of publications, including niche courses, using 3B2 Production Manager. Print on Demand where students will be able to specify the contents they require in a book for their course and receive that customised publication either over the net or as a printed book is another aim. All this is now possible with the automated pagination capabilities of the 3B2 Production Manager.

In the new workflow system at The Open University, designers and production staff will produce the templates for page make-up. Authors prepare text using Word XP with a variety of carefully constructed style sheets in a controlled authoring environment. This is then converted to XML using a specialist application, UpCast, from Infinity Loop, and passed on to the 3B2 Production Manager. Presized illustrations and graphics are automatically downloaded from their graphics server. Pagination takes place automatically and PDF files are produced and automatically passed back to the authors for correction and approval. Authors undertake their own corrections and the repaginate using the system. Testing is currently taking place with work being authored in XML.

At the same time, the OU is currently undertaking a project to benchmark the pagination complexity of different types of academic material to be able to assess the efficacy of automatic pagination against various classes of work without the reader being aware of any change in the OUs high standards of materials. In many cases it is expected that new designs appropriate for the process will be required.

The introduction of the 3B2 Production Manager allows the OU to provide more high quality visually exciting print materials in a shorter time. The materials from their academics can now be imported into an integrated workflow, which allows it to be immediately tagged for multiple paths and usage. In the end it means that the OU can respond to the faculties demands for flexible course materials much faster and effectively than they could previously.

www.open.ac.uk

6 Appendix

6.1 More Information

If you are interested in 3B2-PM, 3B2 or any other solutions and services Advent can provide you with, please contact our sales team @

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6.2 Feature Packed

6.2.1 3B2-PM Scheduler

- Runs as a system service.
- Runs multiple agents simultaneously, locally and/or across a LAN.
- Monitors the agents from start-up and periodically pings them to check that
- they are still alive and working ok.
- Monitors running jobs to check that they have not stalled. AcsAgent
- Multiple instances of an agent can be run simultaneously on a machine (max
- Of 2 instances per CPU are recommended).
- Multiple machines running single or multiple instances of AcsAgent can be
- run simultaneously (according to licensing).
- One or more job priorities can be assigned to an agent.
- Can shutdown after each job, can stay running for X jobs and/or after an elapsed time period.
- Can load before a job or can reload immediately after been shutdown.
- Monitors its own connection to the Scheduler and shutdowns if this connection is lost. AcsMonitor
- Can connect to a local running Scheduler or one on a remote machine.
- Displays global settings, listener and agent settings.
- Displays queued jobs.
- Displays information about the current running job on each agent.
- Allows you to revive dead agents.

6.2.2   File Listener

- ☛ Watches a folder for job files and adds the job into the Schedulers queue.
- ☛ Jobs added to the Schedulers queue are assigned a user definable job priority.
- ☛ Multiple instances of the listener can be loaded to watch different folders and/or file extensions. Socket Listener
- ☛ Binds to a user defined socket and listens for data, then adds a job containing this data into the Schedulers queue.
- ☛ Jobs added to the Schedulers queue are assigned a user definable job priority.
- ☛ Communication is via a simple XML tagged structure.
- ☛ Can accept multiple connections with the maximum number of connections user configurable. Defaults to 10. Text Logger
- ☛ Writes messages to a plain text file.
- ☛ The log file rolls over at midnight each day.
- ☛ The log file rolls over once it has reached a user definable size. Default is 2048KB.
- ☛ Can be configured to log any or all levels of messages.
- ☛ Multiple instances of the logger can be loaded to log different message levels to separate log files. HTML Logger
- ☛ Writes messages into a table in a HTML file.
- ☛ Has the similar properties to the HTML Logger.
- ☛ A Cascading Style Sheets file can be applied to the HTML file.
- ☛ Supports UBB code style commands for stylising the logs. XML Logger
- ☛ Creates XML log files.
- ☛ Has the similar properties to the HTML Logger and can have a XSLT style sheet applied. 3B2 Perl module – Acs.pm
- ☛ Provides functions to : Initialise the 3B2-PM environment, Send messages to
- ☛ 3B2-PM, Ping 3B2-PM, Set the job completion status and various other settings.

7   Glossary

Term	Description
ACA	Advent Composition Agent
3B2	The brand name of the advanced publishing system, developed and sold by Advent Publishing Systems Ltd. (www.Advent3B2.com)
OCX	An OCX is an Object Linking and Embedding (OLE) custom control, a special-purpose program that can be created for use by applications running on Microsoft's Windows systems
DCOM	Distributed Component Object Model. This allows 3B2 to run across multiple PCs, sharing the workload of a printing task
BlackBox	An automated publishing environment, diviod of interface driven from external commands.
3B2-PM	The former name of 3B2-PM was ACS or Managed Server