



## Estonian cloud information day (incl. GÉANT IaaS Framework) April 28<sup>th</sup>, 2017

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 **TIM**



# Agenda

- presented by: Silvio Pastore-Stocchi Sparkle Cloud Marketing
- Company presentation
- Description of why choosing Sparkle
- Cloud offering for Géant (AWS)
- Supporting Infrastructure (Brokerage platform)  
presented by: Francesco. ABRUSCI Sparkle Cloud Engineering

## Sparkle Overview

- A LEADING GLOBAL OPERATOR OFFERING A COMPLETE RANGE OF INTERNATIONAL SERVICES
  - MOBILE AND VOICE International Services
  - IP transit, Managed Bandwidth
  - DATA CENTERS and CLOUD Services
  - ICTsolutions
- Wholly owned subsidiary of Telecom Italia Born in 2003 with the objective of developing the international wholesale and the retail multinational corporate businesses
- Sparkle supports Telecom Italia Group business units delivering International Services
- Company data:
  - >800 employees,
  - presence in 37 countries,
  - Revenues 1.3 Bn €
  - > 1000 #PoPs (122 own)



## Sparkle Key Assets

### State-of-the-art Global Network

with own backbones in Europe, Mediterranean Basin and the Americas and ownership in submarine cables connecting Europe with South-East Asia and the Americas

### Global Services Portfolio

for Fixed and Mobile Operators, ISPs, OTTs, Media & Content Players, Application Service Providers and Multinational Corporations

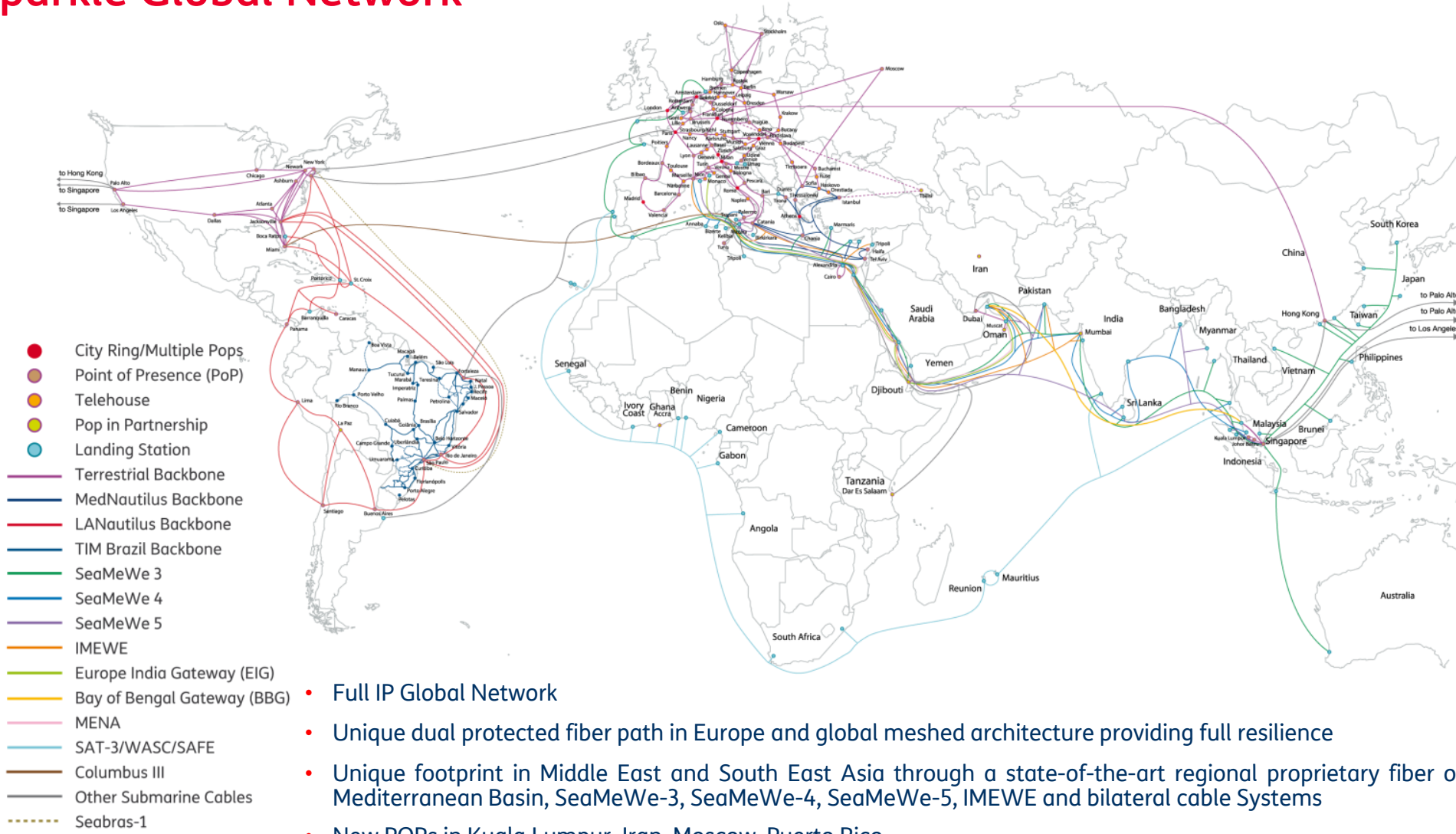
### Worldwide presence

in **37** countries based on fully owned companies and offices

### Customer Care

**capabilities** with multi-lingual call center

# Sparkle Global Network



## GLOBAL CAPABILITIES

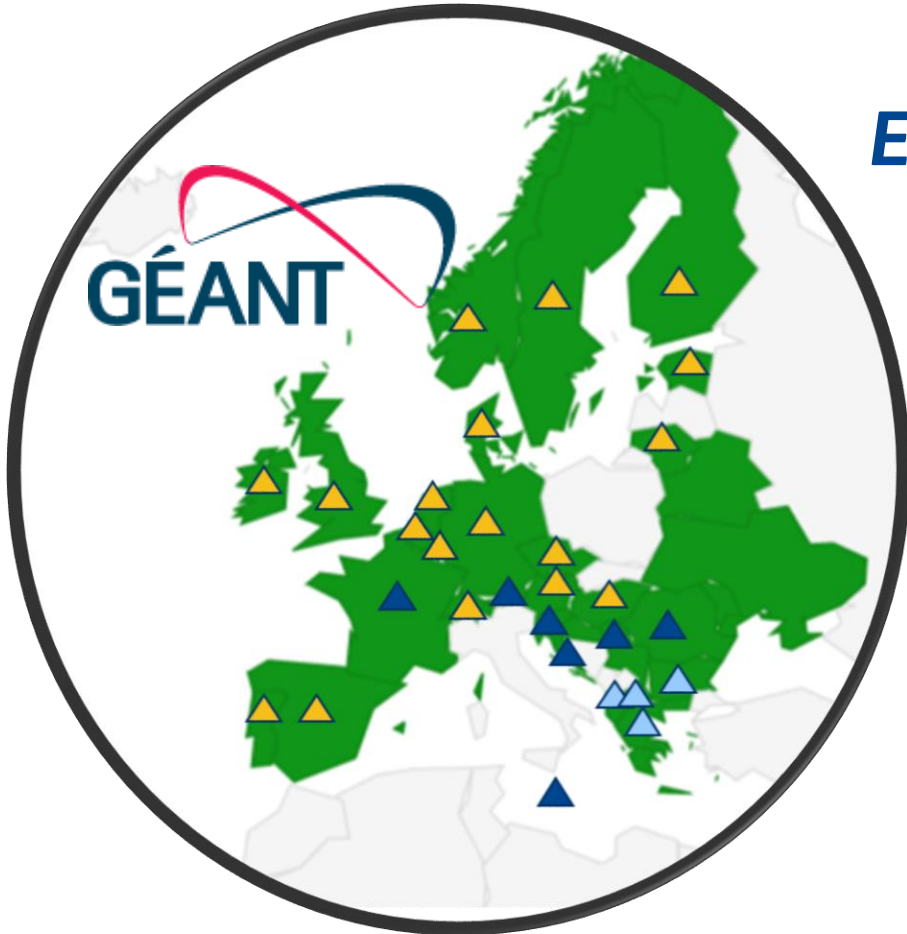
- countries
- ▶ 122 PoPs
- ▶ >1,000 PoPs through partners
- ▶ 45,000 km/fibre PEB
- ▶ 36,000 km LAN
- ▶ 10,800 km MED
- ▶ 14,000 km/fibre Italian network
- ▶ over 450,000 km submarine cables

Data as of December 2016

- Full IP Global Network
- Unique dual protected fiber path in Europe and global meshed architecture providing full resilience
- Unique footprint in Middle East and South East Asia through a state-of-the-art regional proprietary fiber optic backbone in the Mediterranean Basin, SeaMeWe-3, SeaMeWe-4, SeaMeWe-5, IMEWE and bilateral cable Systems
- New POPs in Kuala Lumpur, Iran, Moscow, Puerto Rico
- Increased network capillarity in Europe
- New proprietary redundant backbone links from North to South America and investment in the new cable Seabras-1 connecting New York and Sao Paulo
- Capacity across the Atlantic and the Pacific

## GEANT Infrastructure as a Service – a Brokerage challenge

Sparkle was awarded for provisioning  
**Infrastructure as a service for the Research and Education community in 30 countries connected to GÉANT**



### AWS, TIM & Sparkle IaaS

- Reseller of AWS in 18 countries
- OIP TIM IaaS in 7 Countries
- OIP Sparkle GR IaaS in 5 Countries



### Sparkle Brokerage

- Project Management
- Go2Market
- Marketing Support
- Convergent Billing
- Provisioning of three Service Providers

# Participating and Awarded to Sparkle Countries



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## TIM

Austria  
Croatia  
France  
Malta  
Romania  
Serbia  
Slovenia

SELF DATA  
CENTER (VMWare  
vCloud Director)



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## SPARKLE GREECE

Albania  
Bulgaria  
Cyprus  
Greece  
Macedonia

SELF DATA  
CENTER (VMWare  
vCloud Director)



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## SPARKLE

Belgium	Lithuania
Czech Republic	Luxembourg
Denmark	Norway
<b>Estonia</b>	Portugal
Finland	Spain
Germany	Sweden
Hungary	Switzerland
UK	The Netherlands
Ireland	<b>Israel</b>

The NRENs / countries participating in the tender are displayed in green.

Sparkle-AWS ▲

Sparkle-TIM ▲

Sparkle-GR ▲



## Cloud offering for Géant

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# Sparkle's Cloud offering for Géant



- Compute
- Storage
- Database
- Analytics, application, and managed services
- AWS Direct Connect (powered by Sparkle)



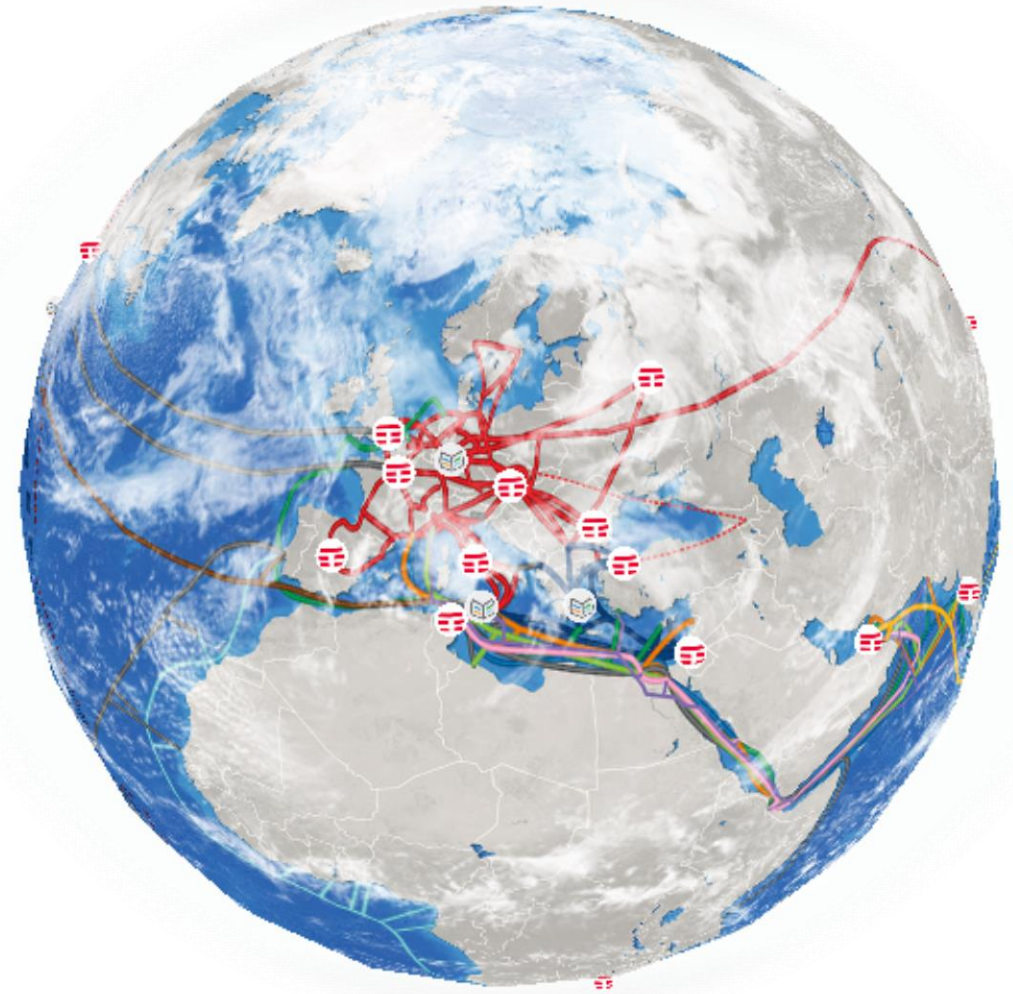
- Compute: TIM Self Data Center
- Compute: Sparkle GR Self Data Center
- Connectivity: Sparkle's global backbone
- Managed services
- Service Desk
- Brokerage services: Reporting, Billing, Accounting
- SSO proxy (SAML2) and eduGain federation



## Common for all countries

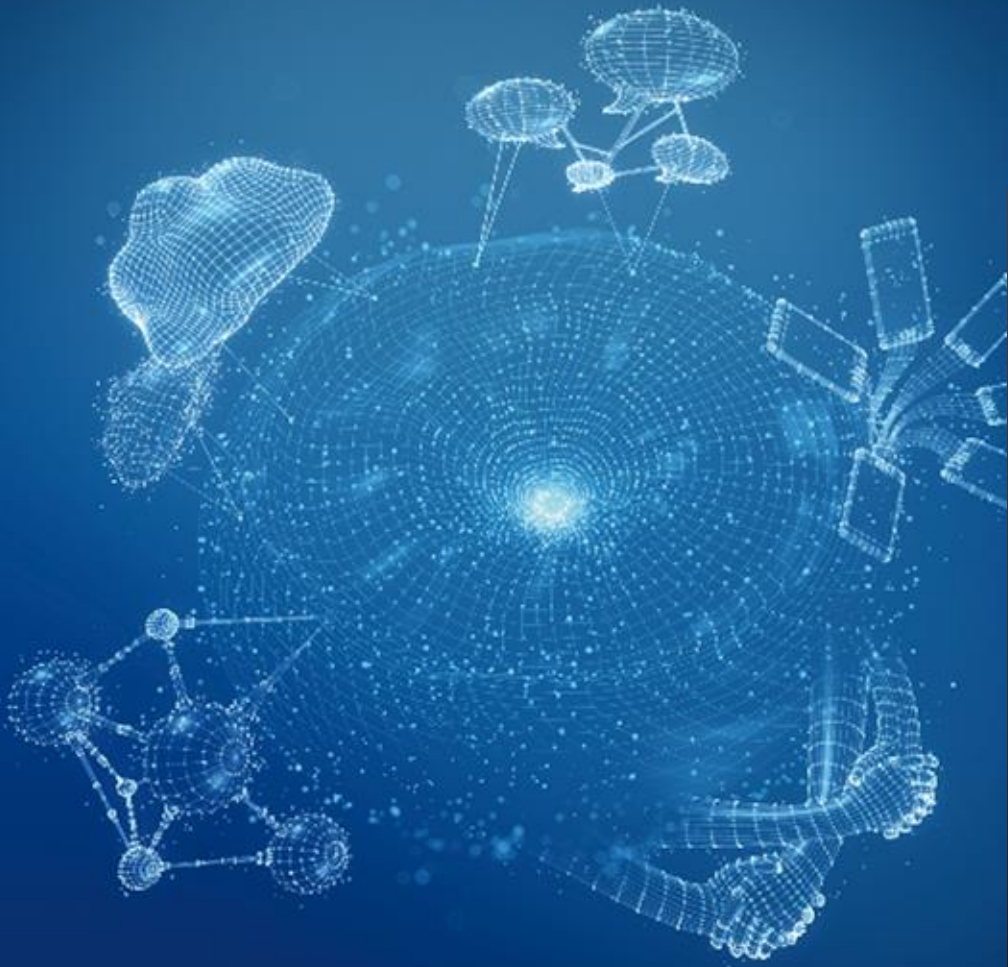


- **Sparkle Global Presence:**  
Sparkle employs an international workforce distributed worldwide,
- **Sparkle Service Desk**
  - Contact Center 7x24
  - Cloud Competence Center
- **Common brokerage platform** to support all business processes for all **NRENs**: from account management, reselling, ordering, billing and reporting
- **Common access to OIP and AWS** control panels using **SAML2**
- **Federation to EDUGAIN community**



## General

- In addition to the Infrastructure as a Service (IaaS), which provides virtualized computing resources over the cloud, Sparkle will support authentication provided by eduGAIN, the pan-European standard and SAML2-based authentication and authorization infrastructure for single-sign on/off. This identity management infrastructure significantly reduces the costs, complexity and security risks of the online services and the data is handled safely. Sparkle will also provide direct peering between the NRENs (National Research and Education Network), institutions and its own data centers, eliminating data transport-related costs.
- Sparkle will offer discounted rates to Géant, as well as volume discounts, and special reselling discount for the NRENs, adopting the role of a broker for the R&E institutions. NRENs can act as brokers for third-party providers on behalf of users.



Sparkle IaaS for Géant



Amazon EC2

# IaaS - Amazon EC2 - Virtual Server Hosting



- Amazon Elastic Compute Cloud (Amazon EC2) is a web service that provides resizable compute capacity in the cloud.
- Designed to make web-scale cloud computing easier for developers. Amazon EC2's simple web service interface allows you to obtain and configure capacity with minimal friction.
- Amazon EC2 provides developers the tools to build failure resilient applications and isolate themselves from common failure scenarios.
- **Amazon EC2 Functionality**
  - Amazon Elastic Block Store
  - EBS-Optimized Instances
  - Multiple Locations
  - Elastic IP Addresses
  - Amazon Virtual Private Cloud
  - Amazon CloudWatch
  - Auto Scaling
  - Elastic Load Balancing
  - High Performance Computing (HPC) Clusters
  - GPU Instances
  - High I/O Instances
  - Dense Storage Instances
  - VM Import/Export
  - Run Command
  - AWS Marketplace
  - Enhanced Networking
  - Amazon Support service



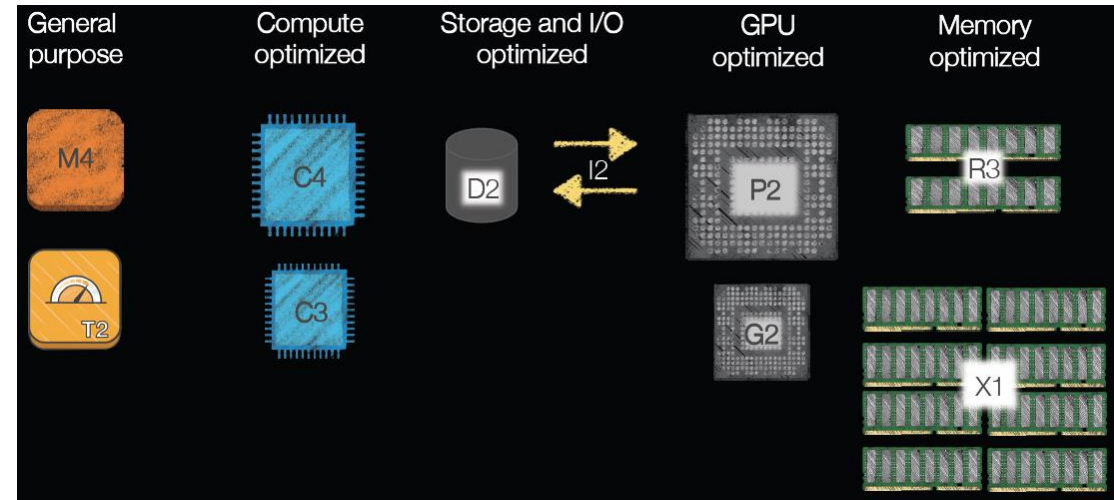
## EC2 main characteristics

- Provides resizable compute capacity in the Cloud
- Designed to make web-scale cloud computing easier
- A true virtual computing environment
- Launch instances with a variety of operating systems
- Run as many or few systems as you desire
- **REGIONS FOR GÉANT: Only European Regions (Ireland, Germany, UK)**
- **AVAILABILITY ZONES**
  - Distinct locations that are engineered to be insulated
  - from failures in other Availability Zones
  - Provide inexpensive, low latency network connectivity
  - to other Availability Zones in the same Region
  - Regions contain between 2 & 5 EC2 availability zones



# INSTANCES

- Amazon EC2 provides a wide selection of instances
  - types optimized to fit different use cases
  - Instance types comprise varying combinations of CPU, memory, storage, and networking capacity
- Choice of instance families with differing resource ratios
- Extensive list of supported operating systems & software
- Integrated with other AWS Services
  - Amazon Elastic Block Store
  - Amazon CloudWatch
  - Amazon Virtual Private Cloud
  - AWS Identity and Access Management



**Compute**

- General Purpose (M4)
- Compute Optimized (C4)
- Memory Optimized (R3)
- GPU Optimized (G2)
- Storage Optimized (D2)
- IO Optimized (I2)
- Low cost, burst-able performance (T2)

# Purchasing options

- On-Demand Instances for cost optimization
  - Pay for compute capacity by the hour with no long-term commitments or upfront payments
- Reserved Instances
  - Provide you with a significant discount (up to 75%) compared to On-Demand Instance pricing
- Spot Instances
  - Purchase compute capacity with no upfront commitment
  - and at hourly rates usually lower than the On-Demand rate
  - Spot Instances are spare Amazon EC2 instances that you can bid on.
    - The Spot price fluctuates in real-time based on supply and demand.
    - When your bid exceeds the Spot Price and spot capacity is available, your Spot instance is launched and will run until the Spot market price exceeds your bid (a Spot interruption).

[aws.amazon.com/ec2/purchasing-options/](https://aws.amazon.com/ec2/purchasing-options/)

## Resource Allocation

- All resources assigned to you are dedicated to your instance with no over commitment
  - All vCPUs are dedicated to you
  - Memory allocated is assigned only to your instance
  - Network resources are partitioned to avoid “noisy neighbors”



## FWA and pricing

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# GÉANT FWA

- Framework Agreement signed !
- FWA contains all the terms necessary to deliver the IaaS services to NRENs
  - GEANT appointed SPARKLE as a Framework Provider of the Services and SPARKLE shall be eligible to receive Orders for such Services from Customers during the Framework Term
- Price models and services are included in the FWA
- NREN and R&E to order services to Sparkle/AWS need to sign a call-off agreement
- Once a Call-off agreement is signed, NREN will be able to order services
- NRENs can assume the role of resellers towards their customers (R&E, Universities, schools, etc.), or just referral
- R&E, Universities, schools,... can sign a call-off independently, or rely on its national NREN

## Price model structure for AWS

- Sparkle's price model is structured as follows\*:
  - **AWS IaaS (mandatory):** pay-per-use prices or recurring fees, generated by the use of AWS services.
    - AWS prices are available in the AWS public standard price list (PSPL, see section 2.1 below).
    - A fixed % universal discount applies to the AWS PSPL.
  - **Program Governance & Support Services (mandatory):** this fee is a fixed % of the monthly AWS IaaS charges, before discounts. Includes contact center.
  - **Sparkle Cloud Competence Center - Service Desk (optional):** this fee is 5% of the monthly AWS IaaS charges, before discounts. The Cloud Competence Center is a prerequisite for Second Level Support.
  - **Second Level Support (optional):** this fee follows **AWS Support Plan Pricing** and is calculated as a % of monthly AWS IaaS charges, before discounts.
    - Choose your support plan and tier. Details of the support plans are available at <https://aws.amazon.com/premiumsupport/>
- Framework volume discount**
- Tiered pricing will be applied based on total revenue generated by all Customers of the Framework Agreement. When a new Tier level is reached, the new orders will benefit of the new discount percentage

\*Commercial conditions will not be discussed in public sessions

## Additional optional discounts for reseller NREN

- For NRENs adopting a reseller role an additional discount\* is applied to the Program Governance & Support Services cost.
- To qualify for this NREN reseller role discount the NREN needs to adopt the reseller role:
  - adopting the role of a broker between TI Sparkle and its community
  - assume responsibility for contractual relationships with its institutions
  - provide end customer support (service provisioning, help desk) and accounting
  - TI Sparkle will only deal with the NREN as an indirect channel towards the end Customers
- Please note: this discount is **only available** for NRENs adopting a reseller role. The discount is **not available** when the NREN adopts a referrer role.

\*Commercial conditions will not be discussed in public sessions



## AWS Use Cases for R&E

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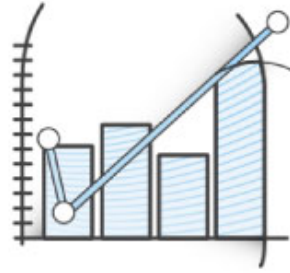
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# AWS Cloud for Higher Education 1/2

- AWS helps to better manage your university's operations or access high-performance computing for demanding research projects
- Instructors, students, researchers, IT staff and administrators can quickly and affordably access compute, storage and application services in the classroom, research lab, data center, and anywhere on campus.
- Not only IaaS!
- Featured Solution: **WorkSpaces** in Education
  - Amazon **WorkSpaces** is cloud-based, virtual desktop infrastructure (VDI) solution that helps higher education institutions give students and instructors consistent access to teaching and learning software on their own device.
- Efficient Campus-wide **IT Management**
  - On-demand compute, storage, and database services help IT teams build secure environments for mission-critical applications, freeing them to focus on student success..
  - Read how the University of Notre Dame moved to a cloud-first strategy, ready to migrate 80% of its IT resources to the cloud.
- **Big Data in the Cloud**
  - Easily build, deploy and operate big data solutions that support predictive analytics, retention efforts and student engagement.
- **Faster Time to Research**
  - The AWS cloud accelerates research timelines by letting you spend less time building infrastructure and more time on your science.
- <https://aws.amazon.com/education/higher-ed/>

# AWS Cloud for Higher Education 2/2

## Featured Higher Education Use Cases



### Big Data and Student Analytics

No hardware to procure, no infrastructure to maintain and scale – just what you need to securely collect, store, process, and analyze student data.



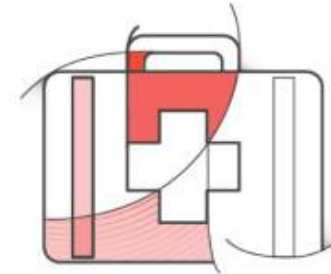
### Managed Desktop Computing

Give students access to the resources they need at home and in the classroom on any supported device with cloud-based desktops.



### Websites in the Cloud

Build your website on AWS – highly scalable, low cost and ready for peak usage times.



### Disaster Recovery

Keep your systems running even when emergencies occur. AWS scales up and enables rapid failover with data centers around the world.

## AWS for Research & Technical Computing

- AWS helps researchers process complex workloads by providing the cost-effective, scalable and secure compute, storage and database capabilities needed to accelerate time-to-science.
- With AWS, scientists can quickly analyze massive data pipelines, store petabytes of data and share their results with collaborators around the world, focusing on science not servers.
  - Accelerated Time to Science
  - Elastic and Scalable
  - Flexible
  - Share and Collaborate
  - Secure
  - Create an AWS account and your first computing machine - or cluster - in minutes.
  - AWS allows to you run experiments, not servers.

# How Researchers Use AWS

- High Performance Computing
  - High Performance Computing (HPC) on AWS allows scientists and engineers to run complex applications which require high bandwidth, enhanced networking, and very high compute capabilities.
  - With AWS, you have access to a full-bisection, high bandwidth network for tightly-coupled, IO-intensive workloads, so you can scale out across thousands of cores and execute throughput-dependent applications
- Machine Learning
  - With Amazon Machine Learning, researchers can generate billions of predictions daily, and serve those predictions in real-time and at high throughput.
  - Developers have the visualization tools and wizards needed to create machine learning (ML) models used to obtain predictions for applications, without dependence on custom code or additional IT infrastructure.
  - The University of California, Berkeley Algorithms, Machines, and People (AMP) Lab leverages AWS and analyzes algorithms to scale and process genome data faster and more cost effectively.
- Science-as-a-Service
  - AWS provides a comprehensive tool kit for storing, sharing, and analyzing data at any scale and creating impactful science applications to advance the science community
  - The University of Chicago and Argonne National Laboratory's Computation Institute built Globus to help researchers manage data and compute for collaborations by providing the tools needed for scientists to focus on science, not IT maintenance.
- Visit for more: <https://aws.amazon.com/government-education/research-and-technical-computing/>



## Brokerage platform & SAML2

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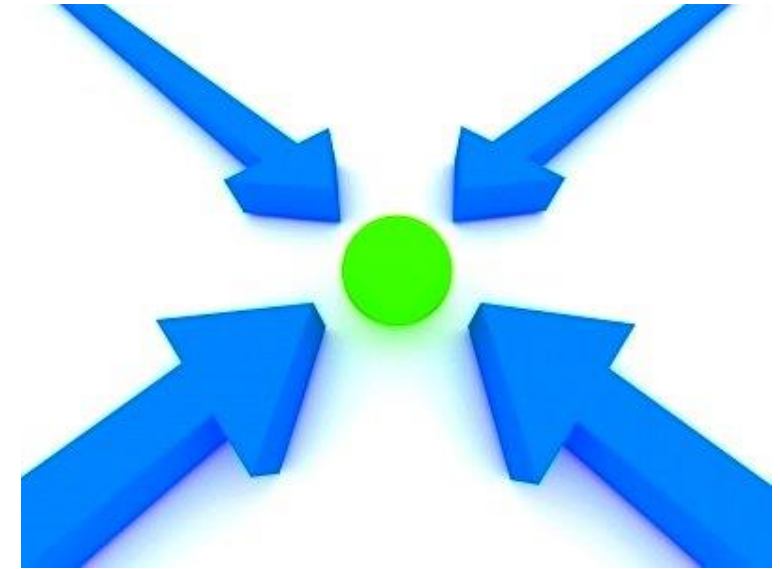
 SPARKLE | VOICE  
PLATFORM

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# Sparkle Cloud Brokerage Platform

Main components:

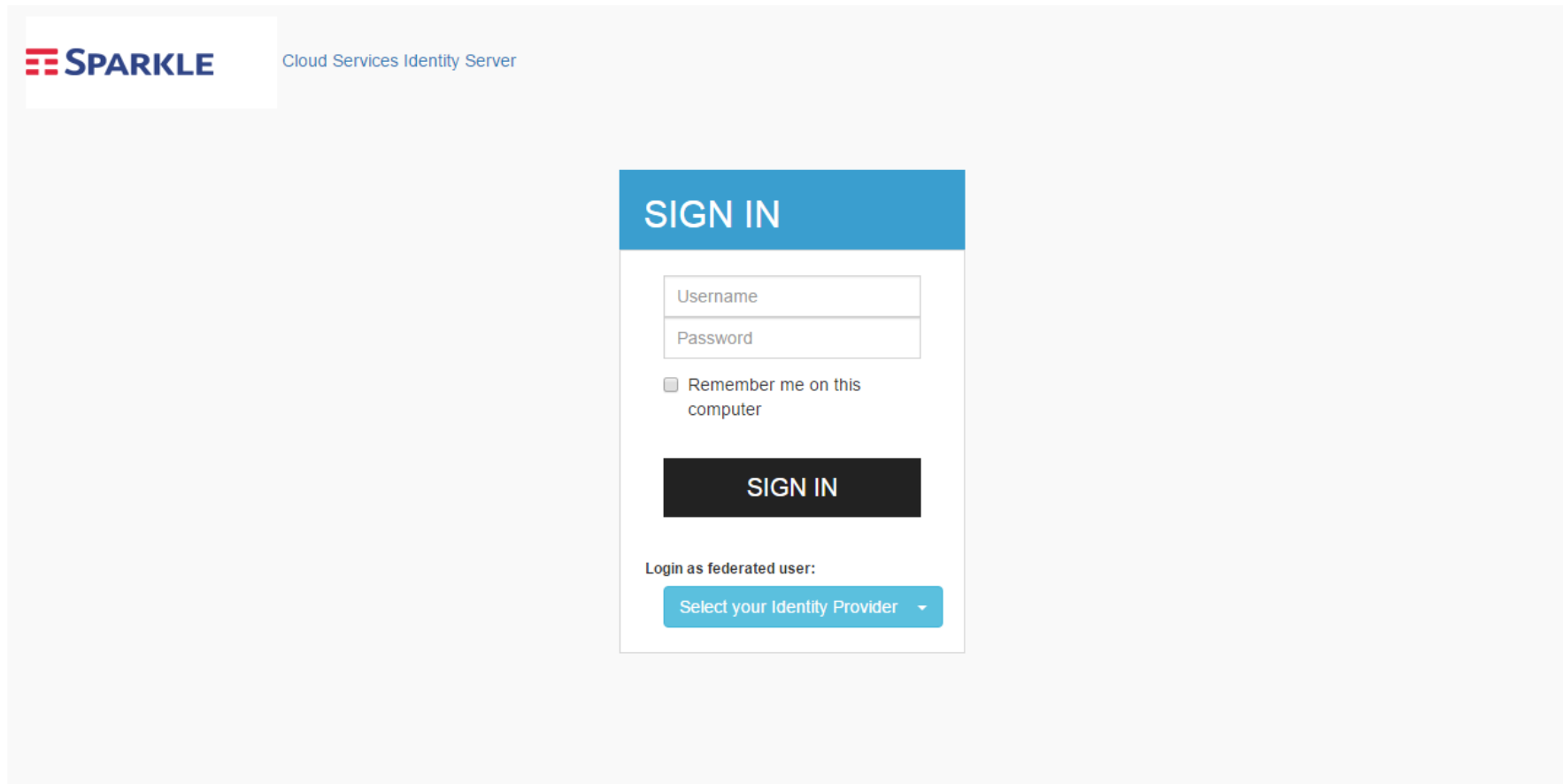
- ***To better serve Géant customers and NRENs, Sparkle will implement a Brokerage Platform based on Odin***
- ***Cloud Services Brokerage Platform Features***
  - Private Cloud and Public Cloud
  - Vendor neutral
  - Self Service Portal
  - Centralized and transparent reporting
  - Chargeback for support « pay per use» and «resources allocation pool» billing model
- **SSO SAML2 Support and EduGain Federation** under implementation, and will be part of the Brokerage platform



## Login page: Cloud Services Identity Server

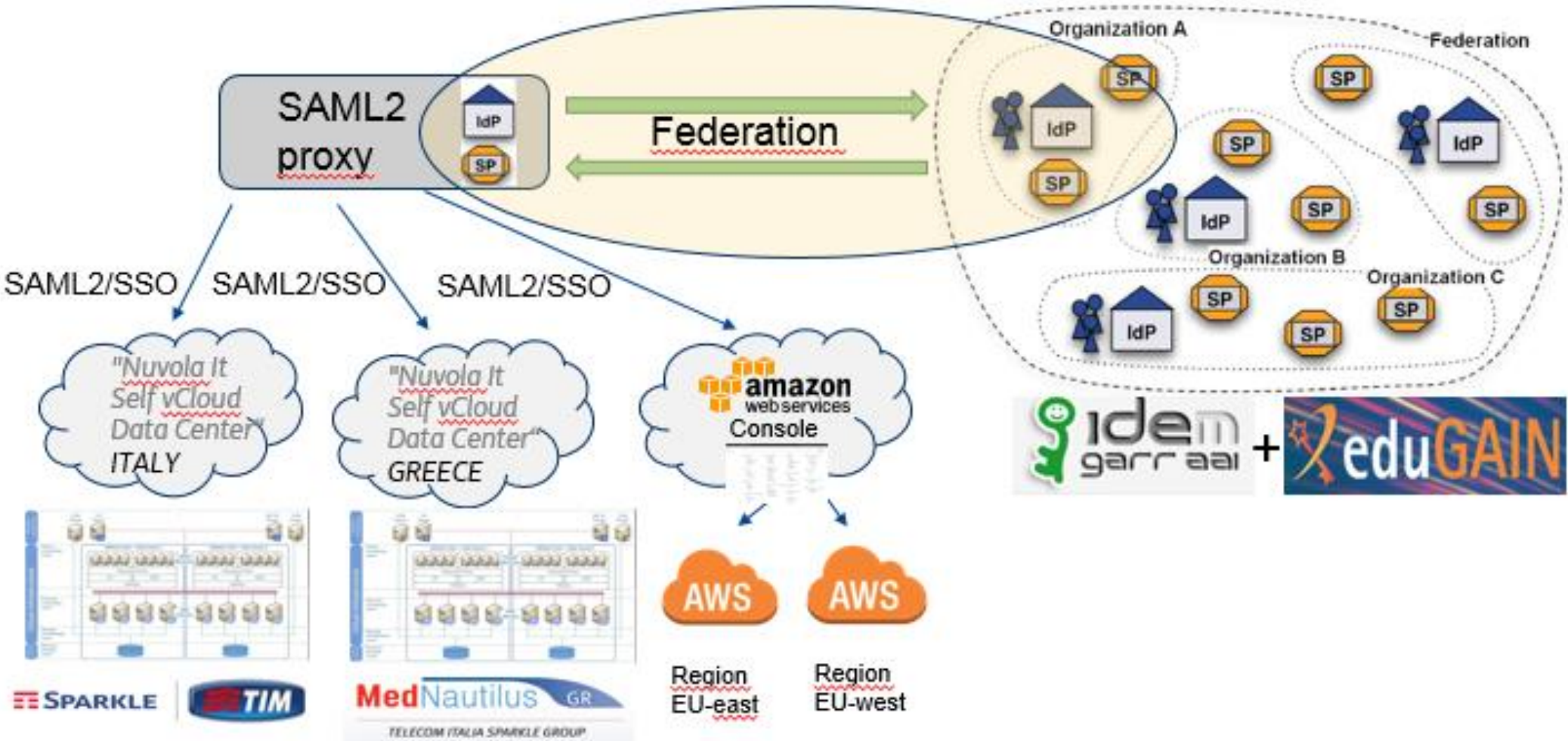
### **SSO SAML2 Proxy:**

SSO module allows EDUGain federating users with an external identity provider.



The screenshot shows the login interface for the SPARKLE Cloud Services Identity Server. In the top left corner, there is the SPARKLE logo (three red horizontal bars followed by the word 'SPARKLE' in blue) and the text 'Cloud Services Identity Server'. The main content area features a central 'SIGN IN' form. This form has a blue header with the text 'SIGN IN' in white. Below the header are two input fields: 'Username' and 'Password'. Underneath these fields is a checkbox labeled 'Remember me on this computer'. A large black button with the text 'SIGN IN' in white is positioned below the checkbox. At the bottom of the form, there is a section titled 'Login as federated user:' followed by a blue button with the text 'Select your Identity Provider' and a small downward-pointing arrow.

# SAML2 Authentication proxy





Thank you

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