Network Function Virtualization (NFV): Challenges(and Dependability)

Erico Augusto Cavalcanti Guedes <eacg@cin.ufpe.br>
PhD Student

Advisor: Paulo Maciel

Universidade Federal de Pernambuco

Motivation

- 2020
  - It is expected **32 billions** of devices connected to Internet

Motivation

- http://www.internetlivestats.com/one-second

and more than 2.4000.000 emails/sec

October 22-24, 2012 at the "SDN and OpenFlow World Congress", Darmstadt-Germany.

Network Functions Virtualisation

An Introduction, Benefits, Enablers, Challenges & Call for Action

OBJECTIVES

This is a non-proprietary white paper authored by network operators.

The key objective for this white paper is to outline the benefits, enablers and challenges for Network Functions Virtualisation (as distinct from Cloud/SDN) and the rationale for encouraging an international collaboration to accelerate development and deployment of interoperable solutions based on high volume industry standard servers.

CONTRIBUTING ORGANISATIONS & AUTHORS

AT&T:	Margaret Chiosi.
BT:	Don Clarke, Peter Willis, Andy Reid.
CenturyLink:	James Feger, Michael Bugenhagen, Waqar Khan, Michael Fargano.
China Mobile:	Dr. Chunfeng Cui, Dr. Hui Deng.
Colt:	Javier Benitez.
Deutsche Telekom:	Uwe Michel, Herbert Damker.
KDDI:	Kenichi Ogaki, Tetsuro Matsuzaki.
NTT:	Masaki Fukui, Katsuhiro Shimano.
Orange:	Dominique Delisle, Quentin Loudier, Christos Kolias.
Telecom Italia:	Ivano Guardini, Elena Demaria, Roberto Minerva, Antonio Manzalini.
Telefonica:	Diego López, Francisco Javier Ramón Salguero.
Telstra:	Frank Ruhl.
Verizon:	Prodip Sen.

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This white paper is available at the following link: http://portal.etsi.org/NFV/NFV_White_Paper.pdf

Network Function Virtualization

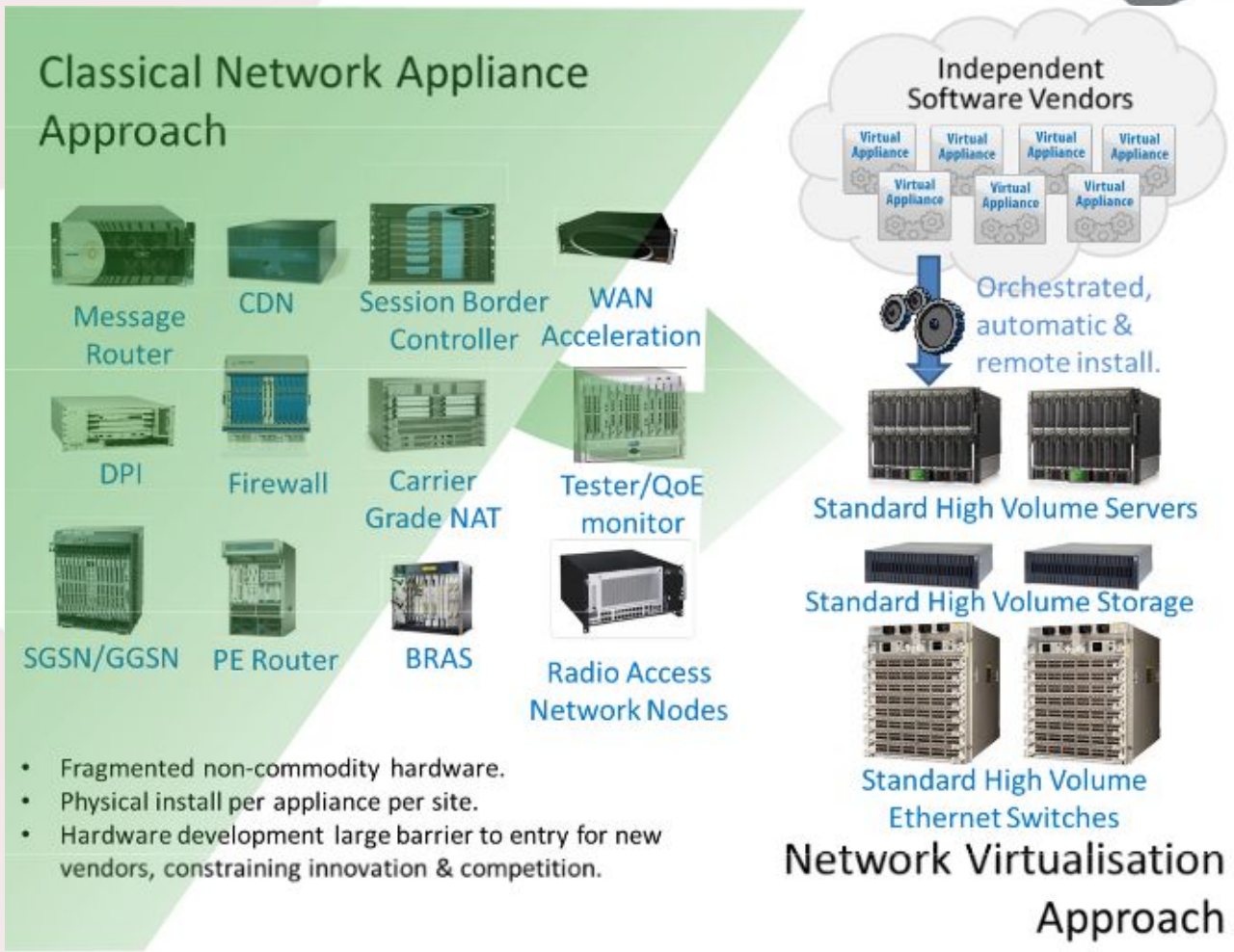


Figure 1: Vision for Network Functions Virtualisation

Network Function Virtualization

- **Network Functions Virtualization (NFV)**
  - It is one of the **most profound paradigm shifts** the networking industry has faced to date.

- **Proven functions, such as:**
  - routing,
  - policy,
  - firewall,
  - DPI, (and many others)

  will move from running on dedicated hardware appliances to running on unproven virtualized server platforms in the hope of achieving massive efficiencies.

Network Function Virtualization

- **NFV has drawn significant attention from both industry and academia:**
  - by **decoupling Network Functions (NFs) from the physical devices** on which they run, it has the potential to lead to significant reductions in:
    - **Operating Expenses (OPEX)**
    - **Capital Expenses(CAPEX)**
  - Furthermore:
    - it facilitates the deployment of new services with increased agility and faster time-to-value

Network Function Virtualization

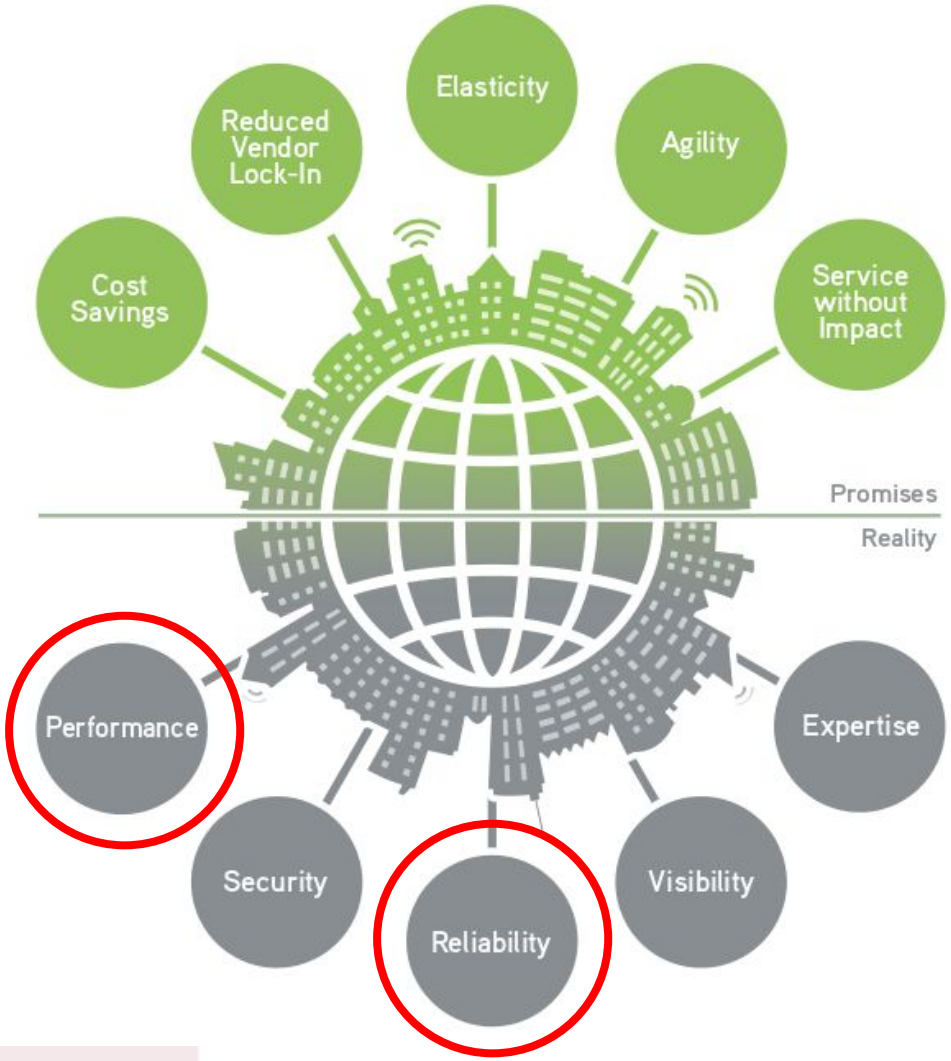
Everything known

becomes unknown again, and there are risks associated both with moving **too fast**, and **not fast enough**

Network Function Virtualization

Promises ⟶

Challenges ⟶



NFV - State of the Art

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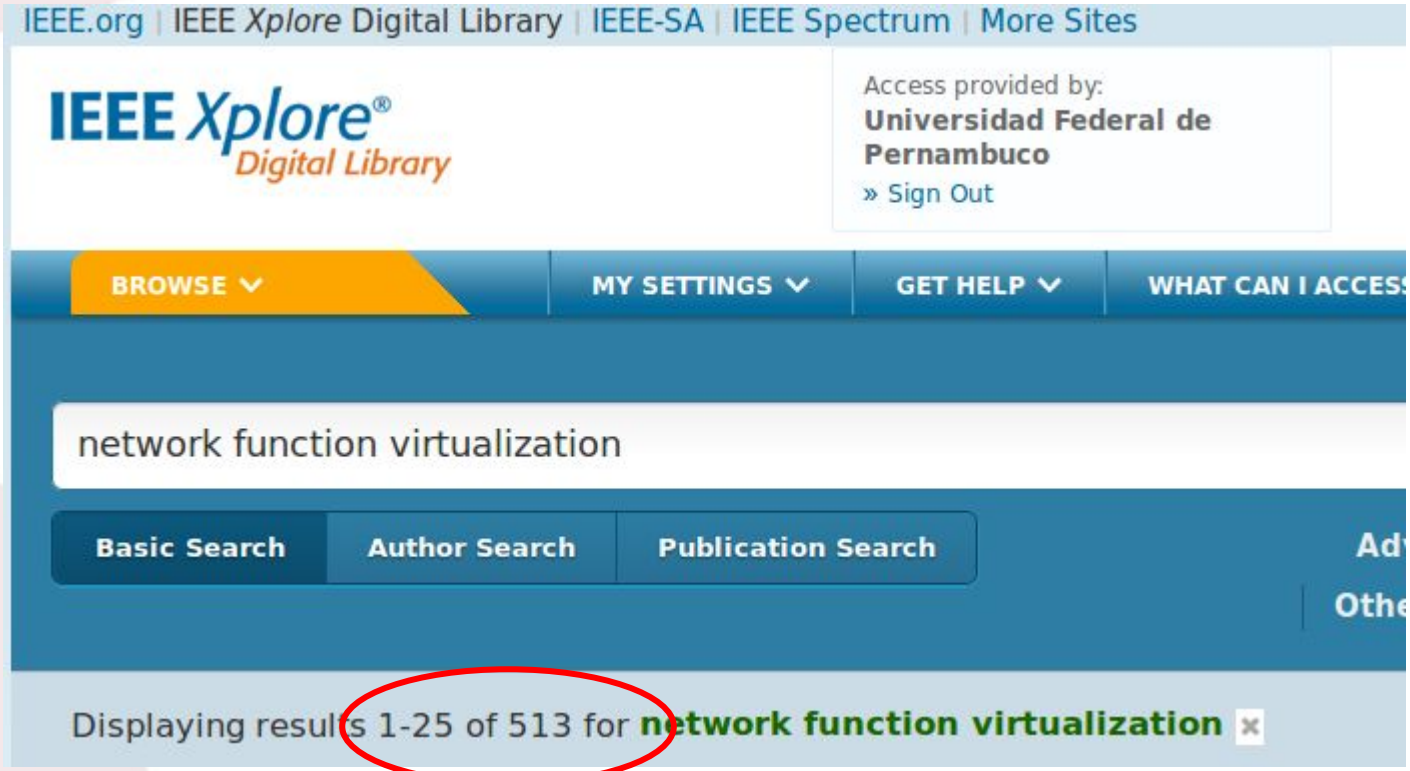

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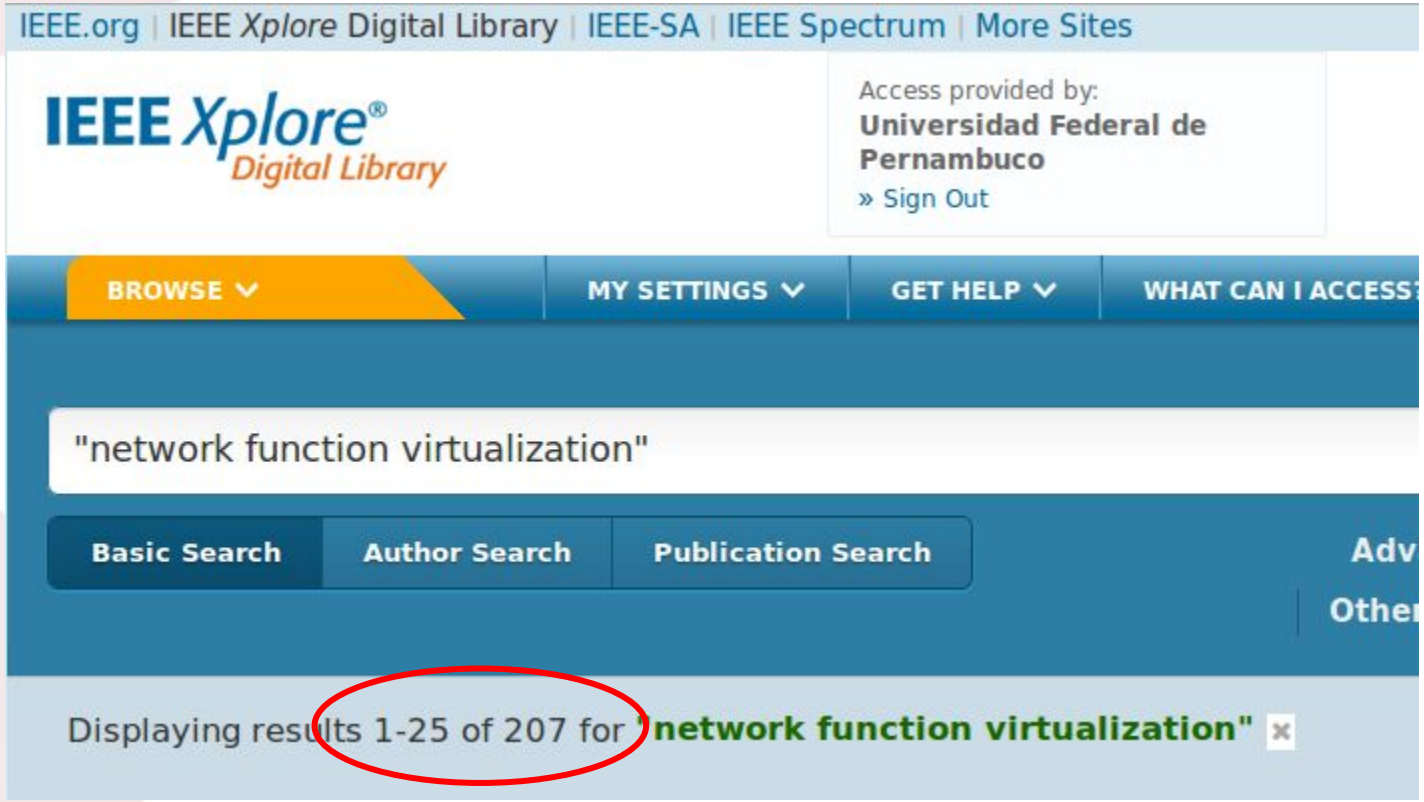

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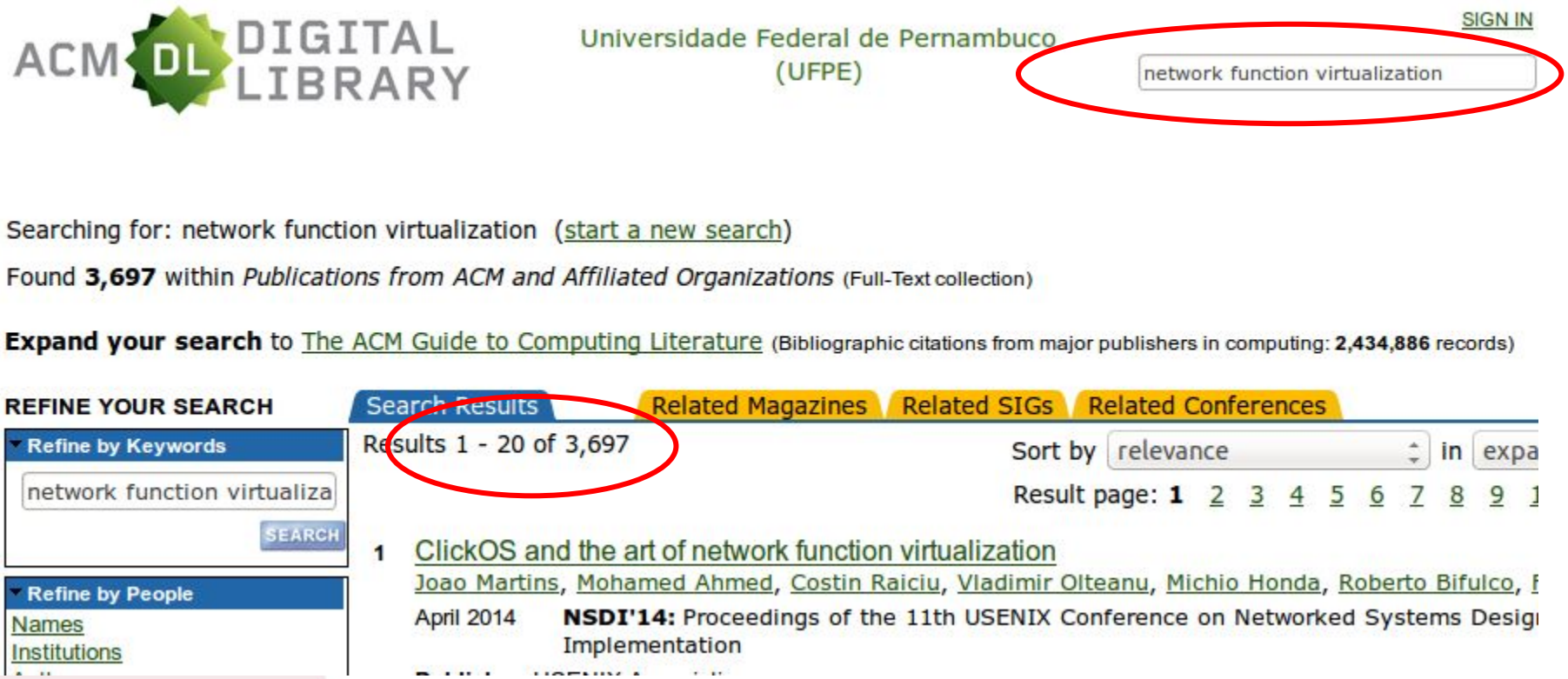

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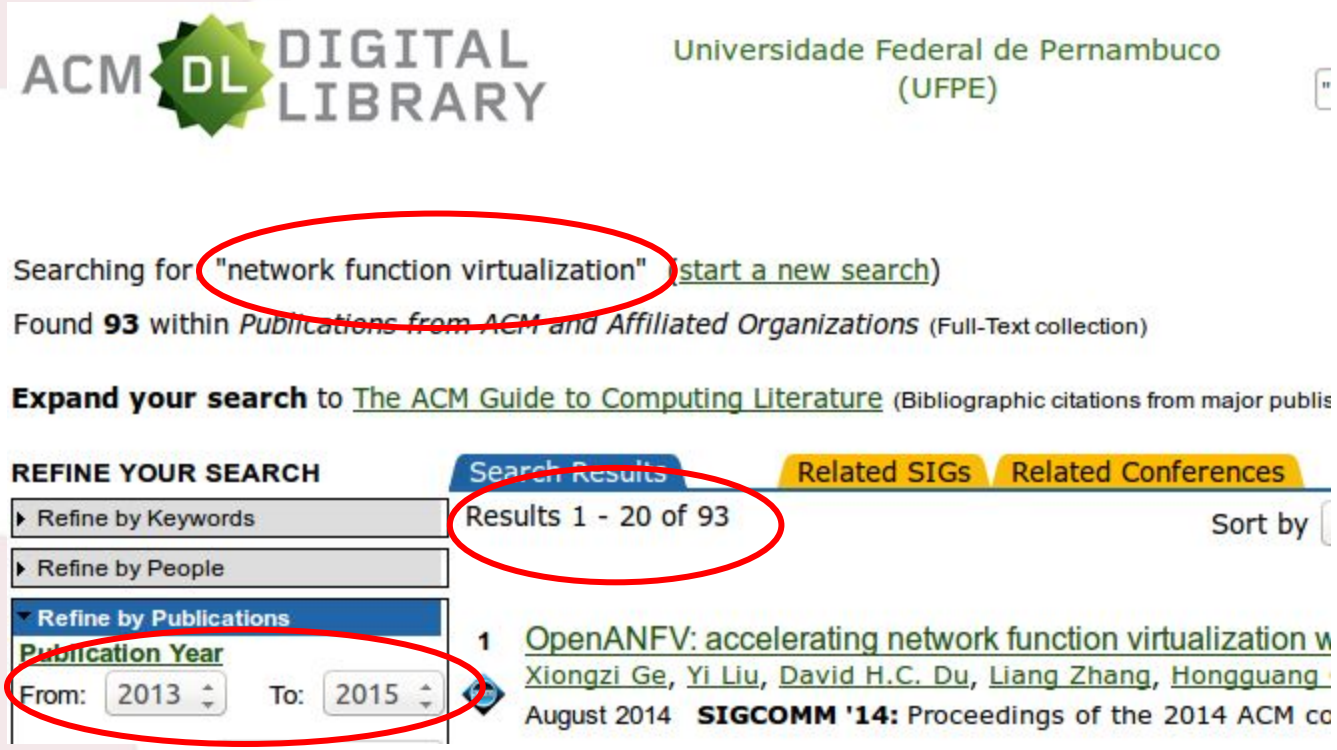

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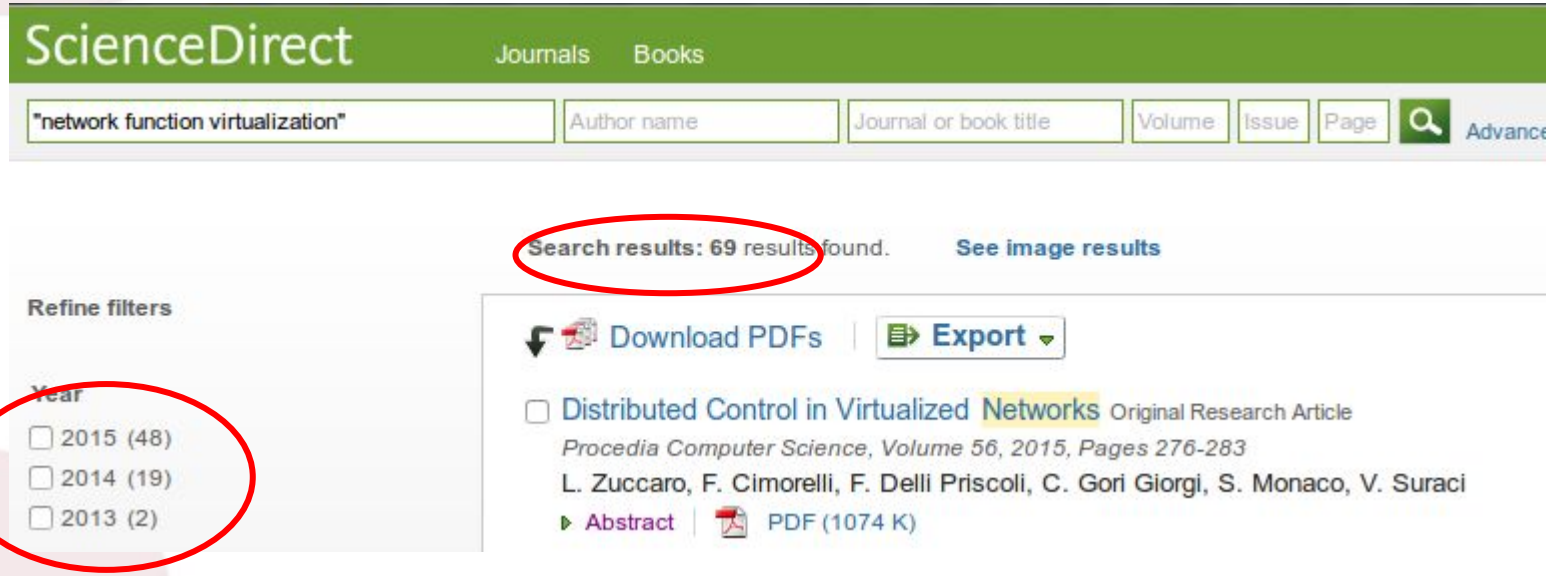

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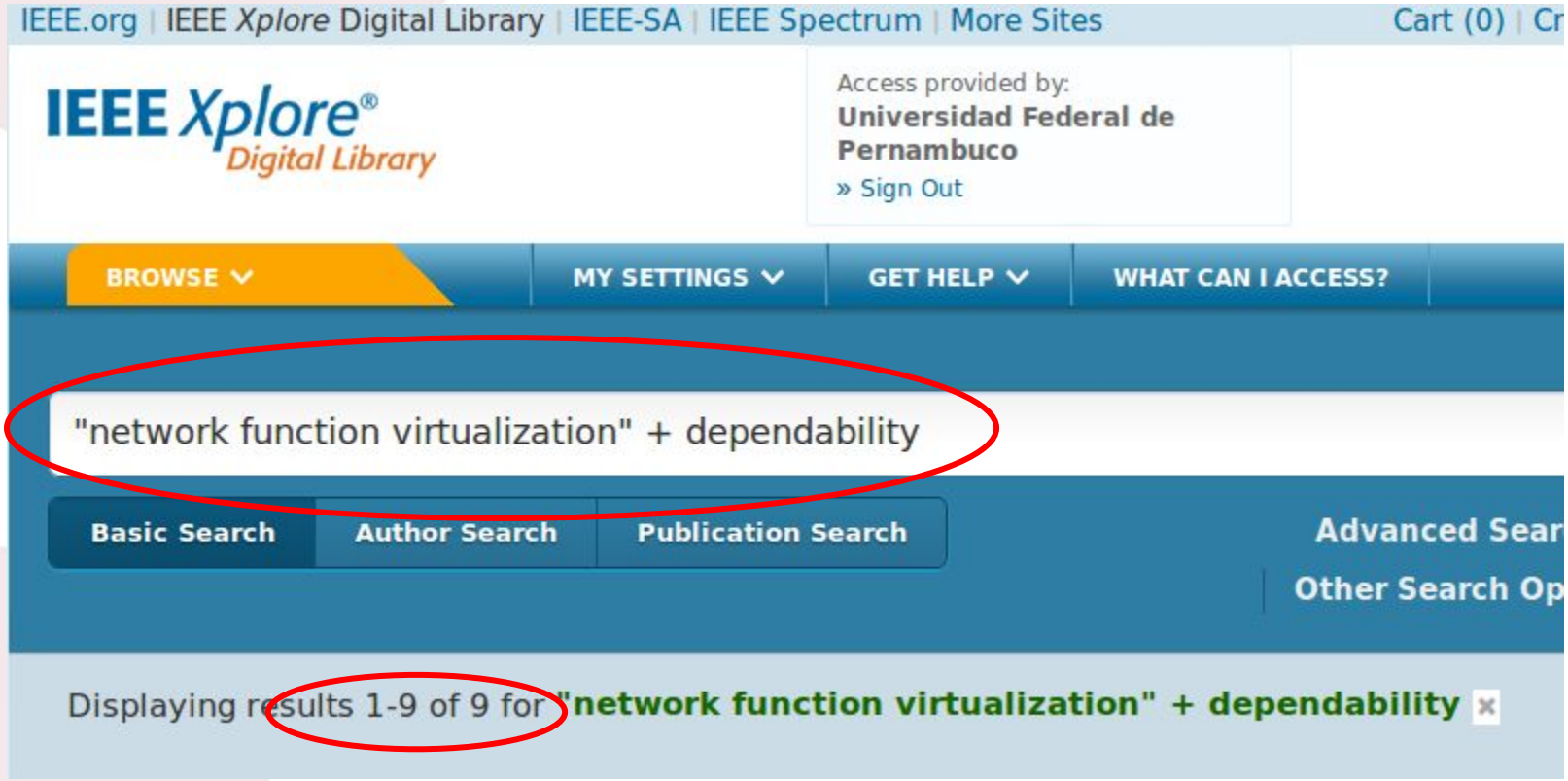

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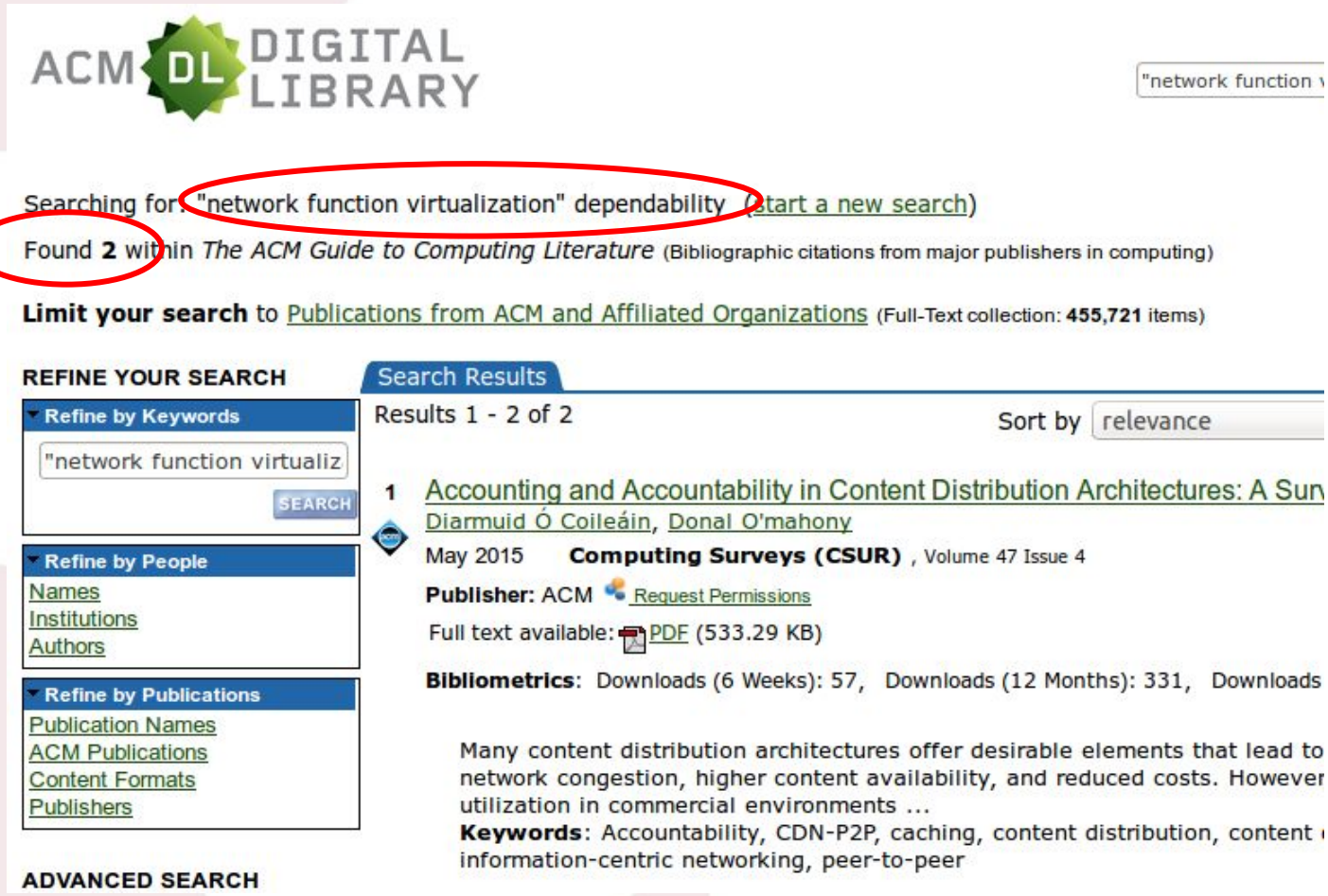


NFV - Survey

Network Function Virtualization: State-of-the-art and Research Challenges

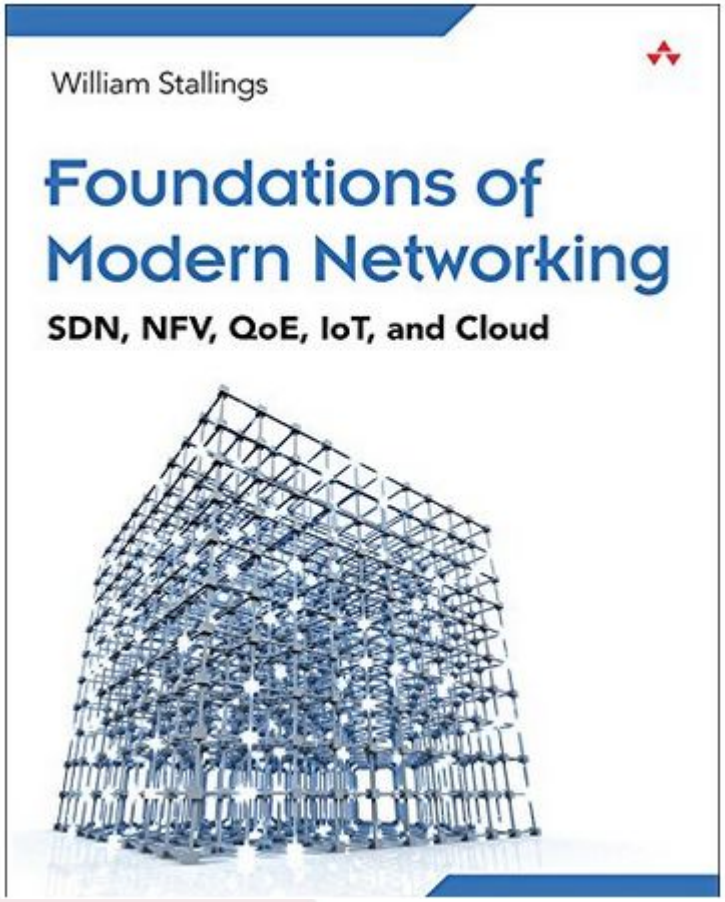
Rashid Mijumbi, Joan Serrat, Juan-Luis Gorricho, Niels Bouten, Filip De Turck, Raouf Boutaba

***Abstract*—Network Function Virtualization (NFV) has drawn significant attention from both industry and academia as an important shift in telecommunication service provisioning. By decoupling Network Functions (NFs) from the physical devices on which they run, NFV has the potential to lead to significant reductions in Operating Expenses (OPEX) and Capital Expenses (CAPEX) and facilitate the deployment of new services with increased agility and faster time-to-value. The NFV paradigm is still in its infancy and there is a large spectrum of opportunities for the research community to develop new architectures, systems and applications, and to evaluate alternatives and trade-offs in developing technologies for its successful deployment. In this paper, after discussing NFV and its relationship with complementary fields of Software Defined Networking (SDN) and cloud computing, we survey the state-of-the-art in NFV, and identify**

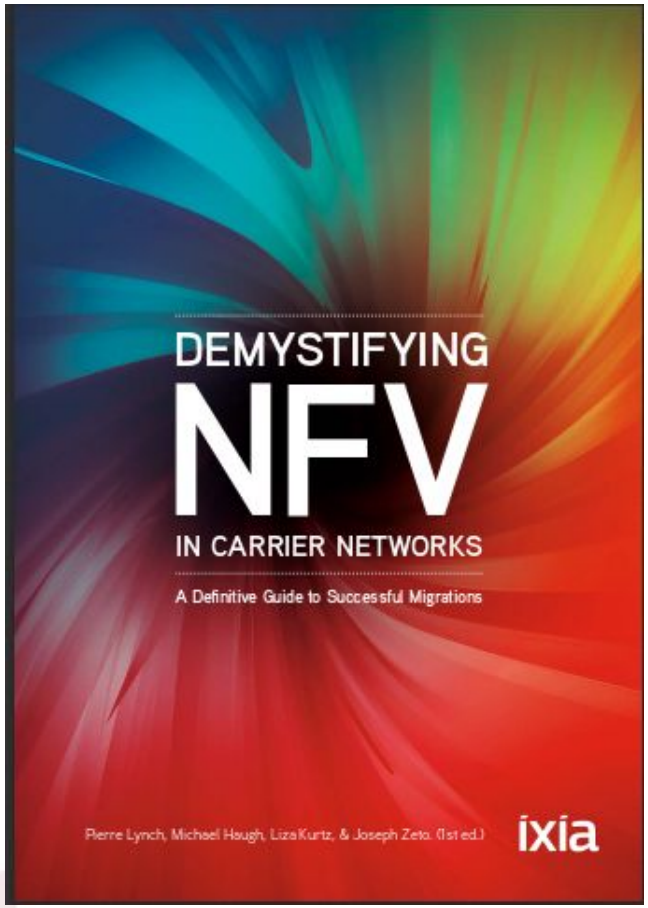
that due to the high competition, both among themselves and from services being provided over-the-top on their data channels, increasing prices only leads to customer churn. Therefore, TSPs have been forced to find ways of building more dynamic and service-aware networks with the objective of reducing product cycles, operating & capital expenses and improving service agility.

NFV [3], [4] has been proposed as a way to address these challenges by leveraging virtualization technology to offer a new way to design, deploy and manage networking services. The main idea of NFV is the decoupling of physical network equipment from the functions that run on them. This means that a network function - such as a firewall - can be dispatched

NFV - Books



2015, november 08



2013

So...

- **Goals**
  - to tackle performance and dependability challenges through the application of models in NFV due to use of virtualization
  - to produce recommendations of optimization in NFV environments

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Thank you

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Questions...