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PREFACE: A COMPUTATIONAL SCIENTIST'S PERSPECTIVE ON APPELLATE TECHNOLOGY

Olaf O. Storaasli*

I. BACKGROUND

Computer power has grown one trillion times since my early NASA days in the 1970s. Our first CDC 6400 supercomputer then boasted 200 kFLOPS,¹ while Oak Ridge National Laboratory's new Titan supercomputer promises a 10^{12} speedup. This exponential rate of advance in computing power² spins off to benefit all society, including, potentially, the appellate courts.

We often look back at advances made in the past and project forward from them, presuming that new advances will occur at the same rate. But our belief that computers advance at this linear rate is wrong; in fact, they are advancing exponentially.³ As we ride this exponential curve, we cannot perceive that our exponential rate of technological advance in the next five years will by far outstrip that of our past five years—even in our appellate courts, which may not grasp just how fast computer technology is advancing. This rapid advance is likely to continue prompting appellate courts to adopt new

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1. A kFLOPS is 1000 Floating-point Operations Per Second.

2. Advances of this type are said to follow Moore's Law: The number of transistors in integrated circuits doubles every two years.

3. Indeed, there are those who predict that technology will someday become sufficiently sophisticated to merge with human intelligence. See e.g. Ray Kurzweil, *The Singularity Is Near: When Humans Transcend Biology* (Viking 2005). But that discussion is beyond the scope of this Preface.

technologies to meet the public's growing expectations for increased efficiency and accessibility.

Why this rush to advance technology, with no end in sight? Human beings strive for power and control (by brawn or brain), whether over the elements, animals, or enemies. Computer technology seems to satisfy this need by offering us omnipotence via its omnipresence (bringing every corner of the world to us via Internet, webcams, tweets, and instant messages) and omniscience (enabling us to know all via Google, Siri or Wikipedia). The truth and quality of information returned varies, so ratings may soon steer us to the best information, allowing us to increase our power over, and control of, our personal and professional surroundings. Ventures tapping our thirst for such knowledge and power may succeed in ways that we can't yet imagine. Many such advances—the telepresence of evidence, for example—may become essential in future courts, updating the appellate process far beyond what we envision today. The four papers collected here describe how such digital advances have already reduced court time and costs in some appellate courts, and also project the future.

II. SYNOPSIS OF THE SPECIAL-SECTION PAPERS

I was indeed impressed and agree with nearly all concepts discussed in all papers. They complement each other, as three focus on different aspects of computer technology in the appellate courts—digital briefs, practice efficiencies, the paperless court in action—and the fourth provides an overview of appellate-court technology.

A. Digital Briefs

After reviewing some recent work in cognitive science, Professor Beazley compares reading and writing paper documents to working with digital records, warning that ready access, instant searches, and portability of digital records may distract, cause one to lose a feel of location in text, and tempt one to skim rather than read. Acknowledging, however, that

“digital documents are not going away,”⁴ she suggests that judges and lawyers reading and writing documents used in digitally connected courts:

- Use big screens to display complex information, mark text up digitally, and print complex text out before reading it;
- Display a table of contents at the left of each screen to help locate each page viewed in the full document;
- Read actively: use highlighting and electronic notes to mark critical passages, don't skim, and use (as a writer) or find (as a reader) the phrase that provides a pithy summary of each section;
- Avoid distractions while reading: phone off, email alarm silenced, set aside time just for reading; and
- Avoid creating distractions when writing: Be succinct, use references, and add hotlinks.

B. Practice Efficiencies

Mr. Delehanty, Mr. Llanes, Mr. Rath, and Ms. Sheff, a team of practicing lawyers and court-technology experts, describe the ways in which technology is being used to reduce the time and expense associated with appeals, and how it might play an increasing role in this effort if approved by appellate courts:

- A pilot technology project saved one appellate court \$2,000,000 after a \$100,000 investment;
- Widely available software for electronic case management, cloud storage for electronic records, and free web-based research portals and law blogs

4. Mary Beth Beazley, *Writing and Reading Appellate Briefs in the Digital Age*, 15 J. App. Prac. & Process 47, 76 (2014).

provide alternatives to both paper-based systems and first-generation proprietary research services;

- Increasingly powerful laptops and tablets combined with web-based video services could reduce the costs of travel associated with oral argument, as could the use of web- or pod-casting technologies; and
- Courts should explore various sources of funding—user fees, data fees, legislative appropriations, time-sharing with other branches of government—that might provide a means of underwriting the expenses that accompany the adoption of new technologies.

C. The Paperless Court in Action

Judge Espinosa describes the “completely paperless appellate case management and decision processing” system used by Arizona’s Second District Court of Appeals,⁵ which includes:

- An electronic dashboard (web-accessible from any PC, laptop, or tablet) that allows judges and court staff to perform all e-filing, case-processing, and approval (via digital signature) functions; access trial transcripts and records; and link to all stages of the court’s handling of cases, including approval and signing of opinions;
- Judges’ routine use of online conferencing, which has increased productivity with fewer in-person conferences; and
- An estimated annual savings of \$20,000.

5. Philip G. Espinosa, *The Paperless Court of Appeals Comes of Age*, 15 J. App. Prac. & Process 99, 99 (including a graphic representation of the electronic “dashboard” available to each judge).

D. Appellate Court Technology Overview

Mr. Magnuson (formerly Chief Justice of the Minnesota Supreme Court, now in practice again as an appellate lawyer) and his colleague, Judge Thumma of Arizona's First District Court of Appeal, discuss these aspects of technology in today's appellate courts:

- Widespread e-filing, electronic case management and processing, and electronic case analysis;
- More efficient, transparent, and less complex appeals-processing systems enable courts to—among other improvements—abandon rooms of boxed records and offer the convenience of links to recorded oral arguments or real-time streaming of oral arguments;
- Technology requires new thinking about the roles and duties of appellate lawyers and appellate judges, including the consideration of questions about whether an appellate judge should search the Web for material outside the record in a particular case;
- The need for more technology seems certain as the paper-based appellate world vanishes: E-filing is now required by some courts, for example, in part because it saves money, and some appellate courts are experimenting with the use of video for oral argument; but
- Appellate courts lag many sectors of society in adoption of technology, and must plan to move ahead with e-filing initiatives, the use of links in briefs and opinions, and adoption of video arguments.

III. EVALUATION OF THE SPECIAL SECTION'S SUGGESTIONS AND CONCLUSIONS

A. The Roadmap

The papers that follow identify key technology advances automating how courts process cases. To aid the reader wishing to implement some or all of the technology described in the papers, I include a roadmap based on the four special-section papers and related computation innovations⁶ that I introduced during my years at NASA and the Department of Energy.

First, success in the implementation of new appellate technology requires all interested parties to agree that digital technology should replace paper use for improved court efficiency.

Second, a successful judicial-support process (like a successful engineering project) requires a detailed development plan, understood and supported by all. The plan should have a clear goal, perhaps as broadly stated as “simplify everyone’s legal workload by providing better service to judges, lawyers, court staff, and the public,” and all must agree on a firm launch date after which e-filing and any other technology-driven changes in historic practice are required.

Third, examples should be provided to everyone who will use the new technology, clearly explaining what to expect, so no mystery remains. Questions and feedback should be encouraged before the launch date in an open setting with a complete understanding and buy-in by all. To whet appetites for progress, updates—think of them, perhaps, as “nuggets” of information—should be released in a timely way to prepare all for the launch. A beta release for early adopters (volunteers chosen from among the judges and lawyers eager to be first) is highly desirable to obtain initial feedback and overcome glitches; these volunteers are invaluable because they will be available to answer other users’ questions during the official launch.

Fourth, build on others’ success. Judge Espinosa’s paper provides an excellent working model to follow. It is user

6. Consider, for example, the finite element machine. See e.g. Olaf Storaasli, Jonathan Ransom & Robert Fulton, *Structural Dynamic Analysis on a Parallel Computer: The Finite Element Machine*, 26:4 *Computers & Structures* 551 (1987).

friendly; paperless, including even digital signatures on judicial opinions; web accessible; hardware and software agnostic, so that it is not tied to any particular device or operating system; able to link widely used existing software (some available in off-the-shelf packages and some that was already in use at his court); and easily extendable for future additions; and it has now been tried and tested for years. Its success may be attributed to two key factors in the form of two individuals whose roles other appellate-court technology innovators are encouraged to emulate:

- Top-down vision and passion by an experienced judge interested in simplifying his own and others' work; and
- A key digital-web-network-hardware-legal-software expert who is familiar with the court's legacy system and can interface existing codes.

Having two such forward-looking innovators with a passionate interest in improving systems is a key to success at any technology-modernizing court, because it pairs top-down commitment and bottom-up support with a thorough understanding of the venture by in-house leaders.

Finally, avoid the temptation to pass the buck to disinterested third parties eager to sell their wares. Instead, maintain an in-depth knowledge of the project by in-house principals like a key judge and a senior IT professional who have sufficient interest and knowledge to remain closely involved in the process. Remember that successful projects usually have key buy-in, commitment, passion, and involvement by those most knowledgeable of current detailed operations plus a keen understanding of what is required in the future implementation.

B. Engineering a Court-Technology Project's Success

One task of NASA Langley's Chief Scientist was to review proposed projects for feasibility and quality, but also to determine the passion of the team involved. Management found

that despite how credible all proposed projects appeared, those that turned out to be most successful had a dedicated team with a passion to succeed despite the odds. I, for example, once felt needled on my proposed project only to be told it was part of the process intended to determine how dedicated I was to success. Others caved to such needling and lost funding, while my project was continued. Every court-technology innovator should keep this example in mind.

Today's young, computer-savvy generation of appellate attorneys may expect and push for technology-based improvements like e-filing and digital case management, and be ready for the accompanying changes in the duties and responsibilities of appellate courts and appellate lawyers. But some appellate courts and judges may be inclined to resist. I suggest in consequence that they could benefit from these four papers.

I commend the authors' positive spirit expressed in their careful, detailed descriptions of all issues related to introducing and then using technology in the appellate courts. I am duly impressed with their remarkable success using paperless caseload systems, already functioning efficiently and saving money. And I hope that these papers motivate other appellate judges to strive for ways to harness computer technology in their own courts.

Equipped with the in-depth knowledge of court-focused technology available in these seminal papers, I trust that future courts will embrace technology to significantly improve their operations. The result should serve the public well, by yielding efficient, transparent, and modern appellate courts that we can all be proud of.

