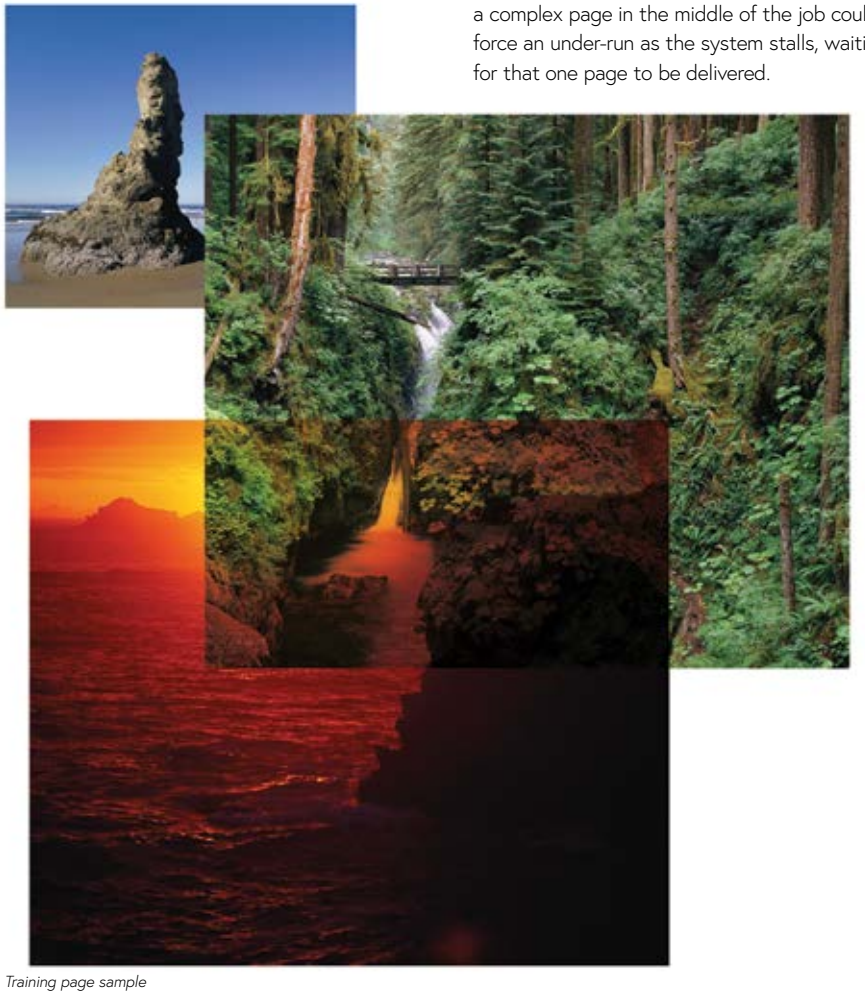
DRIVING HIGHER RATES FOR IMMEDIATE PRODUCTION OF RIPS

A new development in RIPs that makes it possible to stream data directly to the press has the potential to solve some long-standing challenges in production printing, believes Stevenson from Global Graphics

The print market is increasingly becoming digital. Digital printing devices are becoming faster and wider, with higher resolution and extended gamut colour being commonplace. Digital printing devices are moving towards fully variable data for mass-produced, personalised output, meaning that every item or page could be different.

Vast amounts of raster data is needed to drive this new class of device, which is delivered to the electronics that drive the inkjet printhead or other transfer technology. Traditional print software designed for non-digital workflows attempts to handle this requirement by ripping ahead and storing the raster data to physical disks. Even with today's fast solid state drives (SSDs), there comes a point at which disks are too small and too slow for the huge data rates required, not to say expensive.



Training page sample

THE DRAWBACK

The risk is that the system must be able to generate rendered output quickly enough to keep up with the raster imaging process (RIP). If the RIP is unable to render in time, the press will under-run and have to slow down – wasting time and money – or worse, stop production altogether, leading to potential wastage of material.

FACTORS DETERMINING DATA RATE

The data rate measurement for direct streaming workflows is more complex than for the pre-ripped model.

Streaming data on the fly to the printer needs a data-rate measurement be made at the page level rather than as an average across the PDF job. Applying processing power can help, such as ripping pages in parallel with multiple cores and multi-threading, but pages must still be delivered in order and on time. Nevertheless, a complex page in the middle of the job could force an under-run as the system stalls, waiting for that one page to be delivered.

CONVERSION SPEED

To avoid the risk of a job under-running, estimating the speed at which pages can be converted – as accurately as possible – by the RIP software into a raster could help. In addition, processing a job that is potentially too slow, could be re-estimated by finding a way to improve RIP throughout.

"Vast amounts of raster data is needed to drive this new class of device"

Print operators, armed with this knowledge can then make decisions such as running the press at a reduced speed or sending the job to be pre-ripped off-line and printed later.

These two approaches: estimating and optimising, are the concerns of Global Graphics' Streamline Direct.

ESTIMATION OF RUN RATE

Conventional wisdom suggests that knowing how long a PDF page will take means it first being ripped. Clearly that is not going to work in this scenario. To make the job fast and simple there is a need to accurately model the behaviour of the RIP.

The Streamline process attempts to address the problem using a system that:

- Analyses what the RIP must do to render the content of a particular page
- Passes the analysis results through a model trained by profiling the performance of a given software, configuration and hardware combination
- Produces a report based on that information

DATA GENERATION

Global Graphics gathers data by creating many PDFs with specific object types, such as an image or a vector path, arranged in a way that triggers the measurement of RIP operations. To ensure accuracy, the same RIP configuration and hardware platform are used as the production RIP.

Once the data is collected, 'weights' are inferred for the operations that comprise the features of the model. Weights create a time cost, deduced by the training process that calculates weight values by an iterative process seeking to minimise errors in predicted interpretation and rendering times. Analysis of the PDF – which features to use

and their calculations – is the expert knowledge embedded.

Weights, then, are the machine and RIP software-specific information deduced by training and, in aggregate, constitute a predictive model of RIP performance that can be used anywhere.

ESTIMATION

A metric is a measure of the use of a feature present on the page. Estimation is the process of taking an unknown PDF, analysing it for its metrics, and weighting those with the weights of the predictive model, to arrive at a time per page as well as the whole document.

Metrics are not just simple counts – getting them correct is a complex process. However, they can be carried out quickly to yield a result in as little as a few seconds.

The result may be that the job needs to be optimised.

OPTIMISATION

For the direct-to-rip scenario, optimisation is concerned with improving RIP throughput by reducing the complexity of operations needed to render the page. An obvious example is to reduce image data by down sampling images, based on the output device resolution. Another is to pre-convert colour to the output colour space, based on an ICC profile. Such operations make the PDF 'device specific' at the point of production as an acceptable trade-off.

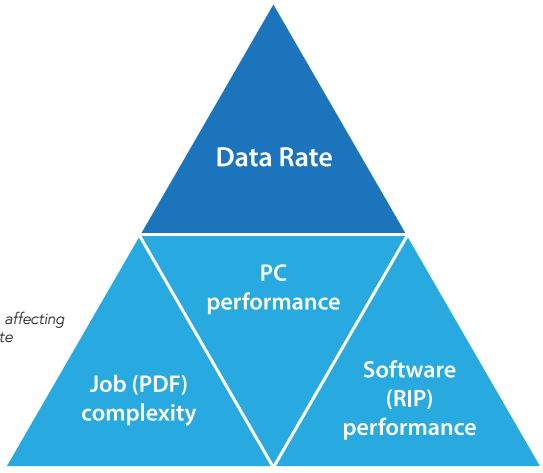
Another option is to flatten transparency – a process whereby any transparency in the job is rendered into a flat image, or a combination of images and vectors, that represents the correct appearance. Typically, only those parts of the page that require flattening are processed. It is computationally expensive, but the process itself can be optimised with multi-threading and caching techniques.

This type of optimisation – a feature of Streamline Direct – can have a dramatic effect on RIP performance. The complicated calculations needed to blend colours that transparency demands are eliminated from the work of the RIP. This in turn enables the printer to run at full speed.

SUMMARY

In order to avoid costly mistakes, understanding a print job's performance profile becomes more important as developments increase in the print industry. This application of machine learning is an exciting development and has the potential to solve some long standing challenges in production printing. ■

David Stevenson is a Product Manager at Global Graphics Software Ltd



Factors affecting data rate

Further information:
Global Graphics Software Ltd, Cambridge, UK
tel: +44 7768 801366
email: david.stevenson@globalgraphics.com
web: www.globalgraphics.com