

DEPARTMENT: CERF'S UP

On Digital Diplomacy

It is apparent that the world needs thoughtful and technically credible debate on alternatives for containing the problem of harmful behavior on the Internet.

Vinton G. Cerf

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DEPARTMENT: BLOG@CACM

Protecting Computers and People From Viruses

Robin K. Hill considers why the comparison of organic viruses and computer viruses is so compelling.

Robin K. Hill

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COLUMN: NEWS

Bouncing Balls and Quantum Computing

A lighthearted method for calculating π is analogous to a fundamental algorithm for quantum computing.

Don Monroe

Pages 10-12

Thwarting Side-Channel Attacks

Deep learning challenges chip security.

Chris Edwards

Pages 13-14

Who Has Access to Your Smartphone

Data?

ISPs, app developers, and even the government may know more about you than you think.

Keith Kirkpatrick

Pages 15-17

Fran Allen: 1932-2020

Frances E. Allen was the first woman recipient of the ACM A.M. Turing Award.

Simson Garfinkel, Eugene H. Spafford

Pages 18-19

COLUMN: TECHNOLOGY

STRATEGY AND MANAGEMENT

Self-Driving Vehicle Technology: Progress and Promises

Seeking the answer to the elusive question, 'Are we there yet'?

Michael A. Cusumano

Pages 20-22

COLUMN: INSIDE RISKS

A Holistic View of Future Risks

Almost everything is somehow interrelated with everything else—and that should not surprise us.

Peter G. Neumann

Pages 23-27

COLUMN: KODE VICIOUS

Sanity vs. Invisible Markings

Tabs vs. spaces

George V. Neville-Neil

Pages 28-29

COLUMN: VIEWPOINT

We Need to Automate the Declaration of *Conflicts of Interest*

Leveraging existing data sources to improve the declaration and management of authorship conflicts of interest.

Richard T. Snodgrass, Marianne Winslett

Pages 30-32

Using Computer
Programs and

Search Problems for Teaching Theory of Computation

Recognizing the significance of a cornerstone of computer science.

John MacCormick

Pages 33-35

SECTION: PRACTICE

The History, Status, and Future of FPGAs

Hitting a nerve with field-programmable gate arrays.

Oskar Mencer, Dennis Allison, Elad Blatt, Mark Cummings, Michael J. Flynn, Jerry Harris, Carl Hewitt, Quinn Jacobson, Maysam Lavasani, Mohsen Moazami, Hal Murray, Masoud Nikravesh, Andreas Nowatzky, Mark Shand, Shahram Shirazi

Pages 36-39

Debugging Incidents
in Google's

Distributed Systems

How experts debug production issues in complex distributed systems.

Charisma Chan, Beth Cooper

Pages 40-46

SECTION: CONTRIBUTED

ARTICLES

What Do Agile, Lean, and ITIL Mean to DevOps?

The value of learning skillsets within a trio of disciplines and the role each plays in DevOps.

Stuart Galup, Ronald Dattero, Jing Quan

Pages 48-53

Real Time Spent on
Real Time

The story of the development of a sound, static method for worst-case execution-time analysis.

Reinhard Wilhelm

Pages 54-60

SECTION: REVIEW ARTICLES

Responsible Vulnerability Disclosure in Cryptocurrencies

Software weaknesses in cryptocurrencies create unique challenges in responsible revelations.

Rainer Böhme, Lisa Eckey, Tyler Moore, Neha Narula, Tim Ruffing, Aviv Zohar

Pages 62-71

A Decade of Social Bot Detection

Bots increasingly tamper with political elections and economic discussions. Tracing trends in detection strategies and key suggestions on how to win the fight.

Stefano Cresci

Pages 72-83

SECTION: RESEARCH

HIGHLIGHTS

Technical Perspective: Analyzing Smart Contracts with MadMax

"MadMax: Analyzing the Out-of-Gas World of Smart Contracts," by Neville Grech *et al.*, effectively discovers a new smart contract vulnerability, and proposes a detection approach based on a static analysis.

Benjamin Livshits

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**MadMax: Analyzing
the Out-of-Gas World**

of Smart Contracts

We identify gas-focused vulnerabilities and present MadMax: a static program analysis technique that automatically detects gas-focused vulnerabilities with very high confidence.

Neville Grech, Michael Kong, Anton Jurisevic, Lexi Brent, Bernhard Scholz, Yannis Smaragdakis

Pages 87-95

**Technical
Perspective: Two for**

the Price of One

"Lower Bounds for External Memory Integer Sorting via Network Coding" proves a remarkable connection between how efficiently computers can perform sorting and transmitting.

Paul Beame

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**Lower Bounds for
External Memory**

Integer Sorting via Network Coding

In this paper, we present a tight conditional lower bound on the complexity of external memory sorting of integers.

Alireza Farhadi, Mohammad Taghi Hajiaghayi, Kasper Green Larsen, Elaine Shi

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COLUMN: LAST BYTE

Privacy-Preserving Polling

Can you answer a poll without revealing your true preferences and have the results of the poll still be accurate?

Dennis Shasha

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