

THE FUTURE OF
VIRTUAL EVENTS

9 TOP DATABASE
TRENDS

REAL-TIME
FINANCIAL SERVICES

THE GREAT REMOTE
WORK EXPERIMENT

REDISCOVER MAGAZINE

Q&As

Tech Legend
**Scott
McNealy**

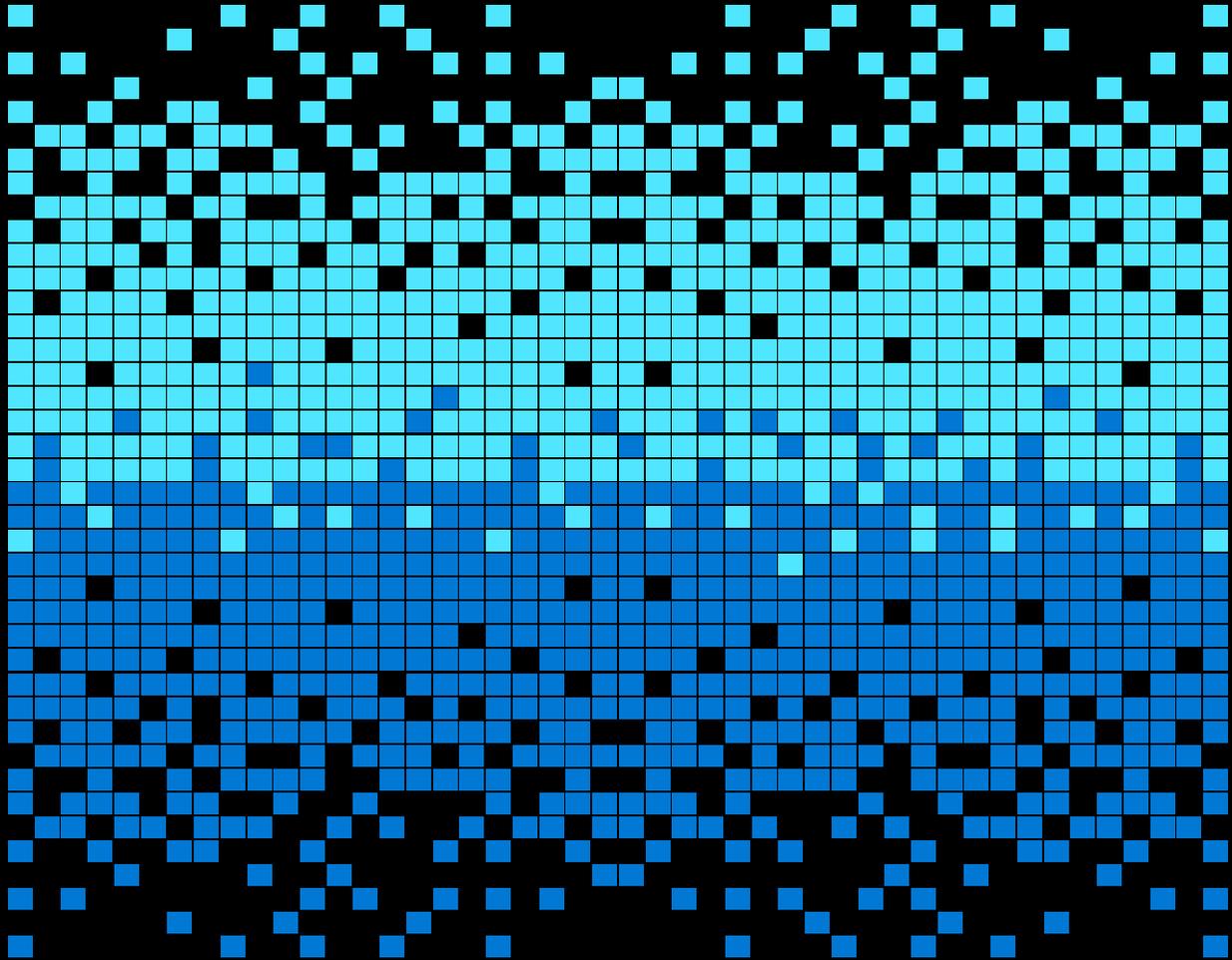
Redis Creator
**Salvatore
Sanfilippo**

FROM WD-40 TO ELON MUSK:
PEOPLE AND PRODUCTS THAT ARE MORE THAN THEY SEEM

THE POWER OF REDISCOVERY

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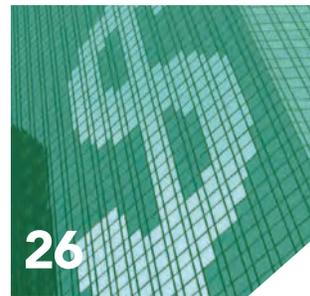
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EDITOR'S NOTE

Rediscovering Redis, Magazines, and More



Welcome to the premiere issue of *Rediscover Magazine*. The team at Redis Labs created this project to highlight the concept of “rediscovery”—the idea that even though you may *think* you know what a person, product, technology, or idea is all about, there may be much more there than you realize.

Not surprisingly, Redis itself was the inspiration for this idea. Developers and DevOps professionals know Redis as a great caching solution—a fast and cost-effective way to optimize data infrastructure. But as software engineers and architects take a closer look, they’re rediscovering the full power of Redis as an ultra-fast, super-scalable, highly available (five-nines uptime!), developer-friendly tool for building applications for the digital economy. Importantly, it’s not just that Redis has grown and improved over the years, though of course it has—rather, many of those capabilities have been there for a long time, even if we didn’t always recognize them.

Of course, Redis is far from the only thing ripe for rediscovery. In “The Power of Rediscovery” (page 14), acclaimed writer Don Steinberg takes an incisive and amusing look at everything from WD-40 (not just a rust-prevention solvent but an all-purpose lubricant with literally thousands of uses) to Arnold Schwarzenegger (not just a body-builder, he had what it takes to become a movie star—and then Governor of California). We think you’ll be surprised by the choices, and their stories.

Finally, it’s no accident that we worked to capture the spirit of rediscovery in a magazine, available both digitally and in print. I spent the formative years of my career writing and editing computer and technology magazines, so I was super excited to rediscover the power and excitement of a compelling story presented in a beautiful and engaging visual environment. We hope you enjoy the results.

Want to learn more about the power of rediscovery? Visit RedisLabs.com/rediscover to access a variety of related content, download a PDF, or request a printed copy of *Rediscover Magazine*.

Thank you!

Fredric “The Freditor” Paul
Editor-in-Chief

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HOME OF REDIS

Rediscover Magazine

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Interested in Redis, Redis Enterprise, or Redis Labs? Visit RedisLabs.com or call (415) 930-9666



Rediscovering the Power of the Inbox

In today's world, email newsletters can seem obsolete. But even as pundits toll the death of email, it turns out that email newsletters can still be incredibly effective and efficient marketing vehicles. Along with email marketing giants like Constant Contact, Mailchimp, and HubSpot, these three companies are helping us rediscover the power of the inbox:

- 1. Substack** is betting on the fact that you'll more likely read and enjoy a newsletter if it comes from a writer you like. The 2017 Bay Area startup has created a platform that makes it easy for writers to monetize their work. Once writers gain a following on their free Substack, they are encouraged to start converting that audience to paid subscribers. Popular Substacks range the spectrum: Emily Atkin writes about climate change on HEATED, Bill Bishop breaks down current events in China in Sinocism, and mechanical/aerospace engineer Surjan Singh documents his sabbatical in An Engineering Self-Study.
- 2. Inside**, founded by angel investor Jason Calacanis in 2006, curates news to specific interests—there's Inside Streaming, Inside Cryptocurrency, Inside Meditation, Inside Podcasting, and 50 more weekly and daily newsletters. A nice touch: the Inside website lists proposed new newsletters—readers are encouraged to vote for the ones they like, and the company will bring on experts to create them if they generate enough interest.
- 3. Revue** makes corporate newsletters easier to send. With customers like Fast Company, Vox Media, and VentureBeat, the Dutch company, founded in 2015, has created an easy-to-use yet sophisticated newsletter editing platform. Users can manage sponsored content, community and events, and affiliate links, and also get tools to help grow their audiences.

One thing's for sure—the world is rediscovering the allure of email newsletters—if we ever really forgot. —**Haley Kim**

Secure Enclaves: Hardware/Software Security for Encryption In Use

Encryption in transit and encryption at rest are now standard procedure in highly regulated industries. But there's another realm of encryption you may not know about: Encryption in use—protecting data when it is being processed in memory, so even operating system admins can't get access.

Today, encryption in use is typically done with client-side encryption—encrypting data within an application before storing it in a database, which can limit database functionality. But an emerging technology called secure enclaves combines hardware and software approaches to solve that problem.

Secure enclave technology—private allocations of memory protected from use by external processes—is not yet widely available in server hardware or from cloud providers. But as the approach gains traction, it promises to change the rules of security in some important ways. With secure enclaves, for example, you no longer have to trust your server administrator and sometimes even your cloud provider—you only have to trust the hardware.

For more information on how Redis Labs is helping build the secure enclave ecosystem, check out our blog post: RedisLabs.com/secure-enclaves. —**Jamie Scott**

DISCOVERIES



How Technology Helped Us Rediscover the Domestic Arts

When COVID-19 forced large swaths of the U.S. to transition to work remotely this Spring, it also upended how we spend our leisure time. With no more hours spent sitting in commuter traffic or socializing outside the home, millions of people rediscovered

the joy of baking bread, gardening, sewing, and other domestic arts.

Of course, technology put a new twist on learning homely new hobbies.

Since quarantine began, YouTube has reported

a 200% increase in daily views of boba-recipe videos and a 330% increase in daily views of videos with “banana bread” in the title. Views of videos related to sourdough bread reached an all-time high in March.

The acute need for masks at the beginning of quarantine also led people to break out their sewing machines and make masks for healthcare workers as well as friends and family. And masks were just the beginning. On TikTok, Gen Z has been busy rediscovering the lost art of sewing and redesigning old clothes into trendy pieces, like lettuce-hem cropped tops, tie-front cardigans, and more—videos tagged with #thrifflip have earned almost 300 million views!

—Haley Kim

330%

increase in daily views of YouTube videos with “banana bread” in the title.

Don't Rediscover These!

Vinyl records may be cool again, but not every technology deserves to be rediscovered.

We never want to see these three again:

CRT Screens: Cathode-ray tubes used to be everywhere, from TVs to computer monitors. But with the arrival of affordable flat-screen displays in the 2000s, there's no room for those dim, low-resolution, power-hungry, desk-hogging monstrosities.

Lotus Notes: This corporate collaboration product was the darling of IT departments back in the day. But it ended up mostly being used as a bloated, fatally flawed email system. Users hated it then, now most folks want to forget it ever existed.

BlackBerry: Remember when every corporate road warrior brandished a BlackBerry? As the first smartphone to be embraced by enterprise IT teams, BlackBerry's physical keyboards were

beloved for email on the go. But then the iPhone showed what a smartphone could truly be and BlackBerry crashed hard. No, we're not going back.

—Fredric Paul ■





Don't Mark Down Markdown

It's time to rediscover the power of this underappreciated markup language.



BY RACHEL STEPHENS, ANALYST AT REDMONK,
THE DEVELOPER-FOCUSED INDUSTRY ANALYST FIRM

Successful technologies often start from humble beginnings. Things that eventually come to define the industry are often initially dismissed as 'toys,' unfit for mass consumption. And while not all new technologies break through to commercial success, when developers build 'toy' solutions to address their own pain points, they often end up addressing gaps that exist in the broader market.

Markdown is one such technology that we're viewing with renewed appreciation at RedMonk.

In 2004, John Gruber and Aaron Swartz were frustrated with the workflow for writing and editing webpages with raw HTML. Together they created Markdown, a tool that allows people to write in a plain text syntax that can then be converted to HTML. The original vision for Markdown was to let people write web pages in a more human-readable syntax than HTML allowed—"email-style writing for the web."

Initial response was mixed. Some people were skeptical that a new solution was needed, with objections coming from the "HTML is not that hard" and "why not just use reStructuredText?" crowds. Even supporters likely had no idea how critical a role Markdown would eventually come to play.

While Markdown served a niche user base early on, it now plays a central role in a new method of application development.

The Rise of the JAMstack

Back in the early 2000s, content management systems (CMS) dominated the web-publishing landscape. CMSs combine a frontend user interface for simplified content creation with a backend that serves the content. Websites powered by a CMS store the content and style templates in a database and fetch and render them when a user requests a webpage.

In recent years, however, we've seen static site generators (SSG) become an increasingly viable alternative to the CMS. Rather than compiling a webpage when it is requested, an SSG pre-renders webpages from some flavor of markup language—almost always Markdown—and stores them as static HTML documents at the point of build.

Static sites can perform significantly faster than CMS sites, but can also have limited capabilities. To extend these capabilities, the JAMstack (JavaScript, APIs, and Markdown) has emerged to integrate backend services and a dynamic presentation layer with the content of the static files.

While not every application is well suited to this method of development, RedMonk sees ample opportunity in the JAMstack ecosystem. Their speed gives JAMstack applications a growing role in the enterprise, and a promising market opportunity for vendors. There are currently multiple billions of dollars of value in JAMstack companies, and we expect this to grow in coming years.

Markdown began as an opinionated approach to web syntax that served a niche audience of web developers. Today it is the foundation of a rising application delivery ecosystem, proving that useful tools often evolve and get rediscovered to fill new uses. ■



Rachel Stephens

Markdown is the foundation of a rising application delivery ecosystem, proving that useful tools will often be rediscovered to fill new uses.



Rediscovering Collaborative Work in the Pandemic Era

BY OFER BENGAL, REDIS LABS CO-FOUNDER AND CEO

Redis Labs is a software startup, so we're used to moving fast. Even though our team is distributed across multiple continents, we've always invested in face-to-face interactions to enable the deep communication, collaboration, and brainstorming required to quickly come to the right decisions and get complex work done fast. So I had always pushed back when our head of HR tried to convince me to allow our engineering department to work from home one day a week.

Then the COVID-19 pandemic hit—and suddenly we had to pivot. Like many other tech companies, we temporarily closed all our offices and the entire company switched to working from home. This was not simple for hundreds of employees spread among offices in Mountain View, Calif.; Austin, Texas; Tel Aviv; London; and Bengaluru, which needs to support more than 7,900 customers in 100+ countries while continuing our aggressive growth towards an IPO.

Because face-to-face meetings were always a key element of our company culture, we had consciously equipped our offices with a wide variety of meeting rooms and other shared spaces. To replace those meetings, we expanded our use of Zoom, which also let us peek into each other's home workplaces—sometimes including children and pets—adding a welcome personal touch.

We also increased our use of collaborative tools like Slack and Jira, which proved extremely effective during these times. Still, I was apprehensive, but then surprised and pleased at the speed with which our resilient teams adapted to the new situation and actually ramped up their productivity! We saw a 15% increase in engineering productivity. And it wasn't just our developers who were able to achieve more! The pipeline created by our marketing campaigns and sales reps calling on potential customers

also went up significantly.

How could this be? Are people really more productive when working from home?

My guess is that many of us waste precious time on lengthy commutes and overlong meetings. Without those distractions, many employees happily invest more time and work harder.

I personally enjoyed every moment of working from home during the lockdown: Fewer distractions, more focus, more sleep, more time with family, and healthier food. Working from home, I found people typically more available, more cooperative, way more patient, and even more friendly. I truly felt I could achieve much more in less time.

The big question, of course, is whether all this is sustainable when we settle on the "new normal." Assuming that new normal includes some combination of office work and working

from home, my guess is that the productivity gains will shrink significantly but not disappear entirely. That's still pretty good! Even better, the additional flexibility could be super beneficial if employees are happier because they can better manage their time and maintain their work-life balance. Furthermore, the reduced importance of actually being in the office could open enormous possibilities to hire talent from almost anywhere in the world—which is mind-boggling.

So, by the way, I have advised our head of HR that I have rediscovered the joys of working from home, and that I am leaning towards encouraging more flexibility in working from home even after we manage to move on from the pandemic.



Best Practices for Building an AI Serving Engine

BY YIFTACH SHOOLMAN, REDIS LABS CO-FOUNDER AND CTO

One of the most critical steps in any operational machine learning (ML) pipeline is artificial intelligence (AI) serving, a task usually performed by an AI serving engine. AI serving engines evaluate and interpret data in the knowledgebase, handle model deployment, and monitor performance. They represent a whole new world in which applications will be able to leverage AI technologies to improve operational efficiencies and solve significant business problems.

AI serving engine for real-time: Best practices

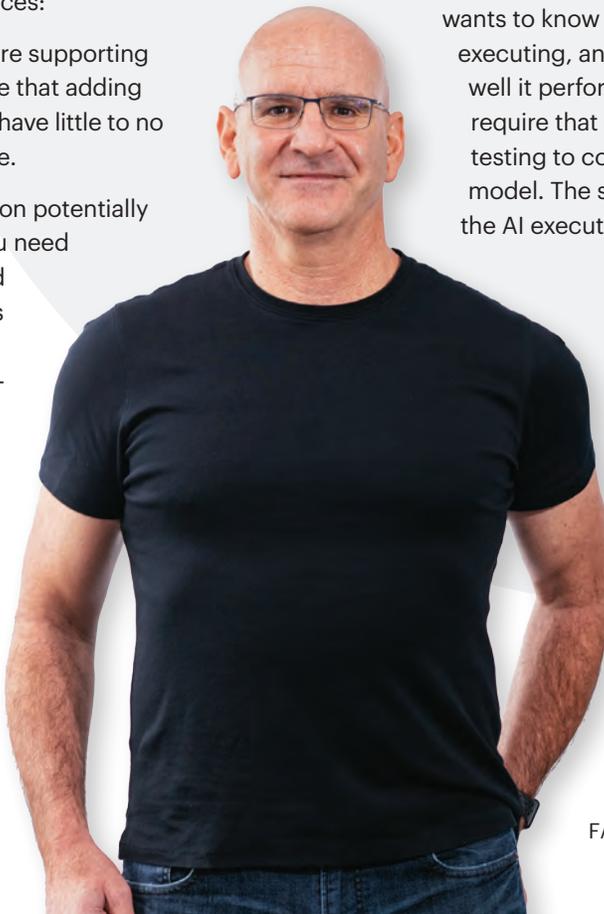
I have been working with Redis Labs customers to better understand their challenges in taking AI to production and how they need to architect their AI serving engines. To help, we've developed a list of best practices:

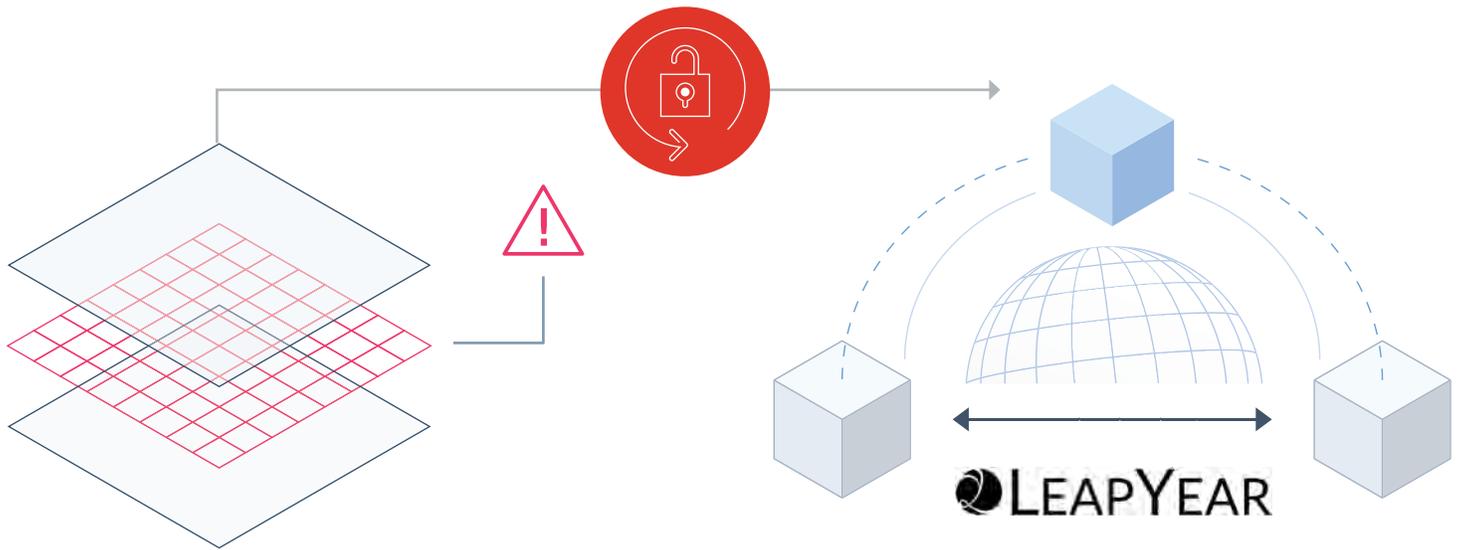
- **Fast end-to-end serving:** If you are supporting real-time apps, you should ensure that adding AI functionality in your stack will have little to no effect on application performance.
- **No downtime:** As every transaction potentially includes some AI processing, you need to maintain a consistent standard SLA, preferably at least five-nines (99.999%) for mission-critical applications, using proven mechanisms such as replication, data persistence, multi availability zone/rack, Active-Active geo-distribution, periodic backups, and auto-cluster recovery.
- **Scalability:** Driven by user behavior, many applications are built to serve peak use cases, from Black Friday to the big game. You need the

flexibility to scale-out or scale-in the AI serving engine based on your expected and current loads.

- **Support for multiple platforms:** Your AI serving engine should be able to serve deep-learning models trained by state-of-the-art platforms like TensorFlow or PyTorch. In addition, machine-learning models like random-forest and linear-regression still provide good predictability for many use cases and should be supported by your AI serving engine.
- **Easy to deploy new models:** Most companies want the option to frequently update their models according to market trends or to exploit new opportunities. Updating a model should be as transparent as possible and should not affect application performance.
- **Performance monitoring and retraining:** Everyone wants to know how well the model they trained is executing, and be able to tune it according to how well it performs in the real world. Make sure to require that the AI serving engine support A/B testing to compare the model against a default model. The system should also provide tools to rank the AI execution of your applications.

- **Deploy everywhere:** In most cases, it's best to build and train in the cloud and be able to serve wherever you need to, for example: in a vendor's cloud, across multiple clouds, on-premises, in hybrid clouds, or at the edge. The AI serving engine should be platform agnostic, based on open source technology, and have a well-known deployment model that can run on CPUs, state-of-the-art GPUs, high-end compute engines, and even Raspberry Pi devices. ■





Rediscovering the Value of Data

Delving into “differential privacy” to unlock unprecedented value from sensitive data. BY ENRIQUE SALEM

In every issue of *Rediscover Magazine*, we ask a prominent technology investor/venture capitalist to share their story of a company, technology, or tech entrepreneur they “rediscovered” to have a far greater impact than they originally realized.

Let me tell you about a company that plays into rediscovering data in a really interesting way. I’m an investor in LeapYear Technologies, based in San Francisco. LeapYear operates in an area called “differential privacy,” or the idea of using data for analysis without compromising underlying individual record privacy. Imagine that you’re trying to do an analysis to predict how many people will potentially get a disease like COVID-19. That’s a really important topic in 2020, right?

The problem with this kind of modeling is that a lot of the pertinent data may be specific to individuals—personally identifiable information (PII) that people involved may not want shared. The data might show, hypothetically, that Enrique Salem got COVID-19, but I’m not willing to make that information public so you can do some kind of analysis on it.

What LeapYear does—and I think it’s game-changing—is use some seriously advanced math to build privacy into the machine-learning models themselves, allowing you to

generate insights without exposing the underlying data. This breakthrough lets enterprises—even in highly regulated industries—create value from their most sensitive datasets.

When LeapYear started in 2016, the initial focus was on internally driven use cases—helping customers better leverage their data internally. Basically, allowing companies to use their data without having to give out access to it, simplifying regulator concerns. For example, a financial institution might want to predict things like how many people over the age of 30 in the region have a student loan that they may not be able to make the payments on during the next 12 months. Not surprisingly, that data includes a lot of proprietary PII, so LeapYear’s ability to enable analysis of the data without exposing it was its initial selling point.

But it turns out that internal use of data was just the tip of the iceberg. While making internal data useful for individual companies was valuable, LeapYear and its customers eventually rediscovered that there’s actually a lot more in play here.

Data owners can share access to data without violating privacy, and earn fees from other companies that might want to analyze the data.

Rediscovering the power of sharing data

Over time it became clear that the biggest value driven by the ability to safely expand access to data to third parties and to data exchanges for both research and product development—to get analytic value from the data without exposing it. For example, think of a data exchange where companies could share interesting data sets of proprietary information that banks, hedge funds, and others could use for research and decision-making without exposing the underlying PII.

By separating the data from the insights in the data, LeapYear becomes a platform that lets analysts and data scientists connect to many different kinds of databases that they previously could not access because it contained sensitive information or belonged to a third party. LeapYear lets them cut across barriers between lines of business, companies, and even national borders to gain insights and surface solutions for business information systems, artificial intelligence training programs and data science projects.

For data scientists, LeapYear supports self service data exploration, data analyses, machine-learning training, and so on, and returns privacy-preserving results to you. For applications, LeapYear generates private data sets for the app to explore—the analysts involved may not even know LeapYear exists—but they get access to maximum insights from data they could not query otherwise.

Now, you might ask why the data owner would be willing to share access to their sensitive assets? Because the data is mathematically proven to be private the data owner can share it without violating privacy, and improve information products and services, or earn fees from other companies that might want to analyze the data. It's a way of monetizing data without the risk of violating privacy regulations.

Rediscovering a broader view of a technology's power

This was a huge rediscovery. The original idea for LeapYear's technology was for a single company to use its own data internally: "How would a company use its customers' data but not take the risk that an unauthorized analyst or other worker might see it?"

But that was too narrow. The market revealed that the real opportunity was data sharing and data exchanges—making all your data available to the world in a secure and private way that allows people to build interesting models to make powerful predictions.

It has large strategic implications because the applications are virtually endless, from virtual data exchanges to social media companies monetizing their data without compromising their users' privacy. Already, for example, one top ten investment bank is using client transactions from the retail side to inform its investment research, without compromising privacy. And two of the top-five health insurers—covering 25% of the US population's health care information—use LeapYear to share that data with third-parties who need data to inform their strategic decisions.

Similarly, multinational pharmaceutical companies can speed time to drug discovery and delivery through efficient access to third-party healthcare data, while retail banks can engage in use cases leveraging analytics across borders to improve customer churn and upsell/cross models. Taking the concept further, many companies across a variety of vertical markets work with LeapYear to safely monetize data and earn significant incremental profit—something they can't do right now because they can't ensure that the confidential and sensitive information in that data will remain private.

The point is, people are trying to figure out how to share sensitive data to make powerful models and analyses. As we rediscover the potential of sharing data privately, we're unlocking a lot of powerful solutions across many industries. ■



Enrique Salem focuses on infrastructure software and services with a specialization in cybersecurity for Bain Capital Ventures. Enrique was previously the President and CEO of Symantec and has more than 27 years of executive experience in technology and security.

The Future of virtual EVENTS

Active Theory's *Nick Mountford* on what makes a great virtual event. BY FREDRIC PAUL

W

ith the onset of the COVID-19 pandemic, many business conferences, including Redis Labs' RedisConf, were quickly recast into virtual events. To explore the ramifications of this change, we spoke with Nick Mountford, Managing Director of Active Theory, the L.A.-based digital agency responsible for the interactive virtual world of RedisConf. Active Theory is a relative newcomer to virtual events, specializing in creating interactive digital experiences driven by web technology—on your mobile device, computer, or even IRL, projected onto the side of a wall somewhere.

Written entirely in JavaScript, Active Theory's DreamWave technology enables multiple users to interact within an online environment at the same time, Mountford said, with no downloads required. The technology is not just aimed at business conferences, he noted: A week before RedisConf, Active Theory put on an online electronic music festival for hundreds of thousands of EDM fans in a 3-D space with each festival-goer represented by a simple line as they watched their favorite DJs, checked out the light show, and so on.



Nick Mountford

You still want people to come away from the conference feeling like they've been able to meet a few people or make a few connections.

What **virtual events** can and can't do

The COVID pandemic, Mountford noted, sped up investment in online events, but what does an online event need to succeed? "The core thing is to make it as easy as possible for people to connect with each other and get a sense of being together around a common interest, whether that's learning more about Redis or partying and enjoying the music."

Done right, he added, virtual events can offer real advantages over physical events. "The obvious one is reach," Mountford said. "You can easily attract a global audience. It's also easier to measure the results of an online conference, because you can monitor everything that happens."

Of course, we're still learning how to create great virtual events, Mountford said, noting that "creating the right aesthetic can be tricky. You've got to make sure that it's on brand and that people feel comfortable connecting with it." Even more important, he said, "you still want people to come away from the conference feeling like they've been able to meet a few people or make a few connections. That's a big reason people go to conferences, and that usually happens at the bars afterwards or at the coffee shop beforehand."

From a technical perspective, Mountford noted, it's still a challenge to put more avatars—and more complex avatars—in a room at the same time. "With complex 3-D objects and environments interacting in different ways," he said, "a lot of data needs to be loaded at once." But big numbers are critical to giving attendees the excitement of watching a keynote with thousands of people in the same room. "That sense of, 'Oh wow! This conference is really huge,'" Mountford said.

Then there's the immersive promise of virtual reality and augmented reality. You could have some events only for VR users, but others could support attendees wearing VR headsets as well as people joining via the website or mobile devices. Ideally, content wouldn't only be on the in-environment screens, but projected on walls and other areas for consumption in different ways.

How to create great **virtual events**

With that in mind, Mountford offered some hard-won best practices for creating a successful virtual event:

Let global visitors consume the content asynchronously. For visitors in other time zones, put up an on-demand video of the keynote immediately after it concludes, but still let them run around and explore the environment and connect with other users in their own time zone.

Share content quickly. This is easy with a virtual conference, because the content is already on the website. No one has to take their phone out to record a session or snap pictures of key slides, and it's easy for both attendees and organizers to snare snippets of content on social media.

"I also think it's nice to give people a profile," Mountford said. "Attendees don't have to share anything if they don't want to, but it helps to let them add some personal details, create links to their LinkedIn profile, Twitter account, or GitHub account. Other attendees can mouse over your avatar and get a high-level view of your profile and start a chat right there."



RedisConf 2020 Takeaway hosted nearly 4,000 attendees from 103 countries during the live event in May.

Let attendees connect with each other over games or other diversions. RedisConf featured a popular ping-pong game, and other possibilities include non-real-time strategy or drawing games that give players time to chat with each other. Beyond games, Active Theory is brainstorming other approaches, including adapting chat roulette/speed dating to a professional setting. “Obviously, you’d need to opt in,” Mountford said, but suggested matching up attendees for quick chats, games, or other interactions to help make connections.

Embrace the different time scale with a nice blend of live and asynchronous content. “People don’t necessarily want to sit in front of their computer for eight hours at a virtual conference,” Mountford acknowledged, so it helps to give them ways to consume content at their own pace. A deeper onboarding process could let people set up their day using notifications to let them know when certain people are talking or to point them toward areas where there’s a lot of interaction. It also helps to let attendees “park” content so that they can come back and consume it when they’re ready.

Make sure people feel safe. Given the valid concerns over online privacy, it’s critical to help attendees feel safe sharing information on their event profile. That means bringing together communities with common

interests, and giving attendees fine-grained control over the personal information they share.

Pay attention to fidelity. “It’s important to make a 3-D virtual conference look really beautiful and polished,” Mountford said, “with nice transitions, details like shadows and lighting.” Just like with a physical conference, you want to create an inviting, exciting atmosphere.

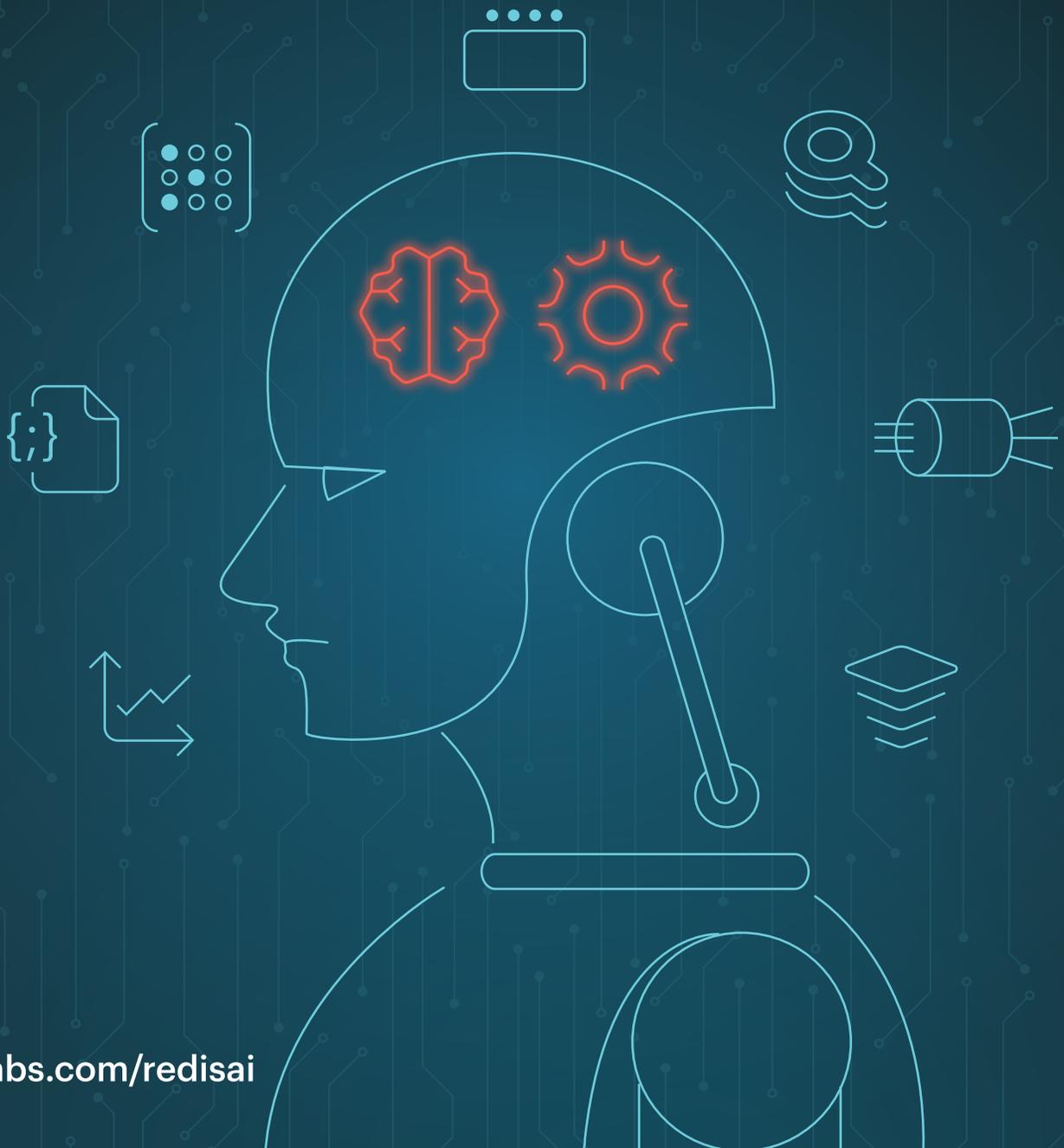
The future of **virtual events**

If virtual events took off in response to the pandemic, what can we expect when the crisis eases? “Even when physical conferences return, Mountford said, “I hope that there will still be rich virtual extensions. For example, we did a website for Coachella, letting viewers watch the shows from their living room. You select your favorite artists, and your live feed updates automatically according to when that artist hits the stage.”

Online extensions to live events could stick long term after this pandemic, Mountford predicted. A lot of companies have now realized that they can do distributed events, he added, and they may decide some events don’t have to take place in a physical space. Overall, Mountford said, look for a recalibration to help find a new balance of the physical and the virtual. ■

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The POW REDISCOVER

Sometimes, things are
more than they seem!

BY DON STEINBERG

It can happen wherever there is deep, unrealized potential in a well-known person, company, trend, idea, technology, or product. Rediscovery may arrive as an organic reinvention of purpose or appear to be a natural evolution to new talents, capabilities, or uses. Either way, rediscovery is a remarkable gift: the mind-opening realization that people and things you thought you knew have the potential to surprise you.

Ironically, perhaps, genuine rediscovery is not as uncommon as you might think. Examples are all around us: Satellites, for instance, now ring the planet. But when Sputnik launched in 1957, the world had no clue that satellites would change the world by enabling global TV broadcasts, GPS, satellite imagery, and vastly improved weather forecasts.

Things that we're familiar with can often surprise us. To demonstrate, we've collected 10 examples of people, products, and other things that became famous for one reason and have since been embraced again and again in new ways.

EVER of VERY



Sriracha: Beyond the soup bowl



Sriracha hot sauce seemed to have rather narrow use when it began to appear on American tables in the 1980s in Vietnamese phở restaurants. “For a long time, if you knew about Sriracha, it was like you knew a secret handshake,” says Randy Clemens, author of *The Sriracha Cookbook*.

Today, American sriracha pioneer Huy Fong Foods owns close to 10% of the \$1.55 billion U.S. hot-sauce market. Sriracha—a puree of red jalapeños, garlic, sugar, and salt—has expanded from its ethnic-food niche to, well, just about everywhere. Bottles are on the shelves in Walmart and Target, and sriracha has spiced up bacon fries at Wendy’s. The *Sriracha Heaven* website sells sriracha-flavored cookies, potato chips, and chocolate. Drinkers can get sriracha-infused beers and vodka. During baseball season, the Seattle Mariners’ popular sriracha night offers fans menu options including sriracha-spiked soft-serve ice cream.

How did this simple sauce become America’s hottest condiment? Privately held Huy Fong hasn’t advertised much, though it has used social media to solicit photos of fanatics’ sriracha body tattoos. The company also offers factory tours for die-hard pilgrims.

The simplicity of the ingredients helped it meet American tastes. Clemens says there was a mainstream breakthrough when Emeril Lagasse and other Food Network hosts started exposing sriracha to their TV audiences. “Then I started seeing it on *Top Chef*,” he says. “Then it was stocked at Walmart. Then there were photos showing it on the International Space Station.”



More than a musclehead

Arnold Schwarzenegger was merely a charismatic bodybuilding champion when he started appearing on TV talk shows in the mid-1970s. He was a novelty guest. On one show, comedian Shecky Green examined Arnold's massive physique, bantered with him, and quipped, "I can't believe it! You can talk!"

It was easy to underestimate the muscle-bound immigrant with the Austrian accent and tongue-twister name. Few people knew how hard Schwarzenegger had worked to get to that point in his career. And no one suspected how much he'd achieve, eventually becoming one of Hollywood's top leading men, transitioning from action movies to comedy, and then rising to be Governor of California from 2003 to 2011. Schwarzenegger is a case study in deciding to become more than meets the eye.

He arrived in America at age 21 and set detailed goals for himself, not only for the bodybuilding competitions he wanted to win, but also to learn English, get a business degree, and take acting classes. Movie duds like *Hercules in New York* didn't stop him. He became a critical darling in the 1977 documentary *Pumping Iron*, a huge success playing *Conan the Barbarian* in 1982, and an iconic bad guy with beloved catchphrases in *The Terminator* in 1984. He defied even more expectations by marrying (his now ex-wife) Maria Shriver—joining the Kennedy family—then parlayed his popularity into a successful run for governor of California. He announced his candidacy on a TV talk show.

The public embraced his unwillingness to be pigeonholed. He wrote in his autobiography, *Total Recall: My Unbelievably True Life Story*, that he was a Republican who loved Democrats, a fitness expert who smoked cigars, an environmentalist who drove a Hummer. "People elected me to solve problems and create a vision for our state, yes, but they also wanted things to feel different," he wrote. "They wanted a Governor and a Governator."



ARNOLD
SCHWARZENEGGER

WD-40

2,000 uses, and counting

In 1988, the WD-40 Company of San Diego acknowledged receiving hundreds of letters from fishermen who swore they were pulling in bigger hauls by spraying the company's sweet-smelling lubricant on their lures and bait. Surprisingly, the fish stories didn't surprise the folks at WD-40. Their namesake product, a rust-prevention solvent invented for the aerospace industry in the 1950s, gained so many uses that its brand name became a metaphor for versatility.

"Some of my favorite uses that people may not know about include lubricating luggage wheels and zippers and preventing dirt and snow from sticking to shovels," says CEO Garry Ridge.

Norm Larsen founded the Rocket Chemical Company in 1953 to develop a formula that could prevent rust and corrosion, which requires displacing water. When his small team made it work on the fortieth attempt, a product name that meant "Water Displacement on 40th try" seemed right. Its first use was to protect the Atlas missile. Then, according to company lore, employees began sneaking it home for civilian uses like lubricating

lawnmowers and loosening nuts. In 1958, Larsen got aerosol cans of WD-40 onto store shelves.

The company eventually took the product name as its corporate name and began marketing WD-40's versatility, trumpeting uses discovered by consumers, who claimed it could remove chewing gum from hair and rings from fingers, repel insects, winterproof boots, and break in baseball gloves. Many new applications of WD-40 come from experimenting customers who share suggestions in an official fan club. (The company doesn't recommend using WD-40 to attract fish, but suggests it can protect fishing gear from corrosion.)

WD-40 has outlasted many things it once fixed: a 1983 ad boasted it was great for loosening stubborn car-window cranks. By 1993, a can of WD-40 was reportedly in 80% of U.S. households. Tim Nyberg and Jim Berg, known as "The Duct Tape Guys," wrote a book about WD-40, claiming: "You only need two things in life: Duct Tape and WD-40. If it moves and shouldn't, use Duct Tape; if it doesn't move and should, use WD-40."



BAKING SODA

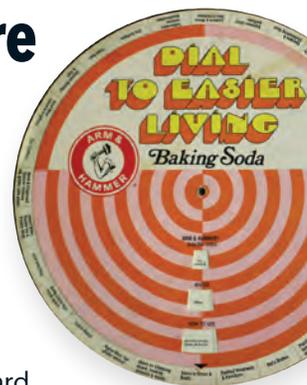
Not just for baking any more

People have been rediscovering sodium bicarbonate—originally called salerus and then baking soda—for ages. Far beyond its common use for leavening quick breads like muffins or pancakes,

it also works as a natural antacid, a mild abrasive for cleaning, a whitener, refrigerator deodorant, and on and on. In fact, it may have been used in ancient Egyptian mummification. It preserved freshly caught fish on boats during the 19th Century,

according to Rudyard Kipling's novel *Captains Courageous*.

In 1846, two New England bakers, Austin Church and John Dwight, built a factory to produce it commercially. By the 1950s, Church & Dwight Co. was sending housewives a cardboard wheel called "Dial to Easier Living" that gave directions for 56 uses of its Arm & Hammer baking soda, including using it as a deodorant and putting out car fires. The rediscovery of baking soda carries on today, as a devoted community of users eagerly shares creative uses at the company's Simple Solutions website.



RAP

+ HIP HOP

Subculture to pop culture

Rap music came to life in Black communities of New York City in the 1970s. It was urban poetry set to a funky beat. Some of it was home-made party music, a microphone-and-turntable rebellion against the glossy corporate beat of disco and rock. DJs re-spun samples from rock, disco, and jazz records—all musical genres with roots in Black culture—into exciting new sounds. But the beats and lyrics were also a fierce artistic response to the poverty and oppression facing Black Americans.

From its specific beginnings, rap swiftly expanded its reach and range. Tapping into audiences around the world as well as new creative fields, rap spawned not just a ground-breaking musical genre but an incredibly popular global subculture known as hip hop that embraced fashion, break dancing, beat boxing, creative graffiti art, and much more. As rapper KRS-One once explained: “Rap is something you do. Hip hop is something you live.”

In retrospect, it seems inevitable. Even early rap hits like Sugarhill Gang’s “Rapper’s Delight” in 1979 and Kurtis Blow’s “The Breaks” in 1980 crossed over to suburban

radios and college parties. How could they not? Their sound was irresistible. Over the years, new audiences kept discovering the music, and more and more people and artists embraced hip hop fashion and attitudes. By 2017, rap surpassed rock to become the most popular music genre in America, while deeply influencing other genres from Broadway shows (*Hamilton* and many others) to country (where they call it “hick hop”).

This unanticipated takeover of pop culture has been a series of breakthroughs and rediscoveries, one punch into the mainstream after another, over the course of four decades, as rap and hip hop ignored critics and proved more varied, more resilient, and more attractive to wider and wider audiences than anyone predicted.

But rap’s global appeal also led many non-Black artists to incorporate hip hop’s culture, sounds, language, and style in their work, creating a sometimes bitter debate over appreciation vs. appropriation that, like rap and hip hop, shows no sign of fading away. No matter how global it gets, though, hip hop’s identity—and its artistic power—will always be tied to the struggle against oppression and social injustice.

Cardi B performs onstage during the Fashion Nova x Cardi B Collaboration Launch Event.

PHOTO BY RICH FURY/GETTY IMAGES

NETFLIX

The birth of the binge

In two decades, Netflix has grown from a startup DVD-rental service to an Oscar-winning Hollywood studio and the world’s biggest creator of original television content. Customers have embraced the evolution (almost) every step of the way.

Back in 1997, millions of early customers were happy

enough with the world’s first online DVD rental store, which had no late fees and personalized movie recommendations. By 2005, *The Economist* reported Netflix was mailing a million DVDs a day! But as speedier home broadband connections made streaming practical, Netflix began operating its new streaming service side

Elon MUSK

The rethinker

April 20, 2020, was celebrated as Elon Musk Day. At least, it was by a community of his most devoted fans. They met via a Zoom live stream to chat about his innovations and defend him from critics. "All of us have been affected by Elon and the companies that he's leading," announced Anuarbek Imanbaev, vice president of the Tesla Owners Club of Central Texas, to launch the nearly two-hour video meeting. "I tell my friends that if Elon's life was a nine-inning baseball game, he's just at the bottom of the third inning. This dude is just getting started."

With his controversial and potentially world-changing ideas, Musk has attracted critics and millions of online followers, in the most devout sense of the word. Restless entrepreneurial ambition has pushed him to build not one but four billion-dollar companies (PayPal, Tesla, SpaceX, and SolarCity) and made him a game-changer in every industry he's touched. His lofty aspirations haven't just forced us to reconsider him, but



New Netflix CMO Bozoma Saint John.

by side with DVDs by mail. Eventually, the streaming side took over as DVDs ran their course.

Over time, Netflix moved from spending its rich cash flow on popular existing movies and shows to financing original content. And for its inaugural original TV series in 2013, *House of Cards*, Netflix did



also to rediscover the potential in space exploration, renewable energy, transportation, and more. "He's managed to sell the world on his capability to achieve objectives so lofty that from the mouth of anyone else, they'd be called fantasies," *Rolling Stone* remarked.

Musk also remains unpredictable—for example, his brazen railing against government stay-home orders during the COVID-19 pandemic. Musk is rediscovery in human form, although his most ardent fans seem to consider him something not conventionally human, an attitude perhaps reinforced when he named his new baby X Æ A-Xii.

something that helped the world rediscover how to watch TV: The company released an entire season of episodes at once, redefining what streaming meant and creating the concept of binge watching.

Netflix also takes a novel approach in selecting and creating movie and TV content. It uses collective viewing data to help decide what to procure and produce, resulting in content that both general audiences and critics adore—its 24 Oscar nominations this year (with two wins) were the most of any studio.

PHOTO BY YICHUAN CAO/NUPRPHOTO; SPACE X PHOTO BY ANDREI STANESCU

SUVs

Redefining the car

Watch any American movie from the 1970s, and you can't help but notice the cars.

But the passenger vehicles that proudly roamed the streets of the Seventies—the Oldsmobile Cutlass, Chevy Impala, Ford LTD, Cadillac Eldorado—are becoming dinosaurs now, replaced by designs derivative of the no-frills Jeeps developed for the American military during World War II.

Today, drivers in the U.S.—and increasingly around the world—are buying trucks, sport-utility vehicles, and crossovers (SUVs built on a unibody or monocoque car platform). In 2016, SUVs began to outsell sedans, leading major automakers, such as Ford, to drastically cut production of good old cars. In fact, Ford only

sells two traditional cars, the Fusion and the Mustang. Somehow, the SUV has burst out of its role as a niche off-road vehicle to reinvent the car.

How did we get here? After the war, Willys-Overland began marketing Jeeps as work vehicles, then pitched consumers on the Jeepster convertible and Wagoneer station wagon. When American Motors took over the brand in 1970, it realized a new audience was rediscovering Jeep. “The marketers looked at what kinds of cars were parked in the same driveways as Wagoneers” and they found expensive luxury cars, writes Keith Bradsher in his 2002 book, *High and Mighty*.

The Jeep Cherokee, introduced in 1984 with car-like unibody construction and four-wheel drive, is considered the first modern SUV. Then came the Jeep Wrangler, Suzuki Samurai, Ford Explorer, Toyota 4Runner, and eventually today's bestselling Honda CR-V and Toyota Rav4. The Hummer made 'em big. Crossovers made 'em small. Luxury brands, like Mercedes-Benz, Porsche, and Rolls Royce, made 'em posh.

What's the attraction? Americans like big vehicles with a lot of space, but minivans could never escape being typecast as the choice of suburban soccer



THE INTERNET

Extending humanity's reach

When J.C.R. Licklider first described his idea for a globally interconnected network of computers, in 1962, he called it the “Galactic Network.” Or, according to another credible report, it was in 1963 and the “Intergalactic Network.”

The records are imprecise. It was before the internet. Licklider was the first head of computer research at the U.S. Department of Defense's Advanced Research Projects Agency. ARPA created the ARPANET government network.

Despite the grandiose nicknames, the internet was imagined as a limited-access network for specialized research. Neither Licklider nor the most inventive futurists foresaw how profoundly it would alter humanity.

Then academia came online, and the real spread started as commercial networks joined in.

The advent of the World Wide Web and the Mosaic web browser made it easy to navigate formatted content around the globe. Early computing entrepreneurs like Bill Gates and Charles Wang were initially skeptical about its potential. But households across the planet



moms. Bradsher puts it this way: “Four-wheel-drive vehicles offer a romantic vision of outdoor adventure to deskbound baby boomers.” In 2018, *Car and Driver* described the Chevrolet Suburban—and by extension the entire SUV category—as a “quintessentially American vehicle,” summing up its Americanness as “big, brash, potent, and pragmatic.” But it is not just America anymore. The humble, utilitarian WWII Jeep has been rediscovered as the SUV. And it’s taking over the world, one parking space at a time.



logged on, and—long story short—what started out as a limited-access research network now lets your mobile phone give you real-time driving directions to any destination, and summon virtually any piece of information, song, or movie ever recorded on demand.

The internet has been a fast-motion study in evolution and rediscovery. As users, we have embraced it in one mind-blowing incarnation after another. Marshall McLuhan, the social scientist who coined the term “global village,” wrote that all technology is an extension of humans. The wheel extends the foot, clothing the skin, electric circuitry the central nervous system. The evolution of our species carries on in our inventions. Now wireless technology has made the Internet nearly as pervasive as oxygen, and we have superpowers as a result: our memory is unlimited and our eyes can see events as they unfold on the other side of the globe.

The global information network has been a reflection of human needs, and it is a constantly evolving reinvention of ourselves.

GLASS



Our evolving lens

It’s strange to think that the modern world has been built upon a substance considered so fragile. But for millennia humankind has used glass to see and reshape our experience in new ways. Transparent, malleable, and surprisingly resilient, glass has been the perpetual vessel for our breakthroughs in perception through mirrors, magnifying glasses, and eyeglasses.

In the late 16th century, scientists developed lenses for microscopes and telescopes, and glass revolutionized our understanding of the universe, enabling advances in physics, biology, and medicine. In 1879, Edison’s incandescent bulbs illuminated the darkness.

Today, it’s fiber optics—strands of glass that form the backbone of the internet, conveying information as trillions of pulses of light. Glass is also used for high-capacity data storage. And augmented reality eyeglasses that display information in real time may be next. Glass is a fulcrum for rediscovery, and has been for thousands of years. ■

PHOTO BY VADYM PLYSHUK

PHOTO BY THOMAS VOGEL

Salvatore Sanfilippo *Talks Redis, Open Source, and More*

BY FREDRIC PAUL

Redis has come a long way since Salvatore Sanfilippo—known online as antirez—created it in 2009. Now that he has released Redis 6 and stepped back from day-to-day responsibility for maintaining the project, this is a great time to celebrate his contributions to Redis, get his insights into open source software, and try his secret pasta recipe.

Let's talk about the very beginnings of Redis. What was your inspiration for creating it?

My main motivation was solving my particular programming problems, but that was more the trigger than the inspiration. The inspiration itself was more towards the idea of having a database system that was internally designed more like a programming language interpreter, processing function calls instead of "queries."

That was one of the most exciting parts of my career. We wanted to solve problems, but we also wanted to have fun. Redis was born in this kind of playful environment.

What do you think is behind Redis' early success?

Three key things helped Redis become successful: First, my accountability. I was there for the users in the early days. Second, simplicity and documentation. Third, storytelling. I was telling the Redis story on Twitter, on my blog, on Hacker News, everywhere I could. Of course, Redis was also very useful, but that's not always enough to guarantee success for an open source project. Developers who are able to communicate clearly are a

critical element. And so far, I don't think that Redis has fundamentally diverged from the original concept.

What was the hardest part in convincing folks to discover Redis?

I didn't really try to convince anyone. What mattered, I think, was that in the end the approaches I took with Redis actually worked. In general, Redis has a tendency to expose the hard reality of computation to the end user, without abstracting away too much of what could come back to bite you if not properly understood. This can be initially challenging, but eventually many users realized that a simple, very good hammer that does what it's supposed to do could work better than a very sophisticated multi-use tool that was hard to understand.

What Redis capability do developers best understand?

The community really gets, since the start, that Redis data structures have very strict tradeoffs. It's up to the developers to use these data structures as building blocks to solve problems.

What do you wish more people would rediscover about Redis?

The fact that Redis is specifically built to be hacked and adapted to address a wide variety of different problems. This means pay attention to how the implementation works. If you have a very large use case, try to modify the code, find alternative solutions, and propose new primitives that you think could solve large, outstanding problems. Basically, think of Redis as a “platform” to build new concepts about shared data structures.

Redis 6 was recently released. What would you like people to pay attention to in the latest release?

I hope people will try the new feature called “tracking,” which allows you to assist clients that want to implement “client-side caching,” where frequently used values are held directly in the application memory. This simple protocol could allow for drastic improvements in many latency-sensitive applications.



I also love the new access-control list (ACL) system. ACLs are often boring and complex to configure, but Redis ACLs are very “Redis-ish,” they are quite approachable. A lot of people believe they don’t need ACLs, but they’re an important way to protect what a given process can call, and help avoid incidents.

Finally, I like the fact that despite a few glitches, the final product is high quality. This was not easy to achieve because Redis 6 is so large and involved so much collaboration with other developers.

Getting to Know Antirez



What was your background before creating Redis?

I worked mainly in the area of computer security, embedded systems, programming languages, and the development of web applications for social networking.

I was originally going to be an architect but quit before graduating school. My key experience came when I went to Milan to work at a security company where I was assigned big projects that forced me to learn a lot. One project that really changed the way I approached programming was a Tcl interpreter that I wrote. After months of developing a content management system in Scheme, I switched to this task of writing a complex interpreter in C, and I realized that how I wrote programming had changed significantly.

What tools could you not live without?

On the hardware side, I recently upgraded my 2015 MacBook with a new 13-inch model. I don’t like to have huge monitors and so forth. For software, I rely on Vim and Valgrind. And outside of computing, I need my pull-up bar.

The evolution of open source

The popularity of open source software has exploded in recent years. What’s going on?

At some point, many companies began to understand that OSS was the only way to do system software that was going to be accepted by the market.

But the rise of the cloud revealed that there was a proprietary alternative, Software-as-a-Service (SaaS). So, while a lot of today’s OSS software is being produced by companies, this is in many cases not really “open source software”—the development process isn’t open source, it’s just licensed as open source.

How has the software development landscape changed since 2009 when you created Redis?

Software development has changed in a number of ways. Some I like, and some I don’t.

What do you do when you need a break from Redis? Do you have other projects in the works?

I never get tired of Redis itself, but sometimes there are Redis-specific issues I need to fix even when I don’t want to. After I finish a task like that, I switch to some other subsystem, or some small sub project. Two side projects I did recently are Load81, a framework for children to learn programming, and dump1090, software to track the airplane positions and locations.

What are you interested in outside of Redis?

I like fitness, wine, and food. I like to go to the sea. And I have a secret pasta recipe, called: “pasta con tutto quello che hai in frigo,” or “pasta with the vegetables you have in your fridge.” It’s easy: Boil the water to make the pasta (don’t put the pasta in before it boils). In a different pan, put whatever vegetables you have (diced into small cubes), and fry them with olive oil and garlic. Then put the pasta in the boiling water, and pour out most of the water one minute before the pasta’s suggested cooking time. Mix the pasta with the vegetables, add a raw egg, and top with some grated parmigiano or pecorino cheese. Done—and delizioso!

First, most open source projects now seem to be company-driven and not spontaneous. I don't like that. There is also a strong tendency to use pre-made code and solutions instead of inventing or re-inventing cool new stuff. Culturally, it seems to be getting harder and harder to innovate. I don't like that, either. In that vein, it's also gotten more difficult to have substantive discussions about open source projects, because participants seem to get offended for the most trivial things, for example if you say that code comments are very important. I really don't like that.

People may not realize how hard it was for me to handle the community requests and attacks that come with leading a big open source project. Sometimes I found it very hard to keep going. I always enjoyed the coding part, but I tend to not work well when there is too much pressure from the outside.

I also feel that developers have become too quick to accept and use whatever the big vendors are pushing, without really trying to understand whether or not there is value in it.

One incredible example is what is happening on the frontend side. With new ways to do things coming out almost daily, frontend developers are struggling to keep up. Yet the results look exactly the same as the web of 20 years ago—content with forms and buttons and so forth. It was possible to do this with just server-side rendering and Javascript to update the dynamic parts, yet we have accepted a daunting amount of complexity just because “the ‘big guys’ told us to.” Not good.

On the other hand, everything open source is now on GitHub. That is a good thing. And distributed systems are much better understood now, and that's great. In general, though, I probably like the way things worked in 2009 better.

How has Redis changed the database landscape?

Redis made it clear that NoSQL databases were not just about consistency. Eventually people started to realize that it's really just a matter of consistency guarantees. If we put the same tradeoffs in SQL systems, there is no reason for other databases to be there.

Redis' multiple data structures deeply influenced the database community. Redis provided a strong argument that the data model should be a key part of the

database story. Also, Redis popularized the idea of very simple protocols as an alternative to JSON, which can be relatively inefficient, and binary, which can be hostile to new client libraries and debugging.

But perhaps the most obvious and important change is that due to Redis, in-memory databases are now considered viable by average developers working in the IT sector. Before Redis, in-memory systems were used only to address very specialized use cases.

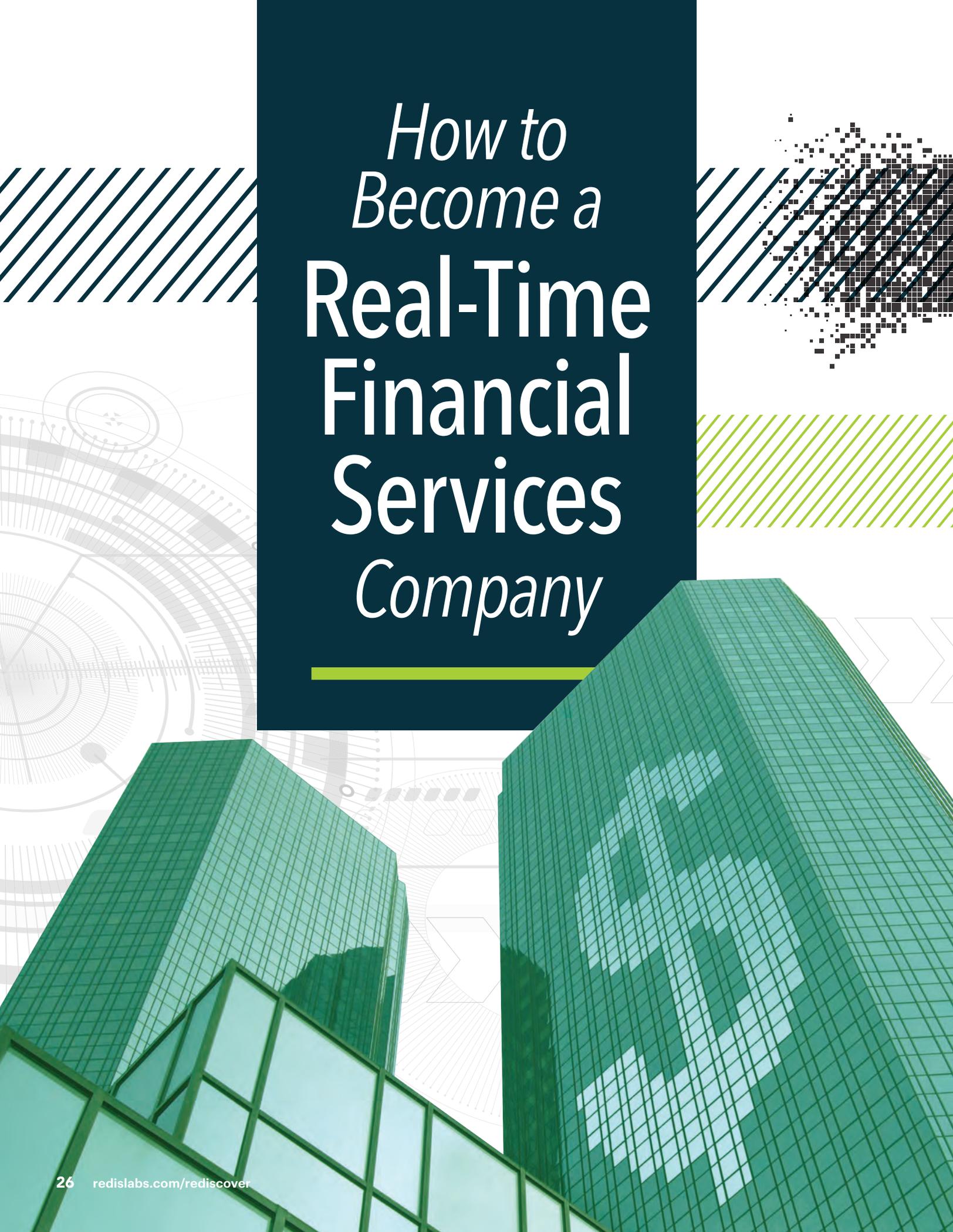
Thoughts for the future

If you could ask the Redis community to rediscover one thing about how to create great work, what would it be?

Make the effort to really understand the systems you are using, even at a lower level than needed in order to accomplish your work. There is no way to use a complex system effectively without understanding the details. In theory, it should *not* be like that—abstraction layers should be completely isolated. But that's not the case in the real world. Only by understanding how things are built at a lower level can you understand certain emerging behaviors. On the other hand, don't fall into the opposite error, believing that the low level is the “true” part of the system. The abstractions are a fundamental part of computing, so you need to work in both levels at the same time. It's hard but rewarding.

Finally, based on your experience creating and building Redis, do you have any recommendations for other programmers?

1. Don't make things more complex than needed.
2. Don't be a perfectionist at all costs. “The perfect is the enemy of the good.” Don't keep endlessly iterating in search of a perfection that users don't even want: they want working systems now, not something more perfect later.
3. Try to make incremental progress every day.
4. Be the storyteller for the projects you work on.
5. Love what you do. Success is a byproduct, not a goal you can reach directly, and may not happen at all. It's important to enjoy the journey. ■



*How to
Become a*
**Real-Time
Financial
Services
Company**



Facing stiff competition and shifting customer behaviors, financial firms are scrambling to deliver instant experiences, high availability, and virtually unlimited scale—but it can't happen without big changes in the data layer.

BY IVAN SCHNEIDER

At a certain point, “real-time” becomes impossible to fake.

Milliseconds count. For many financial firms, the speed with which they implement full-fledged real-time financial services could make all the difference in maintaining relevance in the rapidly approaching future of financial services. Swiftly evolving customer behaviors and the accelerating rate of digital innovation pose extraordinary challenges for today's financial institutions.

Customer expectations are changing as consumers learn to expect more from their financial services institutions—a lot more. People are becoming accustomed to real-time onboarding, real-time investment decisions, and instant personalization from their digital financial providers. That means successful organizations will be the ones that build and deploy real-time services for use cases like online deposits, mobile transfers, electronic payments, credit decisions, fraud detection, transaction scoring, and many more.

The increasing maturity of easy-to-deploy cloud and container technologies is finally making it possible to meet real-time demands. Modern software architectures and the advent of cloud computing and containers are drastically reducing time to market and shortening development cycles for a growing variety of real-time financial services, promising to enable a lucrative landscape of advanced services and capabilities.

For example, what if you could detect and even prevent fraud by conducting real-time analysis of behavior patterns across a global ATM network? What if you could turbocharge ATMs with two-way video chat and built-in voice recognition, not to mention natural-language processing and automated language translation? What if you could harness location-aware services to provide an augmented-reality overlay based on personalized customer data?

For decades, computing speed has been a recognized competitive necessity in the quant-driven capital markets, in which traders seek every possible advantage by being the fastest to respond to market changes. That's an extreme example, but real-time capabilities will also support competitive differentiation in numerous other areas of financial services.

To succeed in real-time business, financial institutions will need to process large datasets quickly enough to support instant response times across large user populations. Real-time financial institutions must be able to support a variety of critical capabilities:

- ⚙️ Personalized customer experiences across smart mobile and in-home devices.
- ⚙️ Integration with other providers for one-stop shopping for financial products and advice.
- ⚙️ Fraud detection and mitigation vs. global adversaries launching real-time attacks.
- ⚙️ Instant transaction scoring and processing for risk management and regulatory needs.
- ⚙️ Artificial-intelligence and machine-learning support across application domains.
- ⚙️ Data-driven investment decisions aided by rapid analysis of large, heterogeneous datasets.

How do you prepare your financial institution—whether it’s a legacy leader, digital fintech disruptor, or a big tech company entering the market—for this real-time future? For starters, evolve your data layer.

The problem with legacy databases

In the all out race for speed, companies constrained by slow, traditional database architectures built for batch processing risk falling behind. Most legacy databases don’t scale well and may not deliver the performance, versatility, and dependability needed for real-time use cases. Successful financial institutions are rethinking their approach to the data layer by adopting newer database technologies that can provide the speed, real-time data models, and high availability required to meet emerging real-time business demands. Also, the continued emergence of NoSQL database models gives software developers and architects more options for building the data layer in different ways.

Legacy databases were built for a world where they had time to replicate the relevant data, pipe it into a separate data warehouse to avoid jamming up your production database with a monster query. The problem: *You no longer have the luxury of time!*

Disk-based database architectures were not built to



support real-time applications, such as a bot answering customer questions in a real-time chat. There are plenty of workarounds to boost the performance of disk-based databases—in-memory cache is a common technique. But this kind of patchwork approach often entails more complexity, higher coordination costs, and scalability bottlenecks. Although an in-memory cache may increase performance for many applications, the benefits may not extend to all users in all situations, as it’s often impractical to store all the requested data in the cache. Plus, already harried IT teams end up maintaining two separate environments and two separate code bases, as well as two separate sets of growth constraints.

Legacy databases have several other shortcomings:

They don’t scale gracefully. Traditionally, database administrators had to anticipate the expected size of an enterprise dataset, which drives specific choices around replication, clustering, backup, and resilience. While that may have worked in the batch era, today’s operating environments often involve highly variable data types and quantities. Organizations must be able to scale their databases quickly and easily, without worrying about how long it will take to rebuild the indexes of a traditional database.

They aren't flexible enough. Legacy databases were built for SQL queries on relational tables. Yet today's most popular internet services, including search and social media, are built using a diverse array of data models offering new ways of conceptualizing, representing, and using data. In some cases, legacy databases can be adapted for these new approaches, but there's a significant cost in terms of complexity and speed.

They aren't reliable enough. As the demands of the marketplace move toward real-time deliverables, financial institutions are encountering instances in which they have to recover from system failure in real time. In such instances, your resilience extends only as far as your persistence and high-availability capabilities. The ability to instantly recover without data loss and mitigate failures across multiple infrastructure regions is essential.

They're complex and difficult to work with. To face the future with confidence, you need to keep your developers happy, innovative, and productive. You need to empower them to apply the latest techniques and data models to solve the most pressing challenges. That's the only way to ensure that your dev teams are ready to respond rapidly to emerging business needs and opportunities—and it's also the best way to attract top software-engineering talent.



To face the future with confidence, you need to keep your developers happy, innovative, and productive. You need to empower them to apply the latest techniques and data models to solve the most pressing challenges.

How to become a real-time financial company

With those constraints in mind, financial firms can adopt a selection of best practices to position themselves to deliver real-time financial services:



REBUILD THE DATA LAYER FOR REAL-TIME.

Real-time financial services call for real-time capabilities that include high throughput, minimal latency, high scalability, high availability, and flexibility in data models. To make the transition to real-time, you need to learn to work with the data layer in a new way. The shape of the data in your application matters to performance and capability—which means that forcing everything into the rows and columns of relational databases is no longer sufficient.

What do you have to do to create tomorrow's real-time financial services? Every organization's needs are different, but there are some best practices that can inform your data layer modernization:

1. Caching is only the beginning. Many companies speed up their legacy database environments by adding an in-memory cache. This approach can provide an effective speed increase, but it's both slower and more complex than working entirely within an in-memory database. A clean break to a modern database can help you gain speed and reduce complexity.

2. Build on your in-memory database. Nothing compares to the sub-millisecond latency of a fully in-memory database. Additionally, choosing an in-memory database that's easy to deploy and maintain on any enterprise cloud ensures another important speed advantage—faster time to market, not to mention cutting vendor lock-in.

3. Avoid database proliferation. To manage complexity, avoid deploying multiple specialized databases. Developers have embraced the NoSQL paradigm for documents, graph, and other data models, and non-relational databases are available to solve point problems in different domains. But as the number of different databases in production grows, the number of people in your organization who understand them all dwindles. Working with too many databases entails more training costs, bigger teams, slower development, and more difficulty troubleshooting problems.

The Technologies Driving the FinTech Revolution

To achieve real-time speed for competitive advantage, the financial services industry can safely rely on a wide range of new technologies already in heavy use by industry leaders in fields ranging from telecom and retail to transportation and smart cities:

✓ **Cloud computing** expands the capabilities of an enterprise with highly scalable, low-latency computing resources.

✓ **Serverless** technologies allows customers of the major cloud providers to dynamically provision resources as needed to manage large numbers of simultaneous connections.

✓ **Containerization** of applications enables faster development, simpler cross-platform deployment, and the ability to ensure that applications work the same way wherever they're run.

✓ **DevOps** approaches allow development and operations teams to manage and implement faster, more-resilient deployment of new features and services.

✓ **Kubernetes** and other container orchestration solutions provide automated management of containers across environments and cloud-computing providers, helping to avoid vendor lock-in by enabling multi-cloud deployment as well as easier integration of on-premises computing resources for hybrid-cloud architectures.

✓ **Microservices** and similar event-driven architectures enable developers to break down monolithic applications into collections of independent services, helping organizations boost the speed and agility of their software development and deployment.

✓ **Artificial intelligence helps companies** make the best use of complex, disparate data sources to drive decision making in real time.

4. Evolve toward multiple data models. The fastest growing, most important applications are now being built with multiple data models. The ideal approach is to build on a single in-memory database that can handle multiple data models with a unified interface.



ADOPT A MULTI-CLOUD APPROACH.

Multi-cloud and hybrid-cloud capabilities are essential to a real-time strategy. Cloud providers such as Amazon Web Services, Microsoft Azure, and Google Cloud have integrated their preferred technology approaches into their offerings. This best-of-breed approach tends to steer customers toward the cloud providers' respective managed database services, which may or may not be your ideal solution. Future generations of data tools, data models, open-source offerings, and managed services may offer better performance and a faster path to innovation. That's why many companies believe it's critical to preserve your options with a multi-cloud architecture.



DON'T PROCRASTINATE. Fintech startups and their technology partners are already building services using modern technology stacks, including real-time databases with multiple data models. Established financial institutions are acknowledging the trend with technology roadmaps that anticipate the need for real-time business requirements.

It's not too early to begin proof-of-concept experiments, test cases, and deployments of new workloads using in-memory databases running in multi-cloud and hybrid environments. Act decisively to ensure that you can put your data to work quickly and nimbly in the new financial services reality. ■

Editor's note: This article was excerpted and adapted from a Redis Labs whitepaper: "Building the Highway to Real-Time Financial Services." Go to RedisLabs.com to download the full whitepaper.

WOMEN LEADERS

MEET

@ Redis Labs

From software to sales and beyond, our women managers share their leadership secrets BY HALEY KIM



Interested in working at Redis Labs? Check out redislabs.com/company/careers to see all our available positions or email redislabs.careers@appynow.io.

Jane Paek

Director, Regional Solution Architects

OFFICE: Mountain View



Jane's journey to Redis Labs was anything but common. With two decades in the software industry, her career includes a 7-year sabbatical to raise two kids and beat lung cancer. She joined Redis Labs in 2017 as a Solution Architect, her second job post-sabbatical, and now manages a team of 11 SAs with 6 direct reports.

At Redis Labs, SAs fill a hybrid pre-sales/technology/product evangelist role, helping customers design and productionize Redis for high-speed applications. While Jane loves the SA role's emphasis on problem-solving, she feels that many new grads—especially women—aren't aware of this type of career. "As well as being technically skilled, time management, emotional intelligence, and multitasking are all important traits of great SAs," she says. "If you were to evaluate traits across these different skills, many women have the attributes to be very successful in this role."

Having always worked with remote managers and remote employees, she emphasizes collaboration on her team. On teamwork: "The only way we can succeed as individuals is to learn from each other and share with each other."



Jeannie Chong

SDR Manager, Americas

OFFICE: Mountain View

Even though Jeannie now manages a team of five sales development representatives, her career didn't begin in sales. From making contact lenses to collecting U.S. Bank Visa card and home loans to providing health rehab solutions for the injured, she's been all over the job map. What she eventually learned, though, is that her empathy and passion for others makes it easy for her to sell. "To me, I have to believe in what I'm selling," she says. "Then it becomes more about helping people solve a challenge."

As a mentor and manager for Redis Labs SDRs since 2015, she views her role as an enabler, helping her team perform their best and improve their skills to become more marketable. At Redis Labs, SDR is an entry-level sales role, and one of Jeannie's goals is to uplevel her team members' skillsets to expand their future career opportunities.

It's an important way for her to give back. "Everybody's going to make mistakes and learn on their own," she says. "But if I can impart some of my experience and help them navigate that—maybe in a way that doesn't cause them as much pain or suffering—then I feel I'm giving them what they need."



Moria Abadi

Software Team Leader

OFFICE: Tel Aviv

Relatively new to Redis Labs, Moria manages six software engineers out of the Israel office. Having worked at a small blockchain startup prior to Redis Labs, she understands the all-hands-on-deck mentality that leadership can sometimes require. "A small company has an advantage: there are only a few people to do everything, so people have to take more responsibility," she says.

Building her self-confidence is something she's worked on throughout her career, and she knows other women face similar issues. "I had to manage things I never believed I could. This gave me more self-confidence," she says. "So if I've learned something about leadership, I learned it from my own experience, and I have a lot more to learn."

While it can be difficult, she says, talking about business and technical problems openly can help raise awareness about important issues that might otherwise get swept under the rug. "Understand the problem and the various ways to cope with it," she says, and then make sure other stakeholders also understand what's going on.



Carolyn Sims

Technical Support Team Lead

OFFICE: Mountain View

Working in support often means long hours helping customers solve their technical problems. But Carolyn loves the challenges of solving problems and making customers happy, along with enabling a team to be successful and fulfilled. Having worked at tech firms both big and small, including running her own technical training and development business, she joined Redis Labs in 2019 and now leads U.S support, managing a team of nine.

Support is also the key to how she manages her team. "If the communication lines are open and trust is in place, team members should have what they need to excel in their work and get help when they need it," she says. That also means learning "what makes them tick as individuals."

Her dedication to support even extends to interviewing job candidates, when she tries to provide specific feedback on their skills and experience. "I want to help people grow and improve," she says. "Who knows—they might come back in a year or two and be somebody who would be good to have here."

Lyndsey Rees

Corporate Sales Manager EMEA

OFFICE: London



When Lyndsey graduated from university, she had two choices: she could join a software sales team or work at an estate agency in London. She chose the former.

Some two decades later, Lyndsey joined Redis Labs in 2017 to set up the Sales Development team in EMEA. Today she manages four people as she builds out our corporate sales team in Europe and Asia.

Her role as a leader, she says, is to inspire her team to come together for a common mission, and to effectively communicate why their role is critical. It's also about supporting the team. "I'm very people oriented," she says. "I care about my team, and their personal and professional well-being, and this is even more important in the current circumstances."

As a female leader, Lyndsey says, it's imperative to support other women, build strong professional relationships, and benefit from collaboration not just competition. Lyndsey enjoys seeing her team develop their skills and strengths, and says it's crucial to celebrate wins and successes. She is an advocate of sharing kudos publicly. "It's not just about their role at Redis Labs," she says. "It's about roles in the future."



Adi Stern

VP of Human Resources

OFFICE: Mountain View

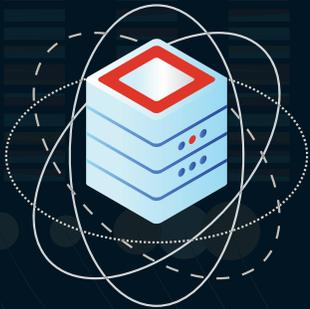
Few Redis Labs employees have been around as long as Adi—she joined nearly six years ago as our first HR staffer. Back then, Redis Labs had 25 employees, all based in Israel. Now, as Vice President of Human Resources and a member of the Redis Labs executive team, she manages a team of HR business partners, recruiters, and office managers around the world. "I believe that HR leaders build bridges between management and employees," she says. "I enjoy working with our senior leadership to set a strategic direction for the business and for employee success, drive Redis Labs culture and values, deliver impactful HR initiatives, hire top talent, and keep our employees engaged."

Leading by example is critical to creating a positive culture and a meaningful set of company values, she says. She values transparency, open communication, and trust. As a mom of four kids, she also understands how challenging (and rewarding!) it can be to balance work and personal life: "I set high standards and expectations for my team, but always try to treat them with respect and empathy." ■

9

Things Your **DATABASE** Must Do

BY HALEY KIM



To keep up with the evolving needs of modern enterprises, your database platforms have to do more than ever before

Today's databases face unprecedented challenges: they must work with mountains of disparate data, return results in the blink of an eye, and cope with hugely complex technology environments, all while remaining easy to work with and highly available. To meet those challenges, modern database platforms must possess these 9 key characteristics:



INSTANT PERFORMANCE

Modern databases have to respond in less than 1 millisecond to avoid becoming a performance bottleneck for today's applications. Databases running on spinning disks simply can't keep up. A caching layer in DRAM can help speed up common requests to slow databases, but this adds complexity and can't always serve every request quickly enough. More and more companies are turning to in-memory databases, which can respond in less than 1 millisecond, with no need for a separate caching layer.



SCALABILITY

Modern apps work with increasingly large data sets. Companies must plan for cost-effective ways to scale their data platform to meet overall growth (a good problem to have!) while also coping with seasonal surges and unexpected peaks in demand. Linear scaling is critical to making that possible without requiring massive infrastructure investments.



HIGH AVAILABILITY

The inability to quickly recover from a database failure can result in loss of data and frustrated users, an unacceptable problem in everything from financial transactions to online orders. That's why choosing a database that offers high availability with five-nines (99.999%) uptime is so important.



TIERED-MEMORY SUPPORT

Database designers are turning to tiered storage schemes, putting the hottest data in DRAM, while warm data resides on persistent memory options like Flash-based solid state discs—which are faster than spinning disks but cheaper than DRAM. They’re getting 60–70% of DRAM performance at a much lower cost.



SIMPLICITY AND EXTENSIBILITY

Because no single data model can work well with all kinds of data, you can end up deploying multiple databases in the same organization, or even the same application. So, what’s the solution? A multi-model database offers multiple data structures in the same database, cutting complexity and overhead by reducing the need to provision and maintain a different database for each data model required.



ADVANCED DEVELOPER TOOLS

In addition to being simple and versatile, databases must also be easy for developers to use. While command line interfaces (CLIs) remain the most common way to work with a database platform, there’s increasing demand for a graphical user interface to make it easier to manage the system and support analysts who want to explore and interact with their data visually.



CLOUD NATIVE

The rise of cloud computing, hybrid-cloud, and multi-cloud computing means you no longer have to manage the internal workings of the database you use. But it’s not just about buying a Database-as-a-Service (DBaaS)—to maximize cloud benefits, every element of your technology stack has to work with a wide variety of resources delivered via the cloud. Your databases must play well with microservices architectures as well as containers and container orchestration systems, such as Docker and Kubernetes, and work across multi-cloud and hybrid cloud environments.



OPEN SOURCE DNA

Even the most conservative enterprises now realize there’s no reason not to rely on open source solutions for virtually any database use case. Having open source DNA is essential: it’s the only way to ensure a technology is as extensible as possible, and gets updated as quickly as possible. Plus, roots in open source means that developers address what the community really needs, rather than what a vendor can do or wants to do.



NoSQL FOR THE FUTURE

Today, most of your data is likely not structured and would be very difficult to organize in a table, as it is in traditional SQL databases. Now, NoSQL databases put unstructured data in a document and use key-value data storage and search capabilities to find what you’re looking for. SQL databases will never go away, but NoSQL is the future—that’s where the most-valuable use cases are being addressed. ■



◀ McNealy onstage at the 2006 RSA Conference.

**HOT
SEAT**

Q & A with Scott McNealy

He led Sun Microsystems for 20 years. Here's what he learned about rediscovering his leadership style to manage through crisis. BY FREDRIC PAUL

Scott McNealy is a Silicon Valley legend. From 1984 through 2006, he was CEO of Sun Microsystems, a cornerstone of the computer industry born out of the Stanford University Network (SUN) computer project. While at the helm of Sun Microsystems, McNealy oversaw the development of the Java programming language, the Solaris operating system, ZFS, the Network File System (NFS), and SPARC—while also selling millions of Sun workstations and servers.

As the son of an American Motors Vice Chairman and armed with a BA in economics from Harvard and an MBA from Stanford, McNealy brought a strong business perspective to the Valley. Since leaving Sun in 2006 (the company was acquired by Oracle in 2009) McNealy has been CEO of Wayin and co-founder and board member of Curriki. He's also a noted golfer and hockey fan.

Redis Labs caught up with McNealy at his Nevada home, where he discussed his hard-won experiences dealing with crises—and how to rediscover your management chops when it matters most.



ILLUSTRATION BY KLAUS VEDFELT/GETTY IMAGES

Redis Labs: COVID-19 is likely the biggest crisis many business leaders have faced, but you were CEO of Sun for 20 years. You must have faced many different kinds of crises—can you talk about how you’ve dealt with them and what you may have learned?

Scott McNealy: When I took over as CEO of Sun, Kodak, which was going to invest \$20 million into the company, called up and said, “We’re not interested in investing.”

I went out on the shop floor and saw that 30% of the computers had a little red hat on them, which meant they were not working. We had a mean time between failure of about four seconds.

That was a pretty interesting crisis, and we solved it in an interesting way. I knew the monitors were gonna blow up, so when we shipped a computer, we sent extra monitors to the local sales office, that we could deliver in 20 minutes. Customers realized that our competitors simply didn’t provide that level of service. We ended up turning a crisis into a competitive advantage. It was expensive, but it created a powerful attitude inside the company. We turned lemons into lemonade with that one.

Another time, at the end of our fiscal year, we were moving off our mainframe computer and we entirely

If you’re facing an existential threat or something that’s new or different, you’ve got to throw the playbook out of the window and get super creative.

lost our ability to book, ship, or bill for an order—all of it. We had a backlog that was off the charts, but we ended up losing money for the first time ever. It caused a huge crisis of confidence—with our customers, with our investors, with our employees, with our bankers, with everybody—because we just couldn’t ship product.

We solved it with elbow grease. We worked 24 hours a day, 7 days a week until we cranked through the transition. We moved to manual processes where we needed to, and we just faked it.

Redis Labs: Are there any common themes in how to respond to a crisis?

Scott McNealy: The common theme is, do what you've gotta do. The key is that you can't take no for an answer. You've got to break the rules of normal operating procedure and do something that is off the charts.

If you're facing an existential threat or something that's new or different, you've got to throw the playbook out of the window and get super creative. We didn't do anything illegal, we didn't do anything unethical, we just didn't do things the way they've always been done. And we just wouldn't accept failure.

Redis Labs: In 2020, the world is facing a severe crisis in COVID-19. Are there particular ways that leaders can deal with a pervasive, external crisis like this?

Scott McNealy: It all depends on which side of the "essential" argument you're on. Are you essential or are you non-essential? When Desert Storm hit in 1990, for example, Sun was the dominant workstation in the Defense Department. We went into full 1941-style production mode. We actually had our workstations in Norman Schwarzkopf's tent.

It was a big deal. We were at war and our soldiers were at risk. And I'll tell you what—it was very, very easy to motivate the team when you're considered essential. It was very easy to say, "All right, gang, we need 50 workstations shipping tomorrow morning." That would be done in a heartbeat. You wouldn't have to ask people twice, because they were on a mission.

I've got to imagine that a lot of companies right now,

We tried to make the cuts to the level that we needed to get to, plus a little bit more. If you're gonna tear the Band-Aid off your hairy arm, do it quick, and make sure you pull it all the way off.

like Amazon and Zoom and others, understand that they are absolutely on the mission-critical, essential, side of saving the economy or saving people. My good friend, Miles White, who has run Abbott for decades, says everybody there is all hands on deck trying to get diagnostic tests out. In that situation, managing and leading is basically trying to organize, not motivate. It's prioritize, not incentivize.

Redis Labs: So how can leaders rediscover their management chops when things get really tough?

Scott McNealy: We've never had a dip like COVID in the computer business. But when we did experience slow-downs, I noticed that people tended to show up on time for staff meetings. At 8 a.m., they would be sitting in their chair, workstations open, hands on the keyboard, ready to take instructions.

Whereas when we were growing super fast and blowing out our numbers, I practically needed a whistle and a gavel to get everybody to sit down and start the meeting. I'd have to talk loudly and aggressively and firmly to get the team to pay attention. I actually found leading in tough times easier. You felt more effective and people listened to you more. In fact, they were begging you to give them hope and excitement. You've got to rediscover your inner cheerleader and give people confidence.

Most importantly, when things are bad, you have to attenuate, not amplify the crisis. People are scared. One of the things I tried to do was use gentle humor to diffuse the pressure, but attenuating was absolutely critical.



If they see the boss amplifying the problems, then they freak out, and you've got adrenaline and fear operating instead of focus and attention and commitment.

When things are going really well, on the other hand, I tended to be a lot grumpier. People weren't listening or were expecting it would always be this easy. You start to think you're a superstar when things are going very, very well. Leaders have to be the one to say, "No, no, no, no," and "Focus, focus, focus."

Redis Labs: How do you help your team rediscover their focus in that situation?

Scott McNealy: It's subtle and it's hard. I always thought, "I can't show the fear." People would come in and say, "The sky is falling. The building is on fire. All our customers went away and we're running out of money." And I have to look them in the eye and show no fear. I have to say, "I get it, I feel your pain, but here's what we can do to go work on that. Here's how we can use that to our advantage" or, "Here's the best way to fight that challenge."

In many ways, I keep rediscovering that being a leader is sometimes acting. You can go home and find a place in the woods and start screaming, "Oh my God, the world is going to end," but you can't do that with your troops. When the commander starts to freak out, the chain of command loses faith. Leaders have to be stronger than they want to be.

Redis Labs: In a crisis, how do you balance what's best for your employees against what's best for your business and your shareholders?

Scott McNealy: At Sun, we had times where we had to cut back and do layoffs and restructure the business. And that was always tough. What we tried to do is make the cuts to the level that we needed to get to, plus a little bit more. If you're gonna tear the Band-Aid off your hairy arm, do it quick, and make sure you pull it all the way off so you don't have to keep pulling more hairs out.

It's no fun. It's horrible. You've got to do it with compassion. And you've got to do it soon enough to where you can afford to send people off with some severance pay and a chance of finding a new job.

But this is something I've never seen before. It's not like you can lay somebody off who works at a sports

Here's how I always tried to rediscover whether something was essential or not. Right after the downturn, write down everything you kept and why.

stadium and they can just go to another stadium.

The bottom line is you've gotta be absolutely brutal about laying people off if you don't have the cash to pay them. I'm just glad I'm not in the piñata right now.

Redis Labs: What do you mean "in the piñata?"

Scott McNealy: I talk about being a CEO as being in the pinata. You wake up every morning and it's dark and everything feels pretty good and you start to stretch. And then some two-by-four hits you with, "Hey, this happened or so-and-so quit or this product isn't working in the labs or that customer went to a competitor." But this isn't a two-by-four. This was a steamroller over the piñata for so many companies, basically a 100% stoppage in your business. In fact, the government said you can't open your doors. That's really different.

Redis Labs: What about your top performers—how do you keep them around and help them rediscover their motivation in a crisis?

Scott McNealy: I think it's incredibly important to get those 12, 15 top performers in a room and you say, "All right, gang, everybody is counting on those of us in this room." You don't say, "Everybody is counting on me." You say, "Everybody is counting on us."

And then you have to be very participative but not consensus driven. You can't wait till everybody agrees that this is the right thing to go do. You tell everybody, "Listen, I'm going to get everybody's opinion, and then on this particular topic, I'm going to make the decision," or, "On this topic, Mary is gonna make the decision." But we're gonna have a very participative conversation.



▲ Since leaving Sun, McNealy moved to Nevada and co-founded Curriki, which develops free online learning experiences.

PHOTO COURTESY OF SCOTT McNEALY

I want to know what everybody would do if they were the decision-maker. And then we're going to hand it to the person I identified and he or she will decide. That ensured everyone felt included and had the chance to offer their insights.

Redis Labs: We've talked a lot about dealing with a crisis, but what about coming out of a crisis? Any advice for when things start to get better and you're trying to ramp the business back up again?

Scott McNealy: The CEO has to understand what is essential and not essential. When you have to make cuts, you'll notice pretty quickly who's essential and who's not essential.

And way too many CEOs blow the critical make-or-buy decisions over time. The strategic value of a company is embedded in what it decides to make versus what it decides to buy or subcontract or partner on. Your secret sauce is what you make or design.

Here's how I always tried to rediscover whether something was essential or not. Right after the downturn, write down everything you kept and why. At Sun,

for example, we bought a bunch of sales offices instead of using the reseller channel. When the downturn hit we were stuck paying rent on all these facilities. If we had just sold through the resellers, we wouldn't have had that problem. The resellers are much more nimble.

Another way to tell what's essential? Ask your customers: "What do you need to know about our product? What questions do you have?" The questions they ask will tell you who you need on board.

Redis Labs: Finally, any thoughts on how to prepare for the next crisis?

Scott McNealy: Here's another phrase that I learned: Leverage the cloud wherever you can. Rent whenever you can. Get short-term contracts wherever you can. A lot of people want to do long-term leases, but the world changes faster than you'll ever, ever believe. I think that people get trapped by not taking more short-term contracts rather than long-term. And I know a lot of people say, "Oh, you've got to think long-term." You can think long-term, but don't commit yourself long-term. Right now, people get that. ■

Managing REMOTE Workers

The Lessons of 2020

COVID-19 upended how, and where, knowledge work gets done. Here's what six thoughtful managers learned about keeping their remote workers productive and engaged. BY DIVYA MURTHY

Before 2020, fewer than 7 out of 100 Americans had the option to work from home. Six months into the year, that number has exploded—one May survey indicated that up to half of the pre-COVID-19 workforce had begun working remotely. The sudden, massive shift to remote work forced managers to adapt on the fly. Here are some remote-work management best practices forged in the crucible of COVID-19:

Build support for the transition

Regular check-ins and outlets for communication were the first order of business for managers like Alvin Richards, Chief Product Officer at Redis Labs. Richards' team, 35 members spread across the Bay Area, Paris, London, and Tel Aviv, went completely remote when California initiated its lockdown in mid-March. To help ease the transition, Richards scheduled video conferences for coffee mornings, questions-of-the-day, and more frequent one-on-ones. "On my team, because it

is distributed, we have never had so much time to get to know each other," Richards says. "I think that has been a valuable benefit of one-on-ones."

Similar bonding sessions work well for Shannon Mayer's team at Annalect, a data and technology agency under owned by Omnicom. Mayer, who is Associate Director of Experience Management, and her team hold biweekly video sessions to take their minds off work and stay connected.

Though particularly important during COVID, being mindful of employees' mental health is crucial to create a sustainable remote workplace. With no physical separation between home and work, Mayer has learned to be more conscious of reminding her team (and herself!) to take breaks, unplug, and separate working hours from non-working hours to avoid burnout.





“You know how they work and what they are capable of,” Mayer says. “If they are not getting to that point for whatever reason, check in on them and say ‘Hey, how are you doing? Are you OK?’”

Reduce clutter

Once remote employees settle into a rhythm, some managers focus on thinning out a crowded calendar, a common annoyance in many offices.

Sung Choi, Senior Director of Engineering at prescription eyewear retailer Warby Parker, stresses the concept of flow: that hyperfocus mode where time seems to fly by as large amounts of work gets done. Interrupting that flow with too many meetings can lower productivity.

“The only way you can get into that state is by having uninterrupted time,” Choi says. “And it takes about 15 to 20 minutes for an engineer to really start to get into that. And when they’re in that state, the last thing you want to do is interrupt them.”



This success might open up our scope of recruiting quite a bit, even though we were already starting to dip our toe in hiring more and more remote employees.

Sung Choi
Senior Director of
Engineering, Warby Parker

So Warby Parker cut down on mandatory but not essential meetings. The reduction in interruptions in the remote workplace has been a big positive for Choi's team, returning valuable chunks of coding time to his team of 45 engineers.

How to play catch-up with remote work

Once calendars and meetings are optimized, many managers try to make the most of their employees' time in a world where video calls replace conference rooms.

Yehong Zhu, a former Product Manager at Twitter (now founder of an early-stage media startup), managed a team of 15 in London from Twitter's San Francisco headquarters, so she was already hyper-aware of the challenges in working across time zones.

Zhu learned it's extra important to take meticulous notes if all team members cannot attend the same meetings. That way, "When your workday ends and the London team starts working at midnight your time, they have all the information they need," she says.

Emphasizing asynchronous communication can also help teams work across multiple time zones. Avoiding unnecessary linear, quick-response communications makes things easier for everyone. That's how GitLab, an open-source project turned remote software-development company, was able to break down location barriers, says Darren Murph, GitLab's Head of Remote. "We break decisions and projects down into their smallest possible components and enable teams to make independent decisions about those components," he says.

Reduce reliance on stressful video calls

But after months of completely remote work—often with unprecedented distractions at home—managers have learned over-reliance on video conferences can add stress. In response, innovators are working to update outmoded tools for online conferences:



We are experiencing a revelation that work and geography can be decoupled. If one's work can be done from anywhere with a stable internet connection, this opens the door for a much more fulfilling life.

Darren Murph
Head of Remote, GitLab

discussion boards, shared online documents, and chat rooms. Loom.ai is a videoconferencing service that lets teams use responsive emoji-style avatars instead of live webcam views like Zoom. Its playfulness aside, Loom.ai gives users the option to participate visually without being on video.

Pragli, meanwhile, re-imagines an audio-based virtual workspace. The app shows team members as cartoon avatars spread across a map, with their doors "open" or "closed" for calls and chats—"kind of like a walkie-talkie," co-founder Doug Safreno told the *New York Times*, freeing up the constraints of being tethered to the desk chair and focused on a screen.

Collaboration tools like Pragli and Loom.ai combat the missed in-office interactions and reduce the tedium of staring into a screen for long hours—both longer-term impacts of sustained remote work.

Mend the social fabric

As many companies are learning this year, satisfaction with remote work dips over time, per a 2015 study by the Association for Psychological Science. Isolation can become a significant deterrent for sustained remote work—workers miss the water-cooler conversations and unplanned interactions that build camaraderie and help create company culture.

"We have scheduled social calls that are specifically designed to help team members meet and interact

virtually without an agenda (virtual coffee chats), global talent shows, and Juicebox Chats—video calls that let our teams use their Zoom accounts for kids to converse, play, and bond with each other across oceans and time zones,” says GitLab’s Murph.

To fight fatigue and flagging enthusiasm, it’s important to periodically evaluate the purpose and scope of social meetings. If they are not working as intended, Redis Labs’ Richards learned to try alternatives like giving employees that time to work on a personal commitment or off-screen hobby. “It helps give a mental break, time to decompress, whether that’s playing a guitar or working on a personal blog,” Richards says. “With the blur between work and home life, either can happen at any point in the day.”

Expand the talent pool

Finally, as companies learn to master remote work, there’s an opportunity to hire great employees who might live too far away to come into the office. For Choi at Warby Parker, this has pretty much eliminated concerns about expanding the talent pool by hiring truly remote employees.

“This success might open up our scope of recruiting quite a bit, even though we were already starting to dip our toe in hiring more and more remote employees,” he says. “I think we’re gonna be really thinking long and hard about whether certain teams can operate *entirely* remotely.”

But what about the remote hiring process? Once a candidate has been identified, it’s a good idea to include the team during the interview process, per online applicant tracking service Recruiterbox—remote work may be independent, but it is not done in isolation from the rest of the team.

Besides the typical questions about the job role and fit, managers should ask candidates about their motivation to work independently, their ideal schedules, and how they see their role in relation to others on the team.



Stay ready to return to the office

The long term effects of remote work are not yet clear, and many people will want to return to their offices when it’s safe to do so. But there will be no going back to pre-pandemic prohibitions on remote work. The trick will be to balance the immediate productivity gains enabled by remote work against the important long-term connections, cooperation, and team-building that may require more face-to-face collaboration.

This unexpected and unprecedented global experiment is challenging managers around the world. Creating an efficient virtual workspace—with room for manager check-ins, one-on-ones, and well-planned social activities—is one part of the solution. Other possible tactics include periodic team retreats and a staggered work week where teams meet up once or twice to work together while still leaving time to work remotely with fewer distractions.

“It’s extra important to take meticulous notes if all team members cannot attend the same meetings. When your workday ends and the London team starts working at midnight your time, they have all the information they need.”

Yehong Zhu
Former Product Manager, Twitter

Done right, the combination could prove a dramatic improvement for both companies and their workers. “We are neighbors, sons, daughters, and community members first—colleagues second,” Murph notes. “We are experiencing a revelation that work and geography can be decoupled. If one’s work can be done from anywhere with a stable internet connection, this opens the door for a much more fulfilling life.” ■

Meet the Redis ST★RS

Get to know a trio of Redis community members and discover the innovative applications they're building. **BY HALEY KIM**

The Redis Stars community is incredibly passionate and creative, and we are constantly inspired by the people who use Redis to power innovative applications. *Rediscover Magazine* is proud to showcase a sampling of community members who have rediscovered Redis to help them conquer their data challenges.



Carlos Justiniano

VP of IoT and Cloud Platforms, Zenerchi

Carlos is a three-time RedisConf speaker, longtime Redis user, and expert in the Internet of Things and cloud-based platforms. Currently, he's VP of IoT and Cloud Platforms at Zenerchi, a biotech software company based in Salt Lake City, Utah. Zenerchi works on human-body simulators, 3D/VR/AR visualization products, and an AI cloud-based SaaS platform.

At Zenerchi, Redis is a critical component of the cloud stack, and the team relies on many Redis features to power its cloud-hosted containerized microservices. Zenerchi's BioGraph project for example, creates a navigable model of human physiology and is powered by RedisGraph.

"RedisGraph allows us to minimize the number items in our tech stack by simply extending our use of Redis," he says. "The synergy offered by the entire suite of Redis technologies creates a platform where the result is truly greater than the sum of its parts."

Carlos first started using Redis more than a decade ago, attracted to its diverse abilities far beyond caching. At Flywheel Sports, a fitness company, his team wrote



and open sourced the Hydra library, a Node.js package that leverages Redis to facilitate building distributed applications, including microservices architectures. It powered an entire nation-wide live and on-demand video and connected fitness service!

When asked why he loves Redis, he says, "I like to paraphrase the *Jerry Maguire* movie: you had me at data structures."



Matthew Goos

CTO and Co-Founder, MDmetrix

Did you know you can use RedisGraph to help save lives? That's what technologist Matthew Goos is doing with MDmetrix, an interactive data analytics platform for hospitals and surgery centers that help clinicians understand patterns in their clinical performance data, empowering them to make educated decisions to improve clinical treatments and workflows.

While MDmetrix has been helping clinicians since 2016—developing the first-ever opioid-free surgery center for outpatient procedures at Seattle Children's Hospital—the company immediately offered its COVID-19 Mission Control module for free to institutions around the country. The analytics platform is designed to help frontline workers treat COVID-19 patients more effectively by providing insights into screenings and treatments.



MDmetrix has been using Redis since early on in the company's history, first as a cache for its ephemeral data and now for its data storage. While it uses RedisJSON to store information about its users, MDmetrix's primary use of Redis relies on RedisGraph. "By using RedisGraph, MDmetrix is able to return data in milliseconds versus seconds with a traditional database," Goos says. "Redis helps us accomplish these amazing things."



Dan Pipe-Mazo

CTO, Elementary Robotics

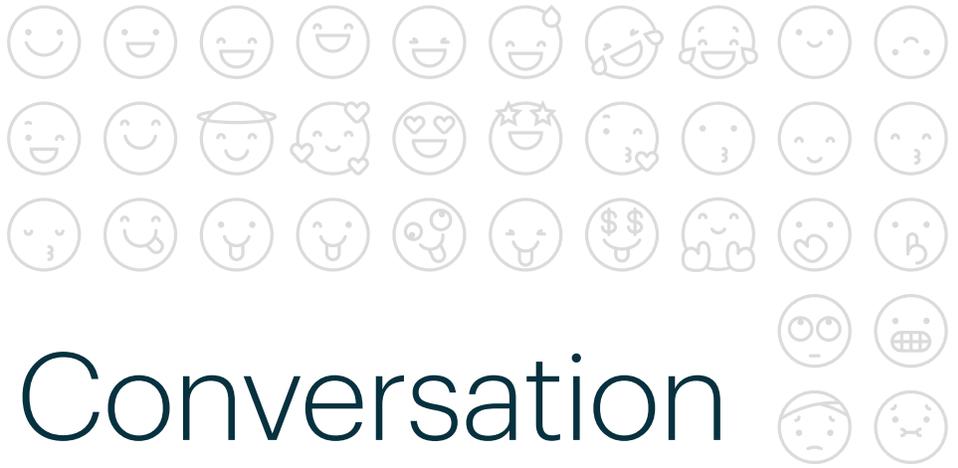


Elementary Robotics' mission is to make robot assistants more affordable and accessible with software. For CTO Dan Pipe-Mazo, discovering Redis Streams spurred the creation of Atom, a microservice SDK that the company uses as its primary robotics software platform.

"Using Atom, each piece of software Elementary develops is a reusable, Docker-containerized microservice," says Pipe-Mazo, who has a background in electrical engineering, firmware, IoT and mechatronics. "These microservices talk to each other through Redis—primarily Redis Streams—meaning that a given microservice can be written in any language that has a Redis client."

For the last two years, Elementary Robotics has been running 100% of its robotics data on Redis Streams. The team chose Redis Streams to deal with multiple high-frequency data inputs being injected at high speed. Since it was written in C, Redis also allows the team to run effectively and efficiently on ARM chipsets. "Redis Streams has not once had a bug or inconsistency, and has even worked well with camera data," Pipe-Mazo says.

Elementary Robotics also uses Redis in the cloud as a message bus for real-time data streaming from robots to web clients; as a time-series database for robot metrics; as a cache; and as a broker for Celery tasks. ■



An Iconic Conversation

BY DON STEINBERG

Icons that communicate ideas are as old as civilization and as modern as a 5G network. Ancient Egyptians had more than 700 hieroglyphs in their alphabet. Today's language of emojis for messaging includes thousands of symbols. Functioning as a visual shorthand, icons transcend language barriers. When Redis Labs recently revamped its website, we updated our palette of icons, but it's always a challenge getting them just right. The ideal icon is simple, yet fully conveys even complex ideas.

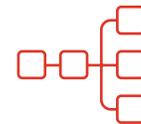
Let's take a lighthearted look at a few of our new icons (see sidebar), check out some extreme icons we rejected, and welcome a selection of icons that don't exist, but maybe ought to.

Redis Labs icons

A FEW EXAMPLES FROM OUR NEW SET OF COMPANY ICONS:



The Redis Labs icon for "text search" is as elegant as they come.



The icon for "event processing" tells its own little story.



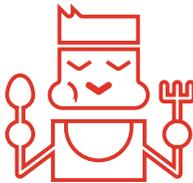
And we think our icon for "linear scaling" is truly inspired.

Iconic failures

Not every icon idea is a winner. Here are some that didn't make the cut:



RedisJSON



Data ingest



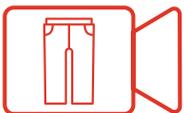
Social networking



ACID compliant

Icons we'd like to see

We love icons so much that we started daydreaming. What if there were Redis-style icons for everyday life?



Long pants are NOT optional for this video conference!



Help, I lost my keys again!



We have watched everything that's on television.



The boss's idea is a little bit strange.



Hey, how does Facebook know I was shopping for an umbrella?



Let's table that meeting 'til tomorrow. I have a 5 p.m. appointment.

Get Redis Enterprise as a fully managed service on Google Cloud

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The Most Secure Redis Experience

Rediscover security with Redis Enterprise 6.0

- Need-based access
- Reduced attack surface
- Easy secure scaling

