Intercepting Windows Printing by Modifying GDI Subsystem

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What for?

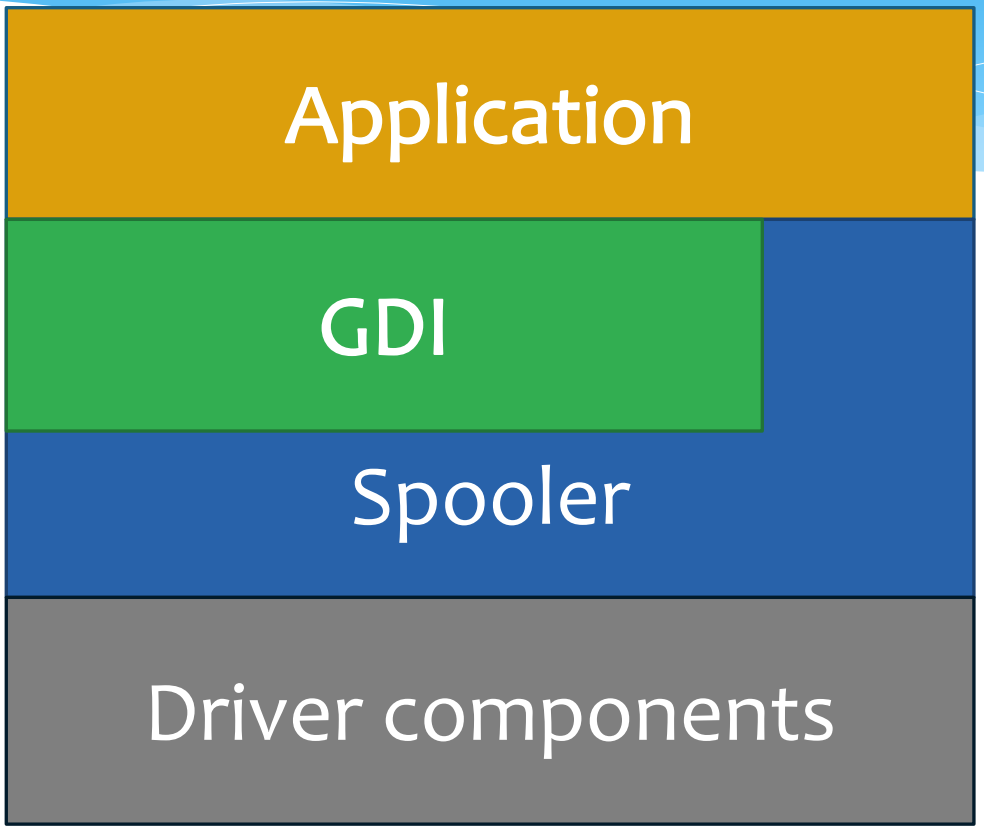
* Basically it's a data source for
  * Monitoring systems
  * DLP solutions

What do we have?

* FindNextPrinterChangeNotification():
  * Printer name
  * Timestamp
  * Job status
  * Pages count

  Print providOr is the source of this info, so I wouldn't rely on it too much.

API levels



Driver components

* Print providers send jobs to a local or a remote machine
* A print processor converts the spooled data into a format suitable for a print monitor
* The print monitor passes the data to a port monitor
* A port monitor is an interface between the usermode and the kernelmode parts of the printing system
* What a mess!

Spooler API

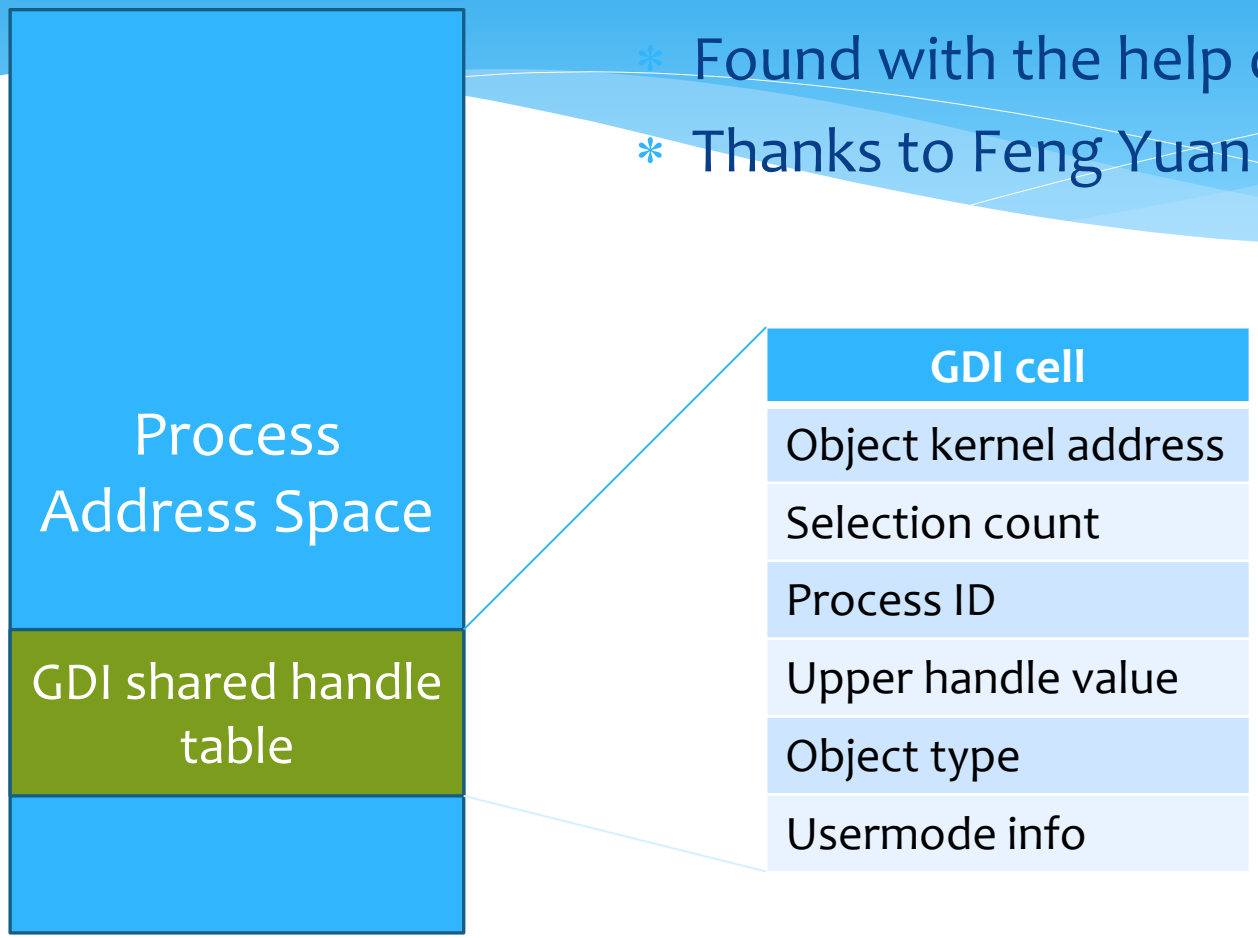
* A set of Spooler service functions, which serve as wrappers for driver components
* At this level, we can only get the spooled data
  * This is a level of raw printing
  * Try to parse this data

GDI API

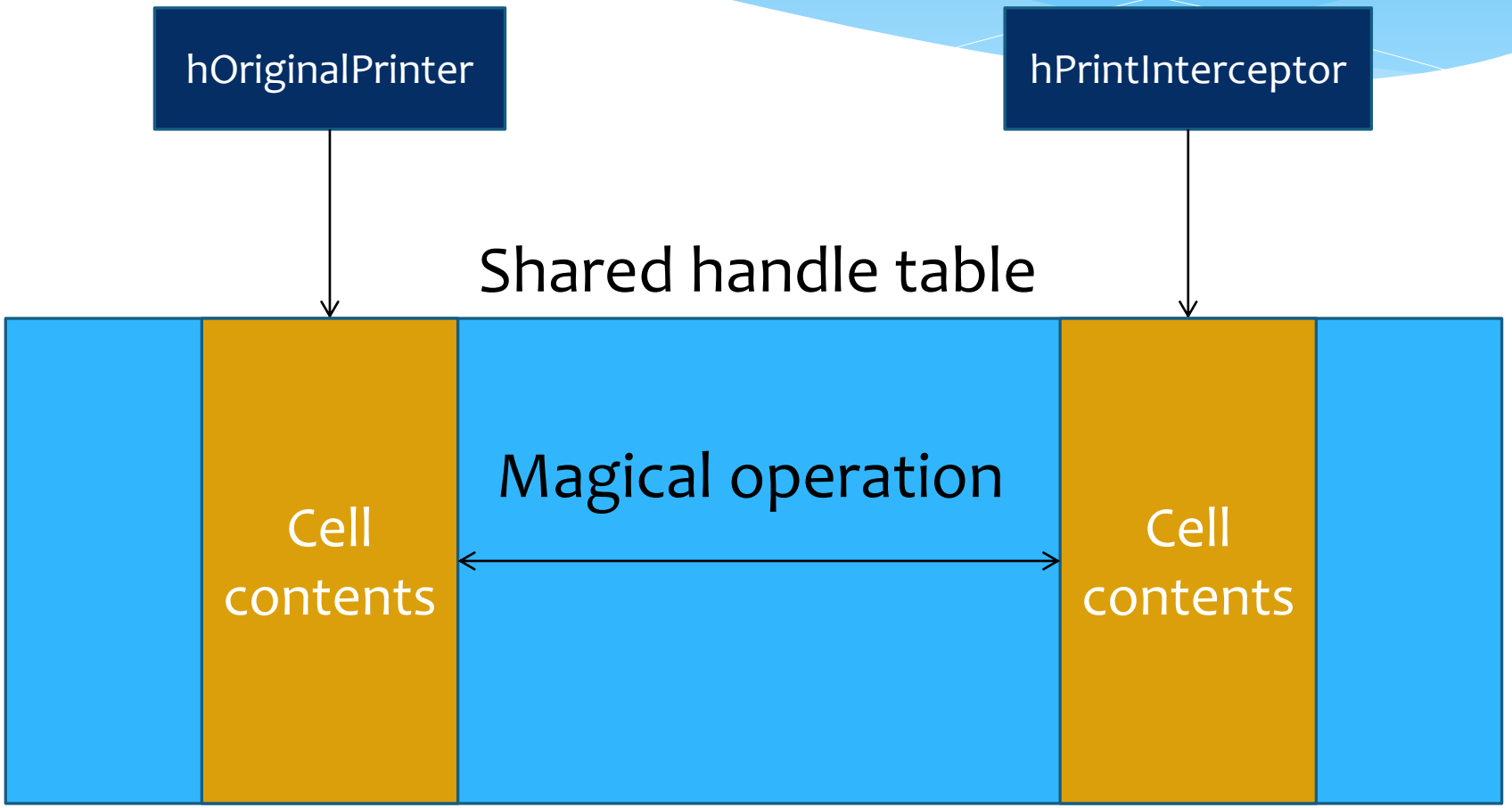
* The same set of functions used for Windows graphics
* A printer is a device context suitable for GDI drawing functions
  * hPrinter = CreateDC('SuperLaserJet', params);
  * StartDoc(hPrinter);
  * TextOut(hPrinter, 'Text');
  * …
* Graphical data is Windows graphical data – NT EMF format

Inside GDI

* Found with the help of PEB
* Thanks to Feng Yuan



The trick


hOriginalPrinter
hPrintInterceptor
Shared handle table
Cell contents
Magical operation
Cell contents

Profit

* Swap GDI cells to send documents to a fake printer
* It is not always necessary to create your own virtual printer, you can use something like Microsoft XPS Writer
* The intercepted image can be easily forwarded to the original printer

The concept

Application wants to print things

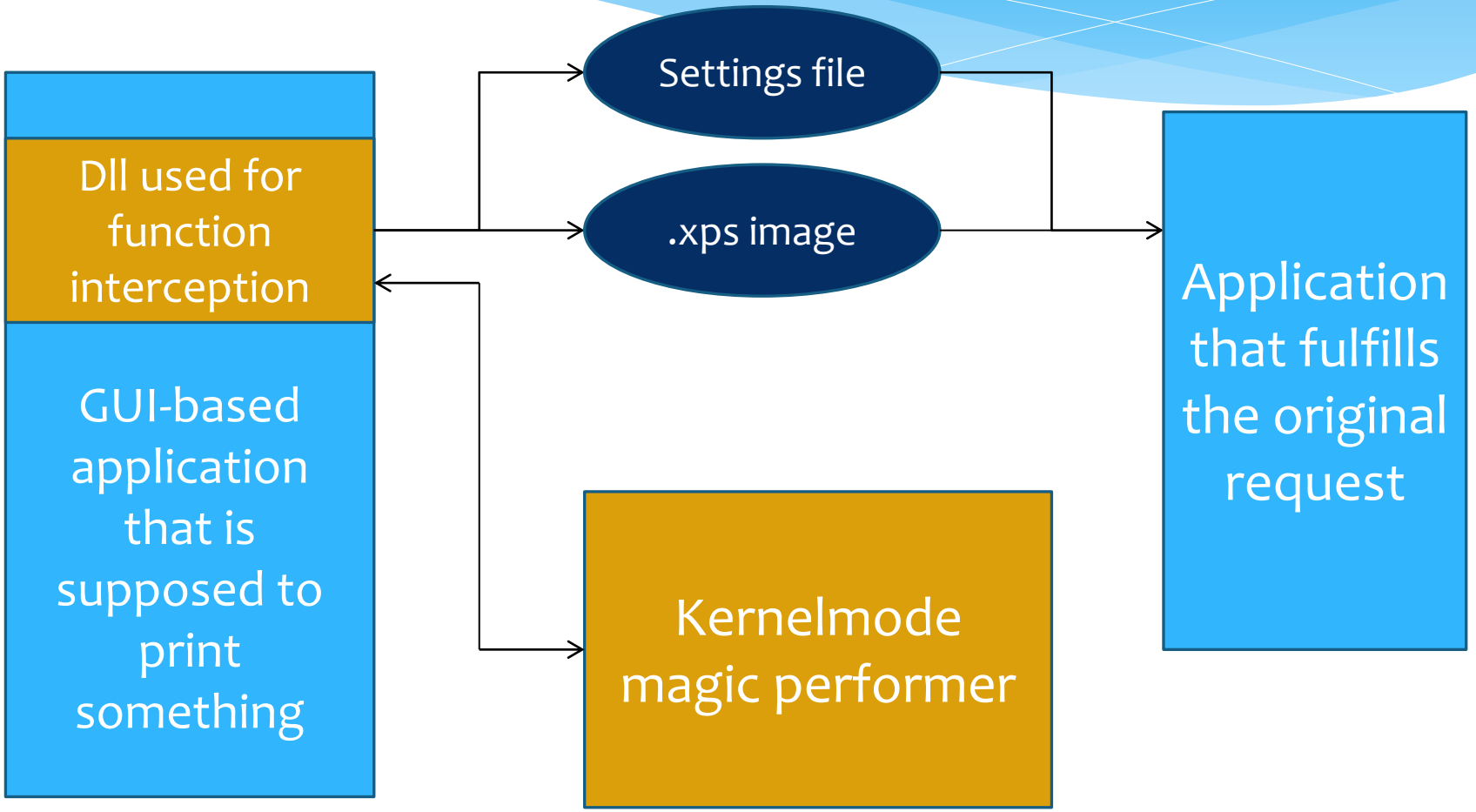
I'll save the original parameters of this printing request

Hey, you've decided to print! I'll swap the GDI cells so that you use the old handle for a new device

Okay, done here, I'll print your document on the real printer

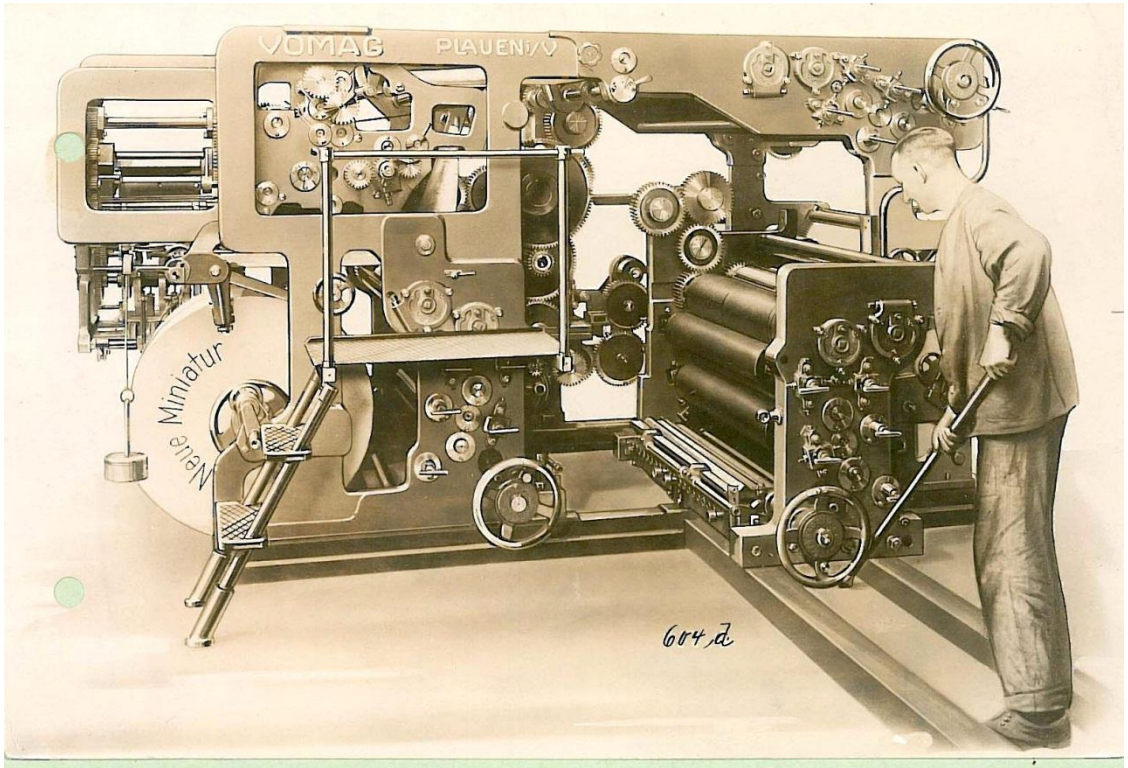
Let's clean everything up and make things look like they did before

Sample implementation



Thank you!

* Any questions?



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