

SCALAC

Advanced Computing System for
Latin America and the Caribbean

Advanced Computing R+D+i Statement in LAC

SCALAC Position Paper

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Executive Summary (Abstract)

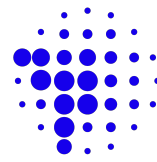
This position paper, presented by the Advanced Computing System for Latin America and the Caribbean (SCALAC) to the CELAC and ECLAC forums, outlines a strategic roadmap to bridge the region's technological divide. It advocates for the urgent transition of Latin America and the Caribbean from passive technology consumers to active creators of sovereign, sustainable, and impactful digital solutions. By emphasizing infrastructure integration, human capacity building, and 'mindful computing' principles across High-Performance Computing (HPC), Quantum Computing (QC), and Artificial Intelligence (AI), SCALAC proposes a collaborative framework. Key recommendations include securing institutional endorsement for SCALAC, leveraging the CARLA conference and other non-profit divulgation activities for regional outreach, and establishing framework cooperation agreements to ensure equitable access to supercomputing resources, thereby fostering long-term scientific and economic sovereignty in the region.

I. Introduction and Topic Background

The transition towards a digital, knowledge-based economy is a fundamental challenge and opportunity for Latin America and the Caribbean (LAC). Currently, the region faces a significant technological divide that hinders scientific discovery, economic competitiveness, and sustainable development. Advanced computational resources, specifically High-Performance Computing (HPC), artificial intelligence (AI) infrastructure, and the computing continuum, are no longer optional tools; they are essential engines for innovation. From climate modeling and epidemiological research to energy optimization and industrial innovation, the ability to process large-scale data is a sovereign necessity.

Beyond mere adoption, the strategic appropriation of technology is critical for the region's autonomy. Latin America and the Caribbean must transition from being passive consumers of foreign technology to active developers of customized, sovereign solutions. This requires the urgent development of sustainable computing capacities, especially in the face of the explosive energy and processing demands generated by the rapid proliferation of Artificial Intelligence. Developing sustainable, "green" HPC infrastructure is not just an environmental mandate but a strategic imperative to ensure long-term viability, observing human impact.

Furthermore, supporting the reduction of technological dependence is paramount. By establishing equitable and strategic partnerships worldwide, such as those with European post-exascale initiatives, the LAC region can participate in the global technological dialogue on its own terms, ensuring that digital advancements directly address regional needs and contribute to a more balanced global scientific landscape. Recognizing this, the region requires a unified,



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cooperative framework to pool resources, optimize technological investments, and build specialized human capital.

II. The Delegation's Position: Introducing SCALAC

To address these pressing regional challenges, this delegation presents the Advanced Computing System for Latin America and the Caribbean (SCALAC). SCALAC was established as an articulated, multi-institutional network designed to integrate and optimize regional supercomputing infrastructures. We firmly believe that no single nation in the LAC region can tackle the global computational race in isolation. SCALAC serves as the definitive collaborative platform to democratize access to high-performance computing, ensuring that researchers, public institutions, and industries across the continent have the technological support needed to drive sustainable progress.

The scope of SCALAC covers the entire region with the support of RedCLARA, encompassing 33 independent countries, as illustrated below.

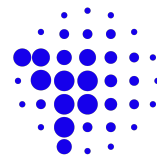


Figure 1. Latin American and Caribbean countries.

III. Mission, Vision, and Strategic Objectives

Mission: To build and sustain a collaborative advanced computing ecosystem in Latin America and the Caribbean. SCALAC is dedicated to integrating technological infrastructures, fostering specialized training, and promoting joint scientific research to accelerate the region's socio-economic and technological development.

Vision: To position Latin America and the Caribbean as a highly competitive and fully integrated region in the global advanced computing landscape, recognized for its collaborative networks, sustainable HPC deployments, and capacity to generate sovereign, impactful technological solutions.



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To materialize our mission, SCALAC pursues the following core priorities:

1. **Infrastructure Integration:** To interlink existing regional HPC centers and AI capabilities into a cohesive computing continuum, maximizing resource utilization and energy efficiency.
2. **Capacity Building and Education:** To develop specialized human talent through continuous training, workshops, and cross-border academic mobility programs.
3. **Observatory and Policy Guidance:** To serve as the primary HPC Observatory in the region, assessing hardware, sustainability metrics, and usage trends to inform governmental and institutional policymaking.
4. **Sustainable Computing:** To advocate for environmentally responsible and "mindful" computing practices across all regional data centers and deployment pipelines.
5. **Human Wellness and Mindful Computing:** To integrate human experience and societal governance into HPC deployments, ensuring that advanced computing aligns directly with worldwide post-exascale projects dedicated to global human wellness and ethical technological progress.

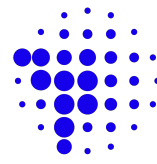
IV. The Relevance of Technology Sharing, Knowledge, and Strategic Alliances

The true strength of SCALAC lies not just in hardware, but in its cooperative architecture. The complex nature of modern scientific challenges requires interdisciplinary and transnational collaboration. By facilitating technology sharing, SCALAC ensures that countries with emerging technological ecosystems can access state-of-the-art resources hosted by regional partners. Furthermore, knowledge transfer through SCALAC empowers local institutions to build their own capacities rather than depending solely on external providers. Strategic alliances form the backbone of this initiative. By forging framework cooperation agreements between universities, national research networks (NRENs), and international bodies (such as European supercomputing initiatives like EuroHPC), SCALAC bridges the gap between LAC and the global scientific community. These alliances enable scientific diplomacy, unlocking funding, joint research projects, and access to post-exascale technologies.

V. Proposed Solutions and Call to Action

To fully leverage the potential of SCALAC for the benefit of the CELAC/ECLAC community, this delegation proposes the following actionable recommendations to the member states:

1. **Institutional Endorsement:** Member states are urged to officially recognize SCALAC as the primary consultative body and framework for regional advanced computing initiatives, integrating its guidelines into national digital agendas.
2. **Leveraging the CARLA Conference for Outreach and meets LAC groups of interest:** We urge member states to leverage the Latin America and Caribbean High Performance Computing Conference (CARLA) as the premier regional platform for community animation, stakeholder engagement, and the promotion of life-cycle sustainability audits across all HPC facilities.
3. **Direct Support for CELAC Member States:** We call upon CELAC member states to establish formal framework cooperation agreements with SCALAC. This will provide structured academic collaboration, capacity development, and direct access to shared supercomputing infrastructure. To sustain this, the creation of a Regional HPC Fund, co-



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funded by regional development banks—and harmonized regional data mobility protocols are strictly necessary.

The scientific output in the region has shown significant growth in AI, HPC, and QC from 2020 to 2025, driven by global events such as the GenAI boom and the UN Year of Quantum, as depicted in the following chart.

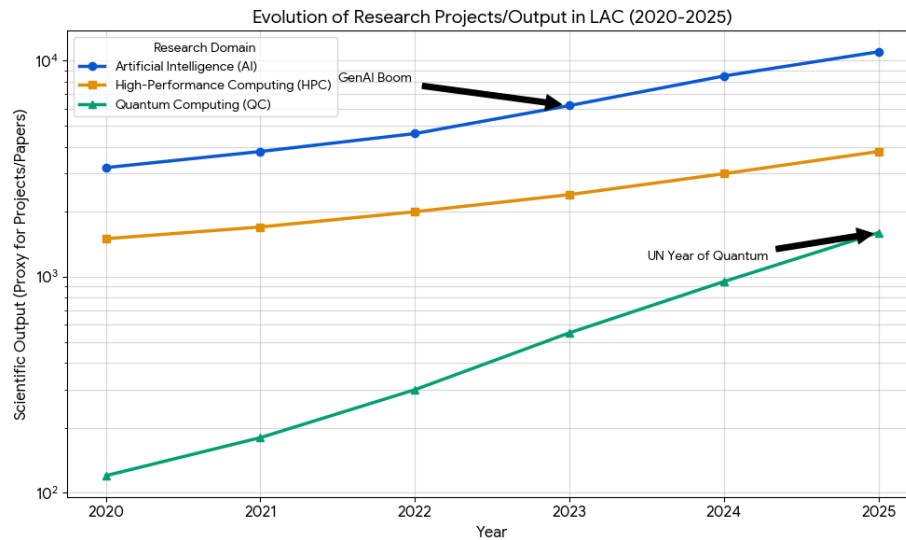


Figure 2. Evolution of Research Projects

VI. Core Research Concerns in HPC, QC, and AI for LAC

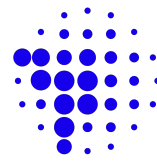
Based on regional diagnostics and the SCALAC HPC Observatory, we outline the following strategic research and development imperatives for Latin America and the Caribbean, which share a common cross-cutting foundation of human talent development, regional cooperation, and public policy adaptation:

1. High-Performance Computing (HPC):

- **Energy Awareness & Sustainability:** Greening HPC and achieving power-efficiency in exascale architectures.
- **Computing Continuum (Edge-to-Cloud):** Seamless resource orchestration and distributed workflows across sensors, edge devices, and supercomputing centers.
- **HPC for Climate Change & Risks:** Multi-scale simulations for regional impact, such as predicting extreme weather patterns.
- **Access & Federation:** Democratizing use through the SCALAC Network Federation.

2. Quantum Computing (QC):

- **QC in Emerging Economies:** Contextualizing development and identifying niche applications tailored for the region.
- **Hardware Limitations & Error Mitigation:** Addressing noise, decoherence, and developing practical algorithms.



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- **NISQ (Noisy Intermediate-Scale Quantum) Applications:** Utilizing early quantum systems for quantum chemistry simulations and optimization in logistics and supply chains.
 - **QC-HPC Hybrid Systems:** Developing integrated software stacks and algorithm decomposition.
3. **Artificial Intelligence (AI):**
- **Sovereign AI & Large Latin Models (LLMs):** Ensuring regional cultural relevance, combating bias, and securing data sovereignty with models trained on local data and languages (Spanish, Portuguese, and regional dialects).
 - **Data Ethics & Privacy:** Establishing robust frameworks and agreements for data usage.
 - **AI in Agriculture & Health:** Advancing sustainable farming practices and precision healthcare, particularly in remote areas via personalized medicine.
 - **AI for Disaster & Conflict Management:** Predicting risks, mapping seismic activity, and building resilience in LAC.

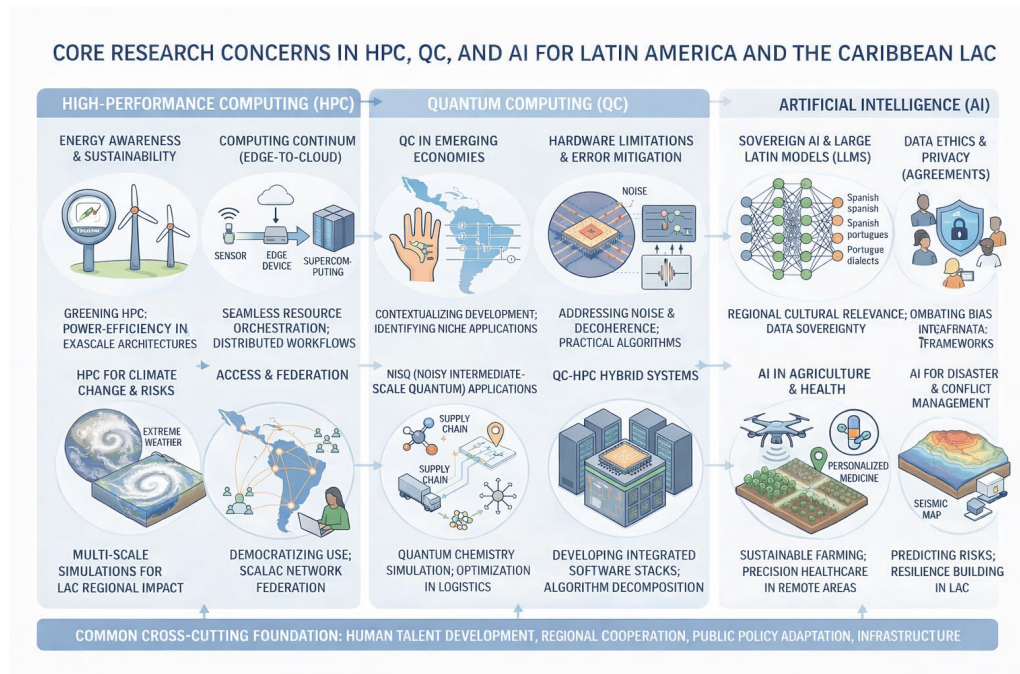
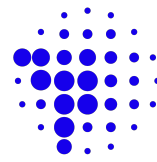


Figure 3. LAC Core Research Topics using HPC / Advanced Computing

VII. SCALAC Historical Timeline: A Journey of Regional Integration (2013–2026)

This section outlines SCALAC's pivotal milestones, demonstrating our enduring commitment to technological sovereignty in Latin America and the Caribbean:

- **March 1, 2013 – The Bucaramanga Declaration:** Official foundation of SCALAC signed in Bucaramanga, Colombia, establishing the first multi-institutional agreement to federate advanced computing resources in the region (Signature in Bucaramanga, Colombia).
- **2014 – First CARLA Conference:** Inauguration of the Latin America High Performance Computing Conference (CARLA), consolidating the regional scientific community, joining



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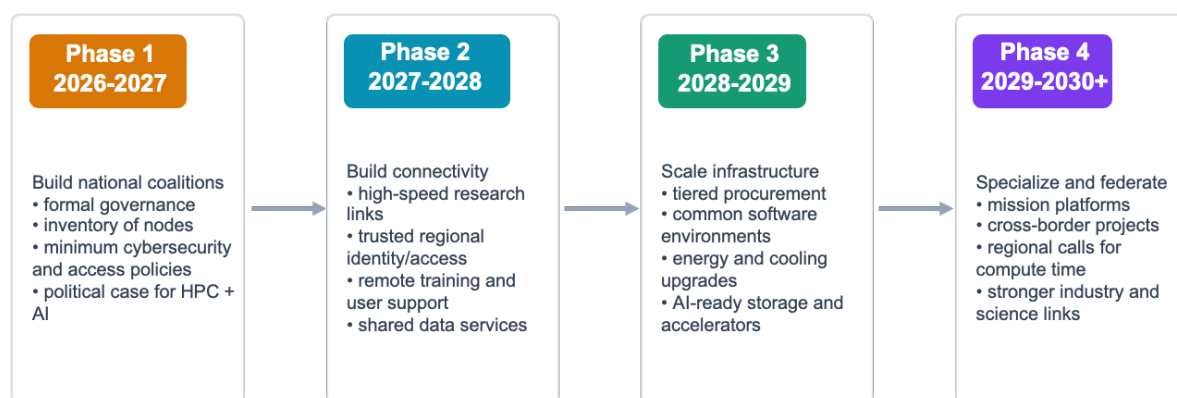
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the CLCAR Conference (created in 2006) and the HPC LatAm Conference (created in 2010).

- **2016-2020 – Expansion and Network Integration:** Strengthening of regional connectivity and data mobility through strategic alliances with National Research and Education Networks (NRENs).
- **2018 – Strategic MoU with RedCLARA:** Signing of a formal Memorandum of Understanding with RedCLARA to strengthen regional academic network integration.
- **2022-2024 – The HPC Observatory Initiative:** Launch of the SCALAC HPC Observatory, inherited from the RISC-2 project, to map, measure, and audit supercomputing capacities and sustainability metrics across LAC.
- **2023 – Mateo Valero Award:** Establishment of the Mateo Valero Award to recognize outstanding collaboration in advanced computing within Latin America and the Caribbean.
- **2024 – CELAC Support alongside RedCLARA:** Joint initiatives established with RedCLARA to provide direct technological and academic support to the CELAC digital agenda.
- **2024 – Philippe Navaux Award:** Creation of the Philippe Navaux Award to honor exceptional mentoring and human capital development in the regional HPC community.
- **2025 – CARLA Conference in Jamaica & Rebranding:** Hosting of the CARLA conference in Jamaica, marking the official adoption of "Latin American and Caribbean" in the conference's title to reflect full regional inclusion.
- **2026 – Board Ratification and Global Alliances:** Official ratification of the new SCALAC Board of Directors, marking a new era of institutional maturity, alongside the formalization of global partnerships for post-exascale and mindful computing projects.

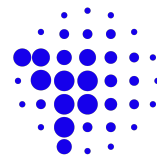
VII. A Latin American and Caribbean Roadmap

To accomplish our strategic objectives, SCALAC recommends a phased infrastructure roadmap extending from 2026 to beyond 2030, progressing from the formation of national coalitions to specialization and resource federation, as illustrated in the diagram below.



Key design principle: do not wait for a single “perfect” flagship machine; create a credible regional platform that can absorb future large-scale investment.

Figure 4. Possible LAC Roadmap (Courtesy I. Gitler)



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VIII. References

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5. **INPEX.** International Post-Exascale Project <https://inpex.science>

IX. Conclusion

The technological trajectory of Latin America and the Caribbean relies on our collective capacity to consolidate resources, synchronize public policies, and strategically invest in advanced computing infrastructure. SCALAC offers the essential, coordinated network to transform isolated national efforts into a unified, highly competitive regional ecosystem. By adopting sustainable practices, prioritizing human well-being in computing, and establishing strong global alliances, the Latin America and the Caribbean (LAC) region can effectively address the challenges presented by the AI and post-exascale eras. The era of fragmented initiatives has ended; regional integration through platforms such as SCALAC represents the only viable pathway to attain technological sovereignty, foster innovation, and ensure sustainable development for all member states.

About the Author

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