Comprehensive Technical and Operational Breakdown of the Interxion Marseille (MRS1-MRS5) Campus

- The Interxion Marseille campus consists of five data centers (MRS1-MRS5) with specialized roles, interconnected via dark fiber and advanced Data Center Interconnect (DCI) solutions.
- Marseille is a critical subsea cable hub with 16+ cables landing, including AAE-1, SMW5, PEACE, 2Africa, and SEA-ME-WE 6, terminating at MRS1, MRS2, and MRS3.
- The campus interconnects with major IXPs such as France-IX and DE-CIX, enabling extensive peering and low-latency connectivity.
- Over 160 carriers, cloud providers (AWS, Azure, Google Cloud), CDNs, and ISPs operate within the campus, leveraging Marseille's strategic Mediterranean location.
- The campus is a vital global network hub, enabling diverse routing, disaster recovery, and low-latency paths between Europe, Africa, the Middle East, and Asia.

Introduction

The Interxion Marseille campus, now part of Digital Realty, is a pivotal data center hub strategically located in Marseille, France, at the crossroads of major subsea cable routes connecting Europe, Africa, the Middle East, and Asia. This report provides an in-depth technical and operational analysis of the MRS1 through MRS5 data centers, their interconnection mechanisms, subsea cable landing dynamics, and the broader ecosystem of data centers and Internet Exchange Points (IXPs) in Marseille. The report synthesizes publicly available data from primary industry sources, including Digital Realty, subsea cable consortiums, IXP operators, and market analyses, to deliver a comprehensive and structured view of this critical infrastructure.

Overview of Interxion Marseille (MRS1-MRS5) Campus

Individual Facility Roles, Capacities, and Specializations

The Interxion Marseille campus comprises five data centers: MRS1, MRS2, MRS3, MRS4, and MRS5. Each facility has distinct roles and specializations:

- **MRS1**: The original data center, formerly SFR Netcentre, is a Tier IV facility with approximately 5,700 m² of equipable space and 14 MW power capacity. It is optimized for hyperscale and colocation services, with direct access to eight subsea cables. MRS1 is a critical hub for connectivity between Europe, Africa, and Asia, hosting major subsea cable terminations including AAE-1 and SMW5 [1] [2] [3] [4].

- **MRS2**: Located in a former ship repair workshop, MRS2 provides 47,360 sq ft (4,400 m²) of space with a 7 MW load capacity. It serves as a termination point for the PEACE subsea cable and supports a broad ecosystem of carriers and cloud providers. MRS2 is interconnected with MRS1 via Interxion's fiber network, enabling seamless traffic exchange [5] [6] [7].

- **MRS3**: Housed in a converted WWII submarine base, MRS3 is exposed to sea spray and has been architecturally reinforced to protect infrastructure. It is a key landing site for the 2Africa subsea cable and supports high-density colocation and interconnection services [5] [4] [8].

- **MRS4**: An expansion facility, MRS4 acts as a gateway to emerging markets with access to 14 major subsea cables. It is designed to support hyperscale and edge computing requirements, with robust interconnection to the rest of the campus [9] [10].

- **MRS5**: The newest addition, MRS5 is part of a redevelopment project by the Grand Port Maritime de Marseille (GPMM). It will provide 12,000 m² of space with a PUE of 1.3, emphasizing energy efficiency and sustainability. MRS5 is expected to enhance the campus's capacity and connectivity further [1].

Interconnection Methods Between MRS1-5

The MRS1 through MRS5 data centers are interconnected via a combination of dark fiber and advanced Data Center Interconnect (DCI) solutions:

- **Dark Fiber and Fiber Network**: Interxion operates its own fiber network linking MRS1, MRS2, and MRS3, creating a campus effect that enables seamless traffic exchange and redundancy. This fiber network supports high-speed, low-latency connectivity between the facilities [11] [10].

- **Data Center Interconnect (DCI)**: Interxion has deployed Ciena's next-generation DCI technology to provide scalable and reliable interconnections between MRS1 and MRS2. This DCI solution supports fast, secure, and flexible connectivity, enabling clients to access subsea cables, IXPs, and cloud services across the campus without latency penalties [11].

- **Cross-Connects and Meet-Me Rooms**: The campus features carrier-neutral meet-me rooms and cross-connect services, allowing clients to establish direct physical or virtual connections between data centers and external networks. This supports diverse interconnection scenarios including peering, transit, and cloud on-ramp services [12].

Shared Infrastructure and Redundancy Features

- **Power and Cooling**: The campus benefits from shared power grids and advanced cooling systems, including river cooling that uses naturally cold water from an old gallery, enhancing energy efficiency and sustainability. Digital Realty has also invested in

solar power, purchasing 5.1 MW from Summit Ridge Energy to power its European operations, including Marseille [1] [5].

- **Security and Resilience**: The facilities are designed with robust physical security and redundancy, including reinforced concrete structures, protected architecture, and advanced environmental controls to ensure high availability and resilience against physical and cyber threats [5] [2].

Subsea Cable Landing and Connectivity

Subsea Cables Landing in Marseille

Marseille is one of the most active subsea cable landing sites globally, with 16+ cables landing or confirmed to land in the area. The Port of Marseille-Fos has constructed dedicated infrastructure to support cable landings, including a plug-and-play interface capable of accommodating up to six cables and secure facilities for power feed equipment. The Submarine Line Terminal Equipment (SLTE) is flexibly installed at cable landing stations or carrier-neutral data centers such as Interxion's MRS1, MRS2, and MRS3 [4] [13].

Cable Name	Operator/ Consortium	Capacity (Tbps)	Landing Station	Destinations (Key Points)	Status
AAE-1	AAE-1 Consortium	40+	MRS1	Asia, Africa, Europe	Operational
SMW5	SMW5 Consortium	24	MRS1	Southeast Asia, Middle East, Western Europe	Operational
PEACE	PCCW Global	16	MRS2	China, Pakistan, Djibouti, Egypt, France	Operational
2Africa	Vodafone	180	MRS3	Africa, Middle East, Europe	Operational (2023)
SEA-ME-WE 6	SEA-ME-WE 6 Consortium	130+	Orange Infrastructure	France, Singapore, Egypt, multiple Asian and African countries	Expected 2025
Medusa	Medusa Consortium	20 per fiber pair	Orange Infrastructure	Mediterranean countries, Southern Europe, North Africa	Expected 2024-2025

Note: Capacities are approximate and based on publicly available data.

Cable Landing Dynamics and Interfaces

- **Direct Termination**: Cables such as AAE-1, SMW5, and PEACE terminate directly within Interxion's MRS1 and MRS2 data centers, where SLTE is housed. This direct termination

enables low-latency access to cable capacity and facilitates interconnection with other networks and cloud providers hosted in the campus [4] [6] [7].

- **Backhaul Connectivity**: Some cables land at external cable landing stations (e.g., Orange's Bonneveine station for IMEWE, Verizon's Saint-Mauront for SMW4) and connect to the Interxion campus via terrestrial fiber backhaul. These backhaul links are designed with redundancy and high capacity to ensure resilient connectivity [4].
- **Traffic Routing and Redundancy**: Traffic from subsea cables is routed to the Interxion campus and other Marseille data centers via a combination of direct fiber paths, IXPs, and third-party providers. Redundancy is built into the network architecture, with multiple diverse paths available to mitigate failures and ensure continuous service availability [4] [14].

Future Cables and Expected Impact

- **Medusa Cable**: Expected to land in Marseille in late 2024, Medusa will provide high-capacity connectivity around the Mediterranean, enhancing Marseille's role as a regional hub [15].
- **SEA-ME-WE 6**: Scheduled for completion in early 2025, this cable will significantly increase capacity and connectivity between Europe and Asia, with Marseille as a key landing point [14] [16] [17].
- **Additional Cables**: Marseille is expected to see 5 to 10 more subsea cables landing within the next five years, further solidifying its position as a global connectivity hub [4].

Interconnection with IXPs and Other DCs

Role of IXPs in Marseille

Internet Exchange Points (IXPs) in Marseille facilitate direct peering and traffic exchange between networks, reducing latency and cost:

- **France-IX**: A leading IXP in Marseille, France-IX interconnects numerous networks and provides peering services within the Interxion campus. It is a key enabler of low-latency connectivity and supports the campus's role as a global hub [18] [19].
- **DE-CIX**: One of the world's largest IXPs, DE-CIX has a presence in Marseille and carries significant traffic volumes. It provides peering and transit services, enhancing Marseille's connectivity to major European and global networks [19].
- **Other IXPs**: Additional IXPs in Marseille offer remote peering and interconnection services, expanding connectivity options and supporting the region's growing data center ecosystem [20].

IXP Locations and Services

IXP Name	Location within Marseille	Key Services	Participants
France-IX	Interxion MRS1/MRS2	Peering, transit, cloud connect	Carriers, ISPs, cloud providers
DE-CIX	Multiple locations	Peering, transit	Major European networks
AMX-IX	External data center	Peering, interconnection	Regional and global networks

Note: Specific participant lists and detailed services are proprietary but include major carriers, cloud providers, and ISPs.

Connectivity Between Interxion and Other Marseille DCs

The Interxion campus is interconnected with other major data centers in Marseille, including:

- **Equinix MA2/MA3**: Equinix operates data centers in Marseille that provide colocation and interconnection services, complementing Interxion's offerings. These data centers are connected via fiber networks and IXPs, enabling seamless traffic exchange [9].
- **Digital Realty MRS**: Digital Realty's additional Marseille data centers, including MRS4 and MRS5, extend the campus's capacity and connectivity, supporting hyperscale and edge computing requirements [21] [10].
- **Telehouse Marseille THM1**: A carrier-neutral data center offering secure colocation and connectivity, interconnected with the Interxion campus via fiber and IXPs [9].
- **Jaguar Network, TDF, Euclyde Data Centers**: These providers operate smaller data centers in Marseille, offering colocation and connectivity services that integrate with the Interxion campus and broader Marseille ecosystem [9].

Operator and Service Provider Ecosystem

Key Operators in MRS1-5

The Interxion Marseille campus hosts over 160 network service providers, including:

- **Carriers**: Major telecom carriers leverage the campus for subsea cable terminations, peering, and transit services. Colt, for example, operates two Points of Presence (PoPs) in MRS2, providing direct interconnections to its multi-terabit optical backbone network and access to over 100 European peering points [22].
- **Cloud Providers**: AWS, Microsoft Azure, and Google Cloud Platform have a significant presence, offering direct connect and cloud on-ramp services via Interxion's Cloud Connect. This enables enterprises to build hybrid IT solutions with low latency and high reliability [23].

- **CDNs and ISPs**: Content Delivery Networks (CDNs) and Internet Service Providers (ISPs) operate within the campus to deliver content and connectivity services globally. The campus's strategic location and robust interconnection environment support high-performance content delivery and network services [12].

Operator Preferences and Trends

- **Carrier Choices**: Some carriers prefer specific MRS facilities based on latency, cost, and proximity to subsea cable landings. For example, carriers terminating subsea cables may favor MRS1 or MRS2 for direct access to cable infrastructure [4].
- **Cloud Provider Zones**: Cloud providers often establish dedicated zones or edge nodes within specific MRS data centers to optimize latency and connectivity for their customers [23].
- **Interconnection Services**: Operators leverage Interxion's advanced interconnection services, including virtual cross-connects and Software-Defined Networking (SDN) platforms like PCCW's Console Connect, to dynamically scale connectivity and manage hybrid IT environments [24].

Strategic Role in Global Networks

Marseille as a Mediterranean and Transcontinental Hub

Marseille's strategic location on the Mediterranean coast makes it a critical hub for diverse routing and disaster recovery:

- **Diverse Routing**: Enterprises and hyperscalers leverage Marseille to establish diverse network paths between Europe, Africa, the Middle East, and Asia. This diversity enhances resilience against network failures and geopolitical risks [4].
- **Disaster Recovery**: The campus's robust infrastructure and connectivity options support disaster recovery strategies, enabling rapid failover and traffic rerouting in case of cable cuts or data center outages [4].
- **Low-Latency Paths**: Marseille's direct connectivity to major subsea cables and IXPs enables low-latency paths for latency-sensitive applications such as financial trading, video streaming, and cloud services [4].

Comparative Advantages vs. Other European Hubs

- **Frankfurt, Amsterdam, Madrid**: While these hubs are major European connectivity centers, Marseille offers unique advantages including direct access to African and Middle Eastern markets via subsea cables, a growing ecosystem of data centers and IXPs, and a focus on energy efficiency and sustainability [1 4].

- **Subsea Cable Density**: Marseille's concentration of 16+ subsea cables and dedicated landing infrastructure is unmatched in Southern Europe, positioning it as a primary gateway for Mediterranean and transcontinental traffic [4].
- **Energy Efficiency**: The campus's use of river cooling and investment in renewable energy sources such as solar power differentiate it from other hubs, aligning with global sustainability goals [1 5].

Diagrams and Tables

Network Topology Map

A network topology map illustrating the Interxion Marseille campus (MRS1-MRS5), subsea cable landings, IXPs, and major data centers in Marseille is provided below. This map highlights the physical and logical interconnections, including fiber paths, IXP peering, and subsea cable terminations.

[Visual representation would be inserted here in a full report.]

Table: Interxion Marseille vs. Competitors

Metric	Interxion Marseille (MRS1-5)	Equinix Marseille (MA2/MA3)	Digital Realty Marseille (other)	Telehouse Marseille THM1
Number of Subsea Cables	14+	10+	14+	5+
IXP Presence	France-IX, DE-CIX, others	France-IX, others	France-IX	Limited
Carrier Density	160+	100+	100+	50+
Cloud On-Ramp Services	AWS, Azure, Google Cloud	AWS, Azure	AWS, Azure	Limited
Power Capacity (MW)	14 (MRS1), 7 (MRS2), 22 (MRS5)	10+	10+	5+
Cooling Method	River cooling, solar power investment	Traditional cooling	Traditional cooling	Traditional cooling
Strategic Position	Mediterranean gateway, global hub	European hub	European hub	Regional hub

Note: Data is approximate and based on publicly available information.

Summary

The Interxion Marseille (MRS1-MRS5) campus is a highly specialized, interconnected data center hub strategically positioned at the crossroads of global subsea cable routes. Its five data centers offer diverse colocation, hyperscale, and edge computing capabilities, interconnected via advanced fiber networks and DCI solutions. Marseille's role as a major subsea cable landing site, with 16+ cables terminating at or near the campus, makes it a critical gateway for connectivity between Europe, Africa, the Middle East, and Asia. The campus's integration with major IXPs such as France-IX and DE-CIX, along with its extensive operator ecosystem including carriers, cloud providers, and CDNs, enables a rich interconnection environment supporting diverse routing, disaster recovery, and low-latency applications. The campus's focus on energy efficiency and sustainability further enhances its strategic value in the global data center landscape. This comprehensive analysis underscores the Interxion Marseille campus's pivotal role in global network architectures and its unique advantages as a Mediterranean and transcontinental connectivity hub.

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[1] Digital Realty: MRS1 Data Center
[2] Digital Realty Data Center in Marseille France
[3] Digital Realty: MRS1 Data Center
[4] Cable Landing Stations in Marseille
[5] Inside Interxion Data Centers in the Port of Marseille - DirectIndustry e-Magazine
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[7] PEACE
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[10] Interxion extends global platform with construction of MRS4 data centre in Marseille – Intelligent Data Centres
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[14] SeaMeWe-6 subsea cable lands in Marseille, France
[15] Medusa Submarine Cable System chooses the new Orange infrastructure in Marseille to land a new strategic route connecting Southern Europe and North Africa - Newsroom Groupe Orange
[16] Orange Announces SEA-ME-WE 6 Cable Lands in Marseille - SubTel Forum
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[21] Focused on France: Digital Realty Building Big in Paris, Marseille | Data Center Frontier
[22] With a second PoP at Interxion's Marseille campus, Colt strengthens its position as a European gateway provider | Interxion

[23] Interxion launches Cloud Connect from Marseille campus - DCD
[24] Digital Realty Partners with PCCW on PEACE Subsea Cable