

Here Comes Trouble

First they Kazaa'd the music industry. Then they Skyped the telcos. Now Janus Friis and Niklas Zennström want to Joost your TV. (That's a good thing.)

By Spencer Reiss Issue 15.02 - February 2007

In a 10th-floor office a few blocks south of New York's Union Square, gangly Janus Friis folds himself into an undersize chair. He's here from London for a couple of days, toting a ThinkPad with demo aboard. A little white sticker on the machine's lid reads in retro-shiny silver letters: THE VENICE PROJECT.

Friis, 30, is half of the most feared digital tag team since Google's Sergey Brin and Larry Page marched across the Net. He's the visionary, a shy Dane in beat-up jeans and loud shirts. Niklas Zennström, an amiable 40-year-old Swede, wears the suit. Together, the pair has spent the past six years bit-bombing the Net's biggest and most vulnerable targets. Kazaa, their free file-sharing network, mushroomed amid the wreckage of the original Napster; it was managing 3 million downloads a month in 2001 when entertainment industry lawyers moved in. Next they built Skype, the free voice-over-IP telephone system, and sold it to eBay just over a year ago for \$2.6 billion. That figure alone guarantees that their calls get returned.

In a little conference room tucked behind a bull pen bustling with new hires, Friis flips open the laptop. He pokes a few keys, locates a Wi-Fi network, hits a few more keys. Then, with a final click and the slightest little smile, he spins the machine around and ... how about that: a Red Hot Chili Peppers concert, running full-screen. Another click. Razor-sharp footage of pandas munching shimmering stalks of bamboo. Click. Fear Factor, back from the grave. Click. Earth: Final Conflict. Click. Rocky and Bullwinkle.

Laptop TV! Not to mention desktop and palmtop. "It even looks pretty good hooked up to my plasma," Friis says. How do you say touché in Danish?

But he's not finished. A flick of the cursor brings up a see-through virtual remote control with buttons for Play, Stop, Skip, and Reverse—plus something novel: a box labeled Search. An icon at screen left opens a translucent program guide that lists Indy Racing, Warner Music, National Geographic, and other attractions interlaced with personalized "smart channels." How many? "Basically, it's infinite," Friis says. Another click opens a palette of widgets straight out of a late-model online social network: buddy list, IM, and options to "Rate It!" and "Share What I'm Watching!" Then up to the top for a window labeled Content Owner's Area. "We're still working on that."

"Pretty cool, yes?" he asks.

Yes.

Somewhere between amazing greatness and raving geek fantasies of world domination lives the Venice Project—or Joost, as it is expected to be rechristened by the time you read this. Zennström and Friis have day jobs as Skype's CEO and executive vice president of innovation, respectively. But in the cute way that Internet billionaires can do whatever the hell they want, they're teeing up the mother of all side projects. "It's really pretty simple," Friis says, shifting into mantra mode. "We've taken the best things about television and added the best things from the Internet."

In just over a year, the pair has roped together a crew of roughly 150 people, including the former chair of the Apache Software Foundation and MTV Networks' ex-global marketing honcho. About half are engineers and developers - a Star Wars bar scene of Nethead talent from IBM to Ubuntu—based in a five-story building in Leiden, the Netherlands, just south of the Amsterdam airport. Front offices in New York and London are busily forging ad and content deals. Server central will be in Luxembourg, home base of Skype's planetary phone network, with mirrors in Europe, Asia, and North America. The whole thing will run on the same proprietary Estonian-built code that keeps Skype's 136 million worldwide users chattering happily.

The vision: universal TV, running on a hybrid P2P platform—millions of exquisitely networked PCs fortified with traditional video servers. Free to viewers who download the

player app. Friendly to content owners, thanks to industrial-strength encryption. Delightful to advertisers, adding pinpoint targeting to their all-time favorite medium. Everyone's a winner!

There are a million reasons to think this is nuts, starting with the fact that television executives haven't exactly been eager to float their treasures on the pirate-infested waters of the Internet. There's also the little matter of competition—checked GooTube's bank account lately? And the cable and satellite guys might take exception to having their cash cows filleted. Then there are the TV moguls, who are scrambling to set up their own Web channels and quietly discussing the possibility of a joint, industry--sanctioned YouTube killer. Why should they hand the keys to their limos to a couple of guys who were dodging subpoenas as recently as last summer?

Silicon Valley has an old saying: Don't bet against the Internet. To which Zennström and Friis clearly hope to add a Scandinavian corollary, with roots going back all the way to the Middle Ages: Don't bet against the Vikings.

Like a lot of major-league geeks, Dirk-Willem van Gulik doesn't pretend to be a fan of television, at least in its traditional incarnation. His vice is Lego. But the Venice Project's chief technical architect also knows as much as anyone about megaweight bitstreams. He made his name figuring out how to transmit large scientific data files, and he's a long-standing director and former president of the foundation that supports open source Apache software, the world's most popular Web server. He's very clear about the economic folly of using big servers to mainline video to millions of desktops. "You can try to cut costs by allowing only crappy little images. You can limit the run times or make money selling hardware. But eventually the bandwidth bills will eat you alive. YouTube, iTunes, and the rest of them haven't got a chance. We just hope they take their time realizing it."

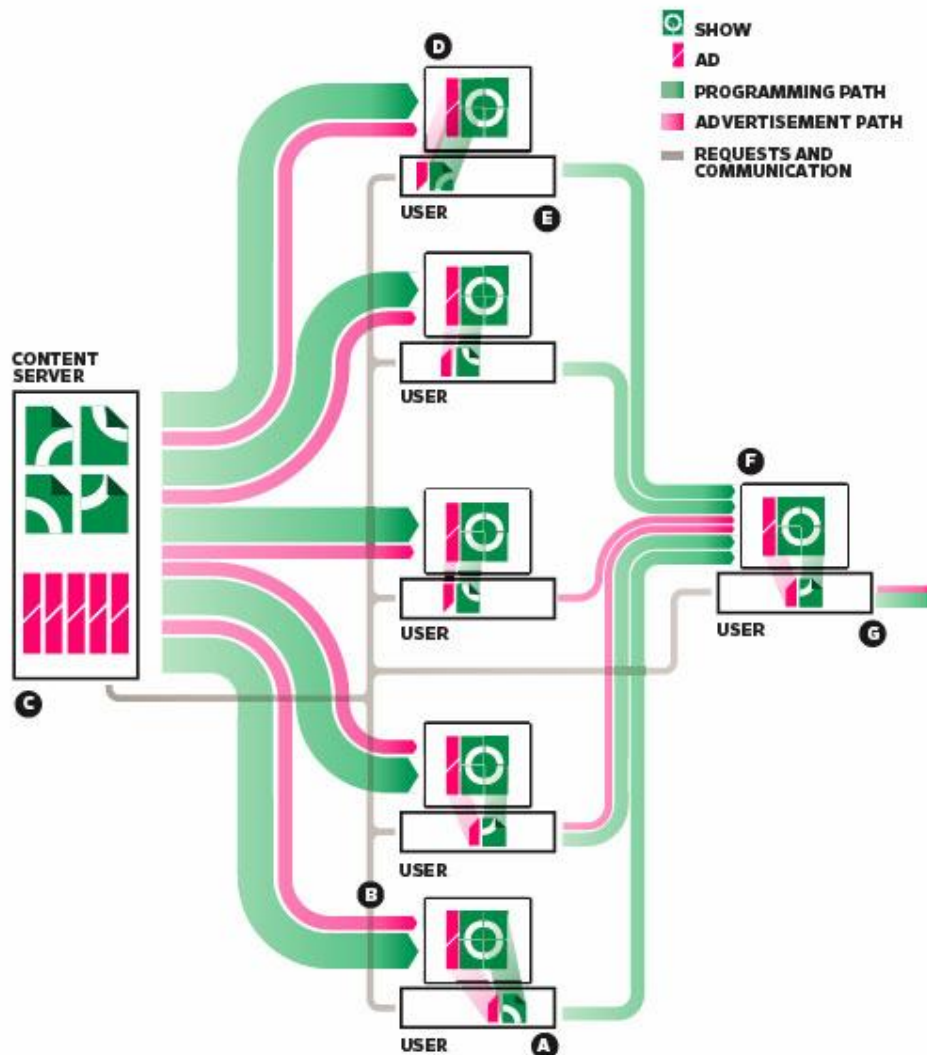
Arguments rage in tech circles about whether Moore's law will someday make bandwidth too cheap to meter. For now, though, the most cost-effective way to move video, music, and other large files over long distances is to distribute the task among a network of users—peers, in computerspeak. Indeed, a peer-to-peer network actually gains efficiency when a howling mob of would-be viewers suddenly logs in, creating exponentially more paths for the data to follow. To date, P2P networks have been used mainly to facilitate downloading, as with Kazaa and BitTorrent. The engineers in Leiden are taking the same scheme and applying it to a different purpose: streaming video directly onto a user's screen.

Video was part of Kazaa's original spec, but pathetic turn-of-the-millennium connection speeds pushed MP3-encoded music to the head of the hit parade. Besieged by irate record and movie companies, Zennström and Friis bailed and turned their P2P guns on the fat and happy telephone industry. Skype neatly sidestepped the copyright issue. But it also demonstrated P2P's ability to stream data, in real time, on a global scale. You just need very clever code to make it work.

By the time eBay put \$2.6 billion in their pockets, Zennström and Friis saw other potentially momentous pieces falling into place. Broadband - or something like it - had finally reached critical mass in the world's leading media market, the US. Led by gamers and fans of pirated movies, even nongeeks were figuring out how to hook computers to TV screens. And despite all the lawsuits, Big Media was finally coming around to viewing the Net as an opportunity, not just a threat. "The opening was there," Friis says. "Somebody needed to take it."

The Venice Project fired up in stealth mode, with Friis and Zennström writing the checks and sitting on the board, van Gulik steering the technology, and Fredrik de Wahl, a 31-year-old Swede, as CEO. By design, it was less a wiggly skunkworks than a mashup shop for existing technologies, principally open source/open standard software. Van Gulik calls it "a big exercise in systems integration." More simply: "We're snapping together Legos."

Block number one is data compression. In a heavily secured machine room in Leiden, Sun workstations crunch video that arrives on everything from Blu-ray discs to obsolete 1-inch tapes. The goal is to render DVD-quality pictures - no sudden freeze-ups or obvious artifacts - at around 400 Kbps. (On a typical 500-Kbps home connection, that leaves headroom for the vital job of uploading to other peers.) The Leiden crew also layers in meta-data - text items like alternate titles, credits, locations, foreign-language subtitles, and other search



The Television Will Be Revolutionized: How Joost's hybrid peer-to-peer system works. After Joost makes a show available, the first users to request it (A) query the network at large (B) to see whether peers can provide the program. If they can't, the request goes to a content server (C), which streams the show, interspersed with individually targeted ads, directly to each viewer's screen (D). While the users watch, short segments of the show and the ad are saved to their local hard disks (E). In this way, the entire show and a variety of ads are seeded throughout the network. So when another user (F) requests the same title, that show, along with a targeted ad, comes not from the server but from the network, one segment at a time. Once again, fragments of the show and ad are stored to the new user's hard disk (G), ready to be streamed to others. - Ted Greenwald

fodder. On the to-do list are user-added tags and a standardized front end that will let video producers pour their own files directly into the system.

The second piece explains the word hybrid in the project description. P2P networks cache content on users' hard disks as tiny fragments - in this case, 10-second video snippets. But new content has to start somewhere. Also, the system needs a server of last resort for rarely viewed material and bits that get lost in transit. Enter what van Gulik's team calls "long-tail storage": conventional servers big enough to hold 40 terabytes of programming - the equivalent of about 80,000 half-hour TV episodes, compressed for streaming. Three data centers, tied via Luxembourg to the main library in Leiden, will cover Europe, North America, and Asia, with more to be added as the user base expands.

Block three is Global Index, the P2P networking technology developed by Joltid, Zennström and Friis' Estonian software shop. Road-tested with Kazaa and Skype, Global Index orchestrates the flow of bits among potentially millions of peers and a complex skein of servers. Its big innovation is to carve a sprawling network into more manageable subnets

without sacrificing P2P efficiency. Ask the engineers for details and they become studiously vague.

They're happier to talk about one final set of key components. Van Gulik estimates that 80 percent of the project's software comes from existing libraries of open source code. Engineers culled the pieces they needed and stitched them together into gnarly databases and backend servers, plus the crucial 10-Mbyte app that runs on users' PCs. "Without Mozilla, Ubuntu, and a lot of other public code," van Gulik says, "we'd still be scratching our heads."

Lego-style architecture, open standards, and public code radically reduced both the build time—the real programming work just started last June—and the complexity of melding P2P, streaming video, encryption, targeted advertising, search, and the rest. It's also an invitation for geeky users to pile in with their own plug-ins and add-ons, using the onscreen community area as a launchpad.

Now we're getting out there: user-built television. Why limit audience participation to uploading content? For that matter, why hem in advertisers and producers with cookie-cutter formats? It's the latest lesson of the Net: Let them come and they'll build it. "A year from now we'd love to have content owners doing all their own uploading," van Gulik says. "The same with advertising. We'll probably lose control of the community side as well." He clearly likes the idea.

Paradoxically, one thing Zennström and Friis don't particularly want is user-generated content. That's partly tactical, a way to differentiate their new baby from YouTube. But they've also learned—the hard way—about the risks of letting the audience upload protected material. Kazaa's unhappy run-in with the law ended last summer with a \$115 million payout to settle copyright infringement claims going all the way back to the file-sharing service's earliest days. "We are going to be the single most legal platform on the Net," says David Clark, the New York-based advertising director, formerly with MTV Networks. "The entire ecosystem falls apart when people don't get paid."

He's not kidding about going legit. From top to bottom, Zennström and Friis are setting out a tasty smorgasbord of treats for content owners. Piracy worries? Industry-grade X.509 encryption is built in. Prefer your own branded channel? Slice and dice your programming any way you like. Want to deliver hi-def? Whenever or wherever typical cable user bandwidth reaches 2 Mbps. (P2P's cost advantage over conventional streaming increases at higher bitrates.) Need to block a country where your digital rights are already spoken for? No problem. Subscriptions and pay-per-view? They're in the road map.

There's more here than just pandering to Big Media. Bigger, better content pulls bigger, better audiences. And bigger audiences make P2P networks run more efficiently. So the aim isn't to create a geek playpen, it's to migrate television's mass audience to the Web. "We want to be in the space where people are doing what they do now with TV, watching four to six hours a day," says Henrik Werdelin, 30, another MTV defector who spearheads overall product development. And he can't resist taking a little potshot: "That's a lot of YouTube clips."

To pull that off, the history of both the Internet and television suggest an obvious price point: zero. "The ultimate value of Skype is free phone calls," says Friis, who cheerfully mixes rabble-rousing populism and cold-eyed business. "The ultimate value of what we're doing here is free TV."

But the project also aims to add value to free TV in a way that only the Internet can: less commercial time. Like, 90 percent less—as little as one minute per hour of viewing, if projections pan out. "The key in the past was volume and frequency," says Clark. "Now it's going to be quality."

One of the Leiden crew's top priorities is a backend ad engine that can pinpoint viewers by location, time of day, viewing habits, and opt-in profile information to serve up a perfect ad. Developed by open source geeks in privacy-centric Europe, the central database doesn't store any identifying data. Personal information is stored only on the user's own PC. Clark, the ad

sales chief, is happy to blue-sky the possibilities: “Buy all the Desperate Housewives viewers in a zip code. Or the first thing a given viewer watches on a given day.”

In theory, that kind of control will make the network much more valuable to advertisers. “We offer targeting they’ve never dreamed about in the TV world,” says Werdelin. “And a deeper relationship with customers. Not just deeper than TV, but deeper than most of what you get on the Net. I don’t think anyone really knows what those things are worth.”

Clark tells a story about a pitch meeting with the head of one of the world’s biggest ad and marketing groups. The executive showed up 25 minutes late, sank into a chair, and began inspecting his nails. Then the demo began. He sat bolt upright and asked: “Can we invest?” One reason for that enthusiasm is the ad industry’s desperation to stop Google from gaining the same dominance in TV commercials that it has in online ads. And it’s no stretch to suggest that marketers will jump at juiced-up television, as long as the viewer numbers justify the hassle of tailoring their marketing efforts to yet another new platform.

Which leaves a final question: content. What’s going to be listed on that lovely translucent channel guide when viewers start logging in en masse? The short answer is, at least initially, less than everyone involved would like. What the TV industry calls “A-plus content” is rare by definition. It’s also invariably snarled in thickets of exclusive rights. Not to mention that big media companies are rapidly developing their own online plans.

So Zennström and Friis are making a run straight at the most reliable early adopters: young men. Watch for sci-fi shows, rock videos, sports, comedy—anything with a testosterone angle. Deals are in the works with the three music majors, plus top US broadcasters and cable channels. For the rest of the world, there’s a modified PBS strategy: classic reruns, documentaries, and independent dramas. Nothing too obscure, though: Content that few people want to see—what Leiden engineers call “the too-long tail”—crimps a P2P network’s advantage.

At Skype’s sleek London headquarters, the two Vikings are penned in a small glass-walled conference room. Zennström is still under the gun to prove the wisdom of eBay’s purchase. He has confidence, though, in his recipe for turning bit-powered ideas into money-spinning businesses. “You can’t just put a technology out there and hope there will be a business in it,” he says. “You have to put together a whole consumer offering, a great instantaneous experience. A simple service that fills an obvious need and can be offered for free.”

Friis, whose role in Skype is mainly advisory, plays his part to the hilt, too: director of disruption. “YouTube, Google, Skype—we’re transforming whole industries into layers of software and making them more powerful at the same time. Before, it took a huge investment to reach a big audience—transmitters and studios and satellite links. Now you can just be Lonelygirl15.”

The mind-bender is that, once upon a time, the Net was supposed to kill television. Now two of the Net’s boldest entrepreneurs are trying to reinvent television. And not just broadcast technology but the user interface, the ads, the whole experience. Television perfected!

Five minutes away, at the project’s new Covent Garden office, a corner shelf holds an Xbox, a DVD player, and a banged-up TV; over-the-air digital TV, offered by a service called Freeview, is a current UK smash. Even Friis, the perpetual revolutionary, admits a taste for some of the fruits of the ancien régime. “What I hate is having all these DVDs piling up with back episodes of *The West Wing*,” he says. “TV is so trapped in the box. But the fact is, it’s the most powerful medium ever invented. It’s not going to just fade away.”

Can they wrestle the broadcast beast onto the Net? Friis and Zennström are players now, big names with a fearsome track record. Even more amazing (or scary, if you’re a TV insider), they have zero stake in the traditional media pillars. They don’t own shows, channels, or networks. They don’t have billion-dollar ad deals to protect. Steve Jobs has married Walt Disney. Jeff Bezos is dating Hollywood. Google, the ur-online software company, is building a globe-girdling web of proprietary pipes and monster servers. And along come these two Euro-geeks—where the hell is Denmark, anyway?—toting serial killer technology, a multimillion-dollar checkbook, a blank slate, and a crazy dream.

Which, of course, the Venice Project, aka Joost, is. TV and the Net are two of the biggest, most complex media systems ever built. Their ongoing collision—actually a three-way, with phone networks skidding into the nexus—is unleashing forces that overshadow every previous era of media disruption. The Net in particular is brutally centrifugal, fragmenting newspapers into articles, movies into clips, and CDs into songs, all dispersed to servers across the earth. It has never been kind to enterprises that try to gather everything under one roof. Google’s \$140 billion value derives not from some comprehensive offering but from simply showing people where the fragments can be found. Total solutions like AOL, Netscape, and—yes—Joost swim against the tide.

	Full Shows	Clips	Streams	Downloads	Revenue Sources	Content
AOL In2TV	•		•	•	advertising	<i>Babylon 5, Falcon Crest, The Fugitive, Max Headroom</i>
BitTorrent	•			•	pay-per-show	<i>24, Chapelle Show, SpongeBob, Laguna Beach, Prison Break</i>
Brightcove	•	•	•	•	advertising, pay-per-show	National Geographic, Time Life, Warner Music
Google Video	•	•	•	•	pay-per-show	<i>CSI, Charlie Rose, Star Trek: Voyager, Macgyver, Now</i>
iTunes Store	•			•	pay-per-show	<i>Battlestar Galactica, CSI, Desperate Housewives, South Park</i>
Joost (the Venice Project)	•		•		advertising	<i>Earth: Final Conflict, Fear Factor, Indie Racing</i>
JumpTV	•	•	•		advertising, pay-per-show, subscriptions	Sports, news, and music from 180 networks in 60 countries
MediaZone	•	•	•	•	advertising, pay-per-show, subscriptions	Mostly sports, from 100 networks in 12 countries
Peer Impact	•	•		•	pay-per-show	<i>Babylon 5, Dukes of Hazzard, Flintstones, The Loop</i>
YouTube		•	•		none	Whatever users upload, plus a special deal with CBS

From Airwaves to Bitstreams: Companies are racing to put A-list TV on the Net. Joost isn't the only business trying to bring the broadcast TV experience to the Internet. Even as the networks hammer out their own offerings, upstarts are cutting licensing deals to deliver streams and downloads, clips and full shows - with various plans for making a buck. Here's a quick survey of the competition. - Lucas Graves

The bad thing about being Internet rock stars is the temptation to jump into things that most people with a billion dollars would instinctively flee. The good thing is that you might actually succeed. Zennström and Friis have made larger-than-life careers of tackling ever bigger opportunities. Each time, they've dragged a hidebound industry kicking and screaming into the 21st century. Broadcasters, watch your backs.