



AuthPaper

<http://www.authpaper.net>

Protecting Paper-based Documents / Credentials Using Authenticated 2D Barcodes

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Problem: Document Forgery

Easy to forge a document...

"High-Quality Forged CET transcript sold for a Few Hundreds RMB only", Xinhua News (July 2008)

- Authorized Seals and Special-Quality paper may only provide a false sense of security
- Signature / Hologram can also be forged
- Document notarization / Letter of certification
 - Time Consuming (for the Good Guys)
 - Not Replicable
 - Need Extra Copies => Extra Trips to Notary Public
 - Can still be forged

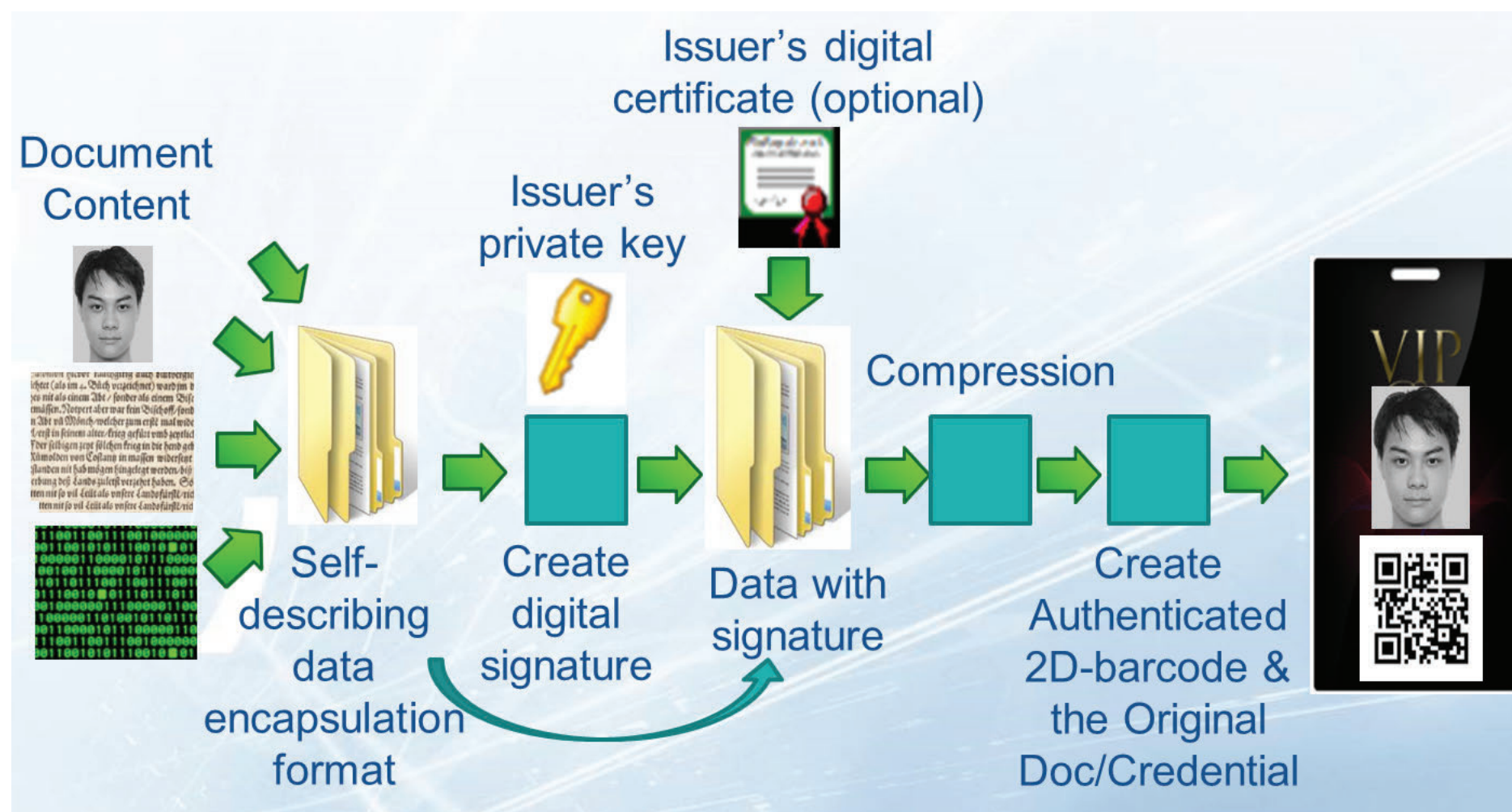


Our Solution

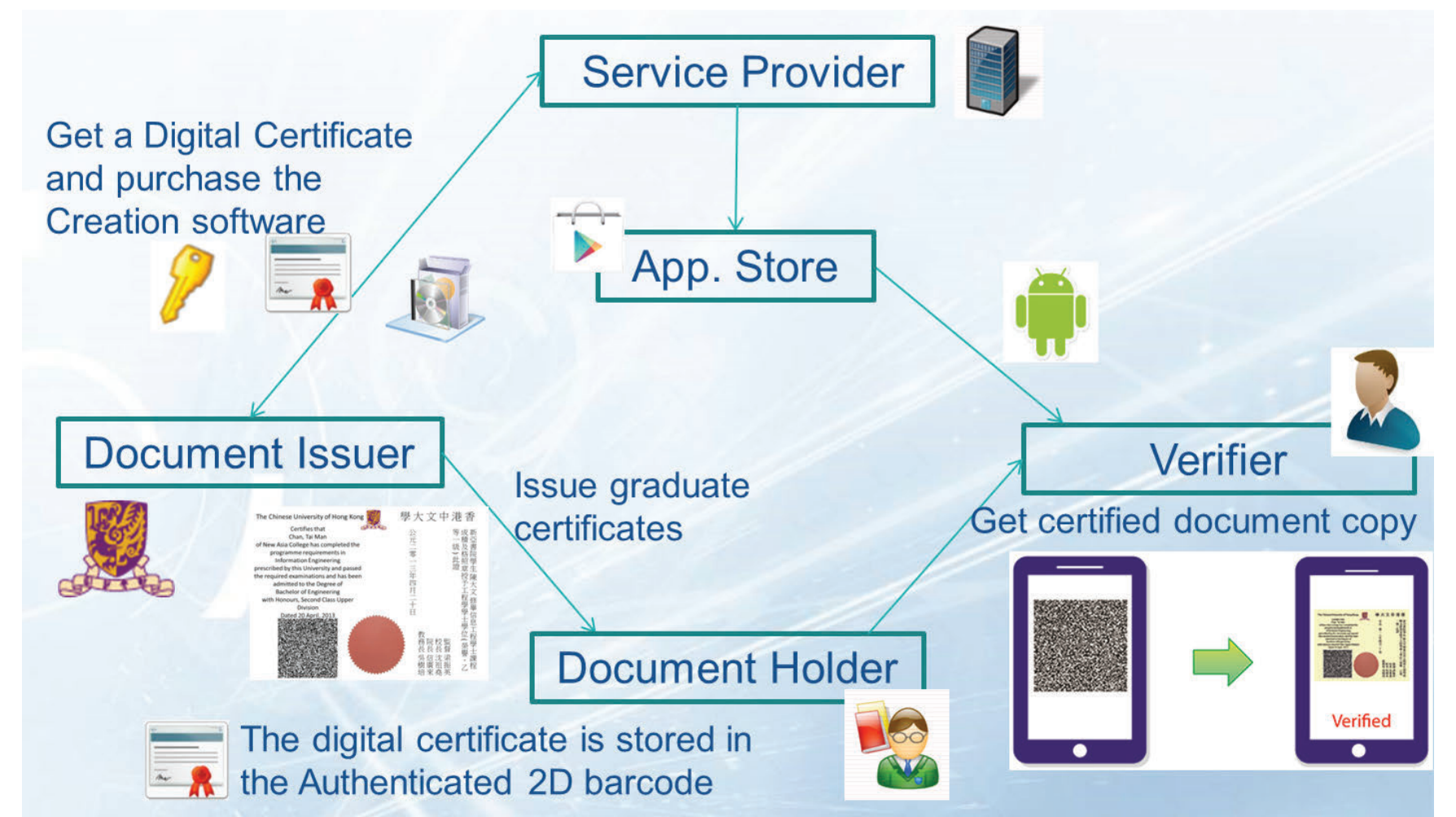


- Embed a digitally-signed copy of the document as part of the "Original" using a High-capacity 2D barcode
- Support Large amount of Heterogeneous Data types, e.g. Text, Image, other Binary data + Digital Signature
- Sensitive Fields/ Content can be Selectively Encrypted and readable only after Authorization, e.g. PIN-protected

Document Creation



Service Model



Leverage Standard Technologies

2D barcode (QR code)	QR Code 2005 Barcode Symbology Specification (ISO/IEC 18004 2nd version)
Digital signature (ECDSA)	Digital Signature Standard (DSS) (FIPS PUB 186-3) and Recommendation for Key Management (SP800-57) from National Institute of Standard and Technology (NIST) in US
Self-describing data encapsulation format (JSON / BSON)	Multipurpose Internet Mail Extensions (MIME) and RFC5751 Secure/Multipurpose Internet Mail Extensions (S/MIME)
Data compression (Deflate)	RFC1951 DEFLATE Compressed Data Format Specification

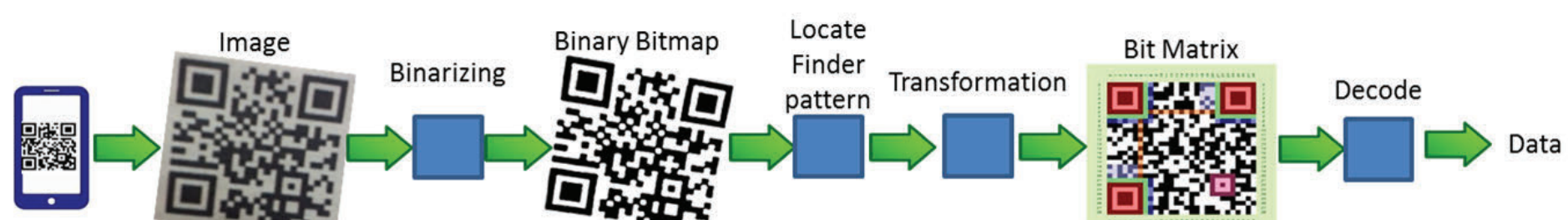
Broad Range of Applications

Low-cost, replicable certified Documents/Credentials: Transcripts, Medical Certs, Tax/Sales receipts, Financial Statements...



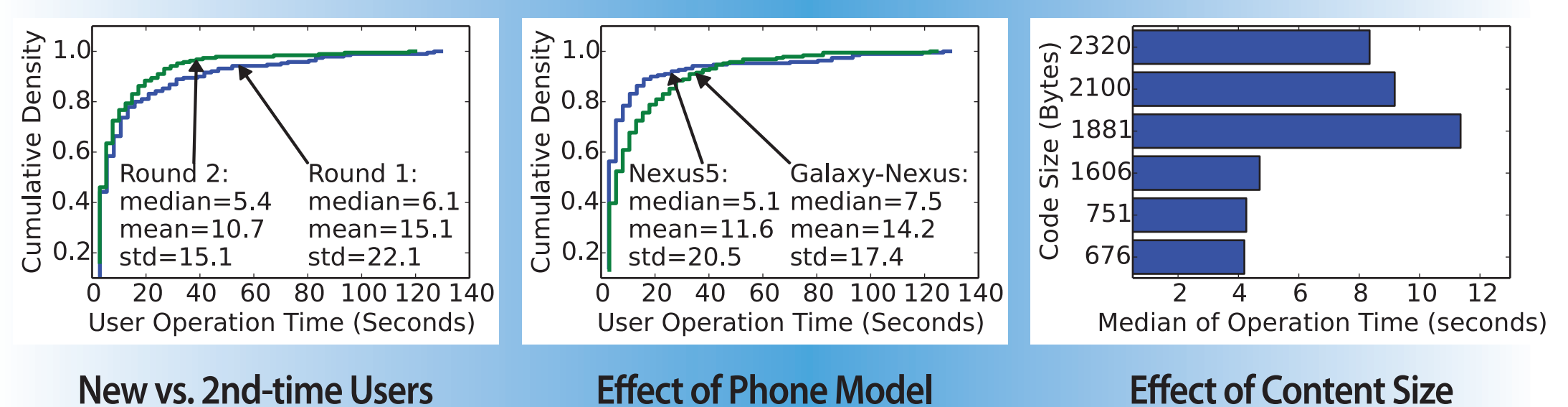
Technical Contributions

We have designed and developed LIGHT-WEIGHT scanning and decoding algorithms for the ROBUST processing of such self-authenticated, densely-packed QR codes



Scanner	RAM Requirement (MByte)	Proc. Latency (msec)	Can it reliably decode Dense 4KB QR codes ?
ZXing	9.3	~ 200	NO
Ours	25.3	300 ~ 400	YES

Usability Study Results



New vs. 2nd-time Users

Effect of Phone Model

Effect of Content Size