

Digital Single Market

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Exploring RINA: The Recursive InterNetwork Architecture

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The IRATI project, a US / Europe, is setting out to build a new, better protocol for the Internet as we know it.

Every day, we enjoy the benefits of a myriad of distributed applications delivered through the Internet. So you might wonder why the European Commission is investing in improving a system that already works so well. In fact, the current high performance is mostly courtesy of an army of skilled engineers who keep it up and running; something which leads to expensive operating costs. Moreover, the current Internet faces limitations in the areas of performance, resource utilisation, multi-homing, mobility or security; limitations that are well [documented](#) [1].

✘ Many researchers argue that it is the requirements of new applications (such as mobility, multi-homing, guarantees on throughput and delay or security) that cause issues for the underlying TCP/IP protocol. The IRATI project comes at the issue from a different perspective: the problem does not hide in the high demands of today's applications, but in the [Internet's original design](#) [2]. Until today the general practice in the networking research community has been not to question these principles, but simply to build solutions on them to mitigate the different scaling, performance and security issues. This approach, [not uncommon in science when a field is still not properly understood](#) [3], has led to an ever-increasing complexity which causes the overall system to be very hard to manage and expensive to operate. Each new problem – a consequence of the original design principles of the Internet – is addressed with a new protocol, which often interacts in unexpected ways with the existing protocols, causing new problems and starting the cycle again.

However there is a very promising way out of this vicious circle: [RINA](#) [4], the Recursive InterNetwork Architecture. RINA is an attempt to go back to basics, starting without assumptions and producing a general theory of networking. The result removes the limitations of TCP/IP, and simplifies by orders of magnitude the current networking landscape. IRATI acts in partnership with the [US pioneers behind RINA](#) [5], who in turn were inspired by [European pioneers](#) [6] to research and develop two open source prototype implementations of RINA over Ethernet for the Linux and FreeBSD operating systems. The project [started in January](#) [7] 2013, where a [RINA workshop](#) [8] attracted over 40 expert researchers from all over the world, to present research results, discuss new collaborations, and build the RINA

community. (See [feedback](#) [9] on the event here).

The project does face challenges. For one thing, convincing the general public that a new network architecture would be better than what they enjoy today; for another, to convince all relevant Internet stakeholders to actually migrate to this new technology. Superior performance of the system will become better once there are actual demos to try; and we believe that, rather than migration; users can just adopt the technology as and when it has clear benefits from the adopters' point of view ([just as with any new technology](#) [10]). As remarkable as it might seem to to change the whole Internet - but the history of technology has shown that such that such technological shifts can and do happen - the original shift to the Internet of course being just one example.

You can follow the progress of the project work through its [website](#) [11] or [twitter account](#) [12].

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[1] http://rina.tssg.org/docs/Is_the_Internet_an_unfinished_demo_-_Meet_RINA.pdf

[2] http://rina.tssg.org/docs/How_in_the_Heck_do_you_lose_a_layer.pdf

[3] <http://csep10.phys.utk.edu/astr161/lect/retrograde/aristotle.html>

[4] <http://rina.tssg.org/>

[5] <http://csr.bu.edu/rina/>

[6] http://en.wikipedia.org/wiki/Louis_Pouzin

[7] <http://irati.eu/irati-project-startup-generates-media-interest-in-spain/>

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[10] http://en.wikipedia.org/wiki/Diffusion_of_innovations

[11] <http://irati.eu/>

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