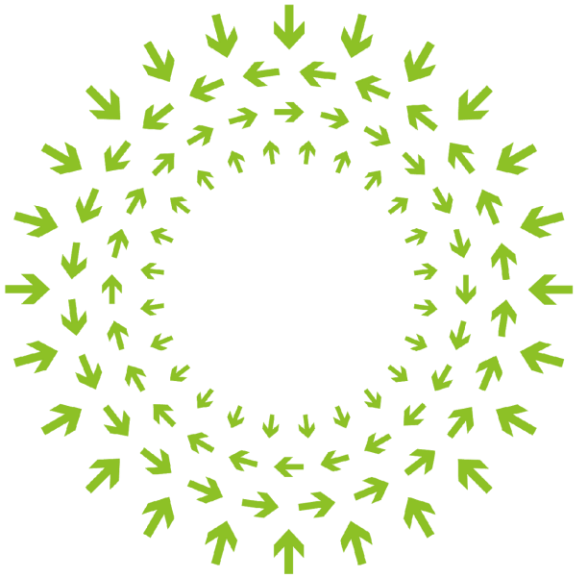

OPEN

Compute Project

Immersion Project Charter

Revision 1.0

Last updated: December 19, 2024

Revision History

Date	Author	Version	Description
Dec 19, 2024	Immersion Project Steering Committee	1.0	Immersion Project Charter, 2025-onward

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1. Introduction

The OCP Immersion Project is a dedicated initiative within the Open Compute Project Foundation, aimed at advancing the development, adoption, and implementation of immersion cooling technologies in the data center industry. This project brings together industry experts, researchers, and practitioners to collaboratively explore and develop innovative solutions that enhance the efficiency, sustainability, and performance of data centers through immersion cooling.

The project seeks to standardize immersion cooling practices and promote their widespread adoption by providing comprehensive guidelines, best practices, requirements and technical standards and open source specifications that promote a healthy and efficient cooling service lifecycle for IT equipment. By fostering a collaborative environment for a diverse global community of volunteers, the OCP Immersion Project aims to drive technological advancements and support the seamless integration of immersion cooling solutions across various regions and sectors of the data center industry. This initiative reflects a commitment to improving data center infrastructure, reducing energy consumption, and addressing the growing demands of modern computing environments globally.

1.1 OCP Tenets

Efficiency

The Immersion Project is committed to enhancing the efficiency of data center operations through innovative cooling solutions. By utilizing immersion cooling technologies, the project aims to achieve significant power delivery and conversion efficiencies, improve thermal management, and enhance platform performance per watt. This collective peer feedback driven approach typically leads to a reduction in overall infrastructure consumption and related costs, minimizing actual and code weight, and reducing network latencies, contributing to more streamlined and effective data center operations.

Impact

The Immersion Project seeks to create a meaningful positive impact within the OCP ecosystem by introducing efficiency gains and leveraging new technologies across a broad base of hundreds of industry leading volunteers focused on exposing these options for data center owners, operators, designers, engineers, suppliers and builders. The project's contributions are valuable for scale-out computing, building on existing OCP Accepted and OCP Inspired products and infrastructure solutions to create a multiplier effect. By providing alternative compatible solutions, the project aims to enable a more robust supply chain, reduce the cost of operating data centers, reduce the environment footprint, and enhance the overall resilience and adaptability of data center operations.

Scalability

Scalability is a core principle of the Immersion Project. The technologies and solutions developed are designed to support large-scale deployments with ease and transparency. This includes considerations for physical maintenance, remote management, upgradability, error reporting, compliance, and workflow support services. The project ensures that infrastructure management tools are open-sourced or made available to adopters, and comprehensive supporting documentation is provided with context and training resources. This includes documentation, installation guidance, initialization processes, configuration information, and service support, enabling adopters to deploy and maintain immersion cooling solutions successfully over the entire lifetime of planned service life.

Openness

The Immersion Project is dedicated to the principle of openness, encouraging as much open-source contribution as possible from the broadest set of volunteers. Contributions strive to comply with existing open interfaces and are interoperable with already existing OCP solutions. By fostering an open-source culture, the project promotes transparency, collaboration, and the sharing of innovations across the community, enhancing the collective knowledge and capabilities of the ecosystem in regional events and monthly calls for specific focus areas.

Sustainability

Sustainability is a critical focus of the Immersion Project. The project aims to maximize transparency regarding the environmental impacts of its contributions, with a commitment to continuous improvement and specifically understanding and communicating the impact data centers have on society and how to measure that impact in objective data collection methods using common peer consensus driven definitions and calculations. Efforts are made to promote more responsible choices in the use of natural resources, including land, air, power, water, and materials. The project seeks to positively impact society by reducing total costs associated with energy, water, and materials, thereby supporting the broader goals of environmental stewardship and sustainable development within the OCP community.

2. Project overview

2.1 Purpose

The primary purpose of the OCP Immersion Project is to spearhead the development, standardization, and adoption of immersion cooling technologies within the data center industry. By leveraging the collective expertise of the community, the project aims to create a robust ecosystem that supports the efficient, sustainable, and cost-effective implementation of immersion cooling solutions. This initiative is dedicated to addressing the critical challenges of energy consumption, water consumption, materials consumption, thermal management including the option of heat reuse and operational efficiency in data centers, ensuring that immersion cooling technologies are accessible, reliable, and scalable for widespread use.

2.2 Objectives

Development of Standards and Best Practices

The project aims to establish comprehensive guidelines, standards, and best practices for the design, deployment, and operation of immersion cooling systems. These standards will ensure interoperability, reliability, and performance consistency across various implementations and use cases.

Promotion of Industry Collaboration

By fostering a collaborative environment, the project seeks to bring together stakeholders from across the data center ecosystem, including technology providers, data center operators, researchers, and end-users. This collaboration will facilitate the exchange of knowledge, drive innovation, and accelerate the adoption of immersion cooling technologies.

Innovation and Technological Advancement

The project is committed to advancing the state of immersion cooling technology through continuous research, development, and experimentation. By encouraging innovative approaches and solutions, the project aims to push the boundaries of what is possible with immersion cooling and address broad challenges in the data center industry.

Sustainability and Energy Efficiency

A key objective of the project is to enhance the sustainability of data centers by significantly reducing energy, water and materials consumption and improving thermal management. Immersion cooling technologies have the potential to deliver substantial energy savings and reduce the environmental impact of data centers, aligning with global sustainability goals[1]. Additionally, the project is committed to promoting circularity by encouraging the reuse of heat generated by data centers and recycling of materials and driving CO2 reduction throughout the lifecycle of immersion cooling products. This focus extends beyond end users to include the manufacturing and operational processes of all components related to immersion cooling, ensuring a comprehensive approach to minimizing the carbon footprint and enhancing overall sustainability.

Education and Awareness

The project aims to increase awareness and understanding of immersion cooling technologies among stakeholders and the broader community. Through educational initiatives, workshops, and publications, the project seeks to disseminate knowledge, highlight benefits, and demonstrate the practical applications of immersion cooling.

Support for Implementation and Adoption

To facilitate the widespread adoption of immersion cooling, the project will provide support and resources for organizations looking to implement these technologies. This includes guidance on best practices, case studies, and access to a network of industry experts.

Creation of Open Source Materials

The project is dedicated to the creation and dissemination of open source materials, including open specifications and products. By making all work products openly accessible, the project aims to stimulate innovation, ensure transparency, and provide valuable resources that can be used and modified by the broader community to advance immersion cooling technologies.

[1] https://www.undp.org/sustainable-development-goals

2.3 Key deliverables

The Immersion Project aims to advance the adoption and integration of immersion cooling technologies through the development of open source materials, standards, and collaborative efforts. The key deliverables for the project include:

Whitepapers

- **Purpose:** To provide in-depth analysis, insights, and recommendations on various aspects of immersion cooling technologies.
- **Content:** Topics may include the latest research findings, technical evaluations, performance analyses, and case studies.
- **Impact:** Educate the community and industry stakeholders, driving informed decision-making and adoption of immersion cooling solutions.

Best Practice Documents

- **Purpose:** To establish standardized guidelines and procedures for the effective implementation and management of immersion cooling systems.
- **Content:** Detailed instructions on system design, deployment, operation, and maintenance, including safety protocols and efficiency optimization techniques.
- **Impact:** Ensure consistency and high standards across the industry, reducing risks and enhancing the reliability of immersion cooling deployments.

Industry Guidelines and Requirements

- **Purpose:** To establish baseline industry-wide guidelines that ensure safety, interoperability, and regulatory compliance across all immersion cooling technologies.
- **Content:** Broad guidelines, safety standards, environmental impact considerations, and regulatory compliance requirements.
- **Impact:** Drive industry-wide adoption by ensuring that all immersion cooling technologies meet essential safety and operational norms, fostering trust and standardization in the industry.

Technical Requirements and Standards

- **Purpose:** To specify precise technical and performance criteria that components and systems must meet to be considered compliant within the established industry guidelines.
- **Content:** Detailed technical specifications, component performance metrics, and standardized testing protocols specific to design and functionality.
- **Impact:** Ensure that the components and systems used in immersion cooling are not only compliant with broader industry guidelines but also meet high-performance standards, facilitating innovation and quality assurance.

Open Source Designs and Contributions

- **Purpose:** To develop and share open source models, designs and contributions that can be used and modified by the community and industry stakeholders.
- **Content:** Design specifications, models, engineering drawings, recipes, software tools, and reference designs for immersion cooling systems and components.
- **Impact:** Accelerate innovation and adoption by providing accessible and modifiable solutions that can be tailored to specific needs.

Educational Materials and Training Programs

- **Purpose:** To educate and train industry professionals, researchers, and community members on the principles and practices of immersion cooling.
- **Content:** Training manuals, online courses, workshops, and webinars covering various aspects of immersion cooling technology.
- **Impact:** Build expertise and capacity within the industry, ensuring a knowledgeable and skilled workforce to support immersion cooling initiatives.

3. Project scope

3.1 In scope

The scope of the Immersion Project encompasses the development, evaluation, categorization, testing, standardization, and promotion of immersion cooling technologies within the data center industry. The project aims to address the technical, operational, and environmental challenges associated with traditional cooling methods by providing efficient, scalable, and sustainable alternatives. The key areas of focus include, but are not limited to:

Definition of Immersion Cooling Technologies

- Immersion cooling technology encompasses systems in which electronic components are directly exposed to and interact with dielectric fluids for cooling purposes.
- The scope includes systems using single-phase or two-phase dielectric fluids, leveraging their thermal capabilities to manage and dissipate heat generated by electronic components.

Development of Immersion Cooling Technologies

- Innovate and refine immersion cooling solutions for a range of IT equipment, including servers, storage, and networking devices with their associated power supply units (PSUs) and cooling distribution units (CDUs).
- Design and develop open source specifications and systems that support the deployment and operational efficiency of immersion cooling.
- Facilitate the introduction of immersion-supported products into the OCP Product Recognition Program and OCP Marketplace, ensuring they meet an approved relevant OCP Specification and adhere to the OCP Tenets of Impact, Efficiency, Openness, Scale and Sustainability.

Standardization and Documentation

- Create and maintain open standards and best practices for immersion cooling to facilitate widespread adoption and interoperability.
- Develop industry guidelines, whitepapers, and best practice documents that serve as authoritative resources for the community.

Sustainability and Environmental Impact

- Focus on reducing the energy and water consumption and environmental footprint of data centers through immersion cooling.
- Promote circularity and CO2 reduction throughout the lifecycle of immersion cooling products, from manufacturing to end-of-service life with heat reuse options when practical.

Knowledge Sharing and Community Enablement

- Build a vibrant, active, and growing community of contributors who collaborate on immersion cooling solutions.
- Organize workshops, webinars, and training sessions to educate stakeholders on the benefits and practical implementation of immersion cooling.

Industry Collaboration and Advocacy

- Engage with data center operators, hardware manufacturers, industry- and government bodies to drive the adoption of immersion cooling.
- Represent the immersion cooling community in industry forums and advocate for supportive policies and regulations.

Educational and Promotional Activities

- Develop and distribute educational materials such as case studies and detailed analyses to promote understanding and adoption of immersion cooling technologies.
- Conduct outreach activities to raise awareness and educate the broader industry and public about the advantages of immersion cooling.

Continuous Improvement

- Establish mechanisms for ongoing feedback and continuous improvement of immersion cooling technologies and practices.
- Stay abreast of industry trends and technological advancements to ensure the project remains at the cutting edge of data center cooling solutions.

3.2 Out of scope

Non-immersion technologies

Technologies in which none of the electronic components are directly exposed to dielectric fluids, such as air cooling and indirect liquid cooling systems, fall outside the scope of this immersion cooling project.

General Data Center Infrastructure

The project will not cover the overall design, construction, or maintenance of general data center infrastructure unrelated to immersion cooling, such as building architecture, power distribution, and non-cooling-specific reporting or security systems.

Proprietary and Closed-Source Solutions

Development of proprietary or closed-source immersion cooling technologies and solutions that do not align with the open-source principles of the Open Compute Project.

Non-Data Center Applications

The project will not address the application of immersion cooling technologies outside of data centers or IT equipment, such as in industrial processes, consumer electronics, EV battery cooling or other unrelated fields.

Unrelated IT Equipment Standards

The project will not focus on developing standards or specifications for IT equipment that are unrelated to their use in immersion cooling environments.

Commercial Product Development

The project will not engage in the commercial development or sales of immersion cooling products. It will focus on creating open-source designs, guidelines, and best practices that can be adopted and adapted by commercial entities.

Vendor-Specific Solutions

The project will avoid developing or endorsing solutions that are specific to a single vendor or proprietary technology, ensuring that contributions remain broadly applicable and vendor-neutral.

Business and Financial Consulting

The project will not provide business or financial consulting services to any stakeholders regarding the adoption of immersion cooling technologies.

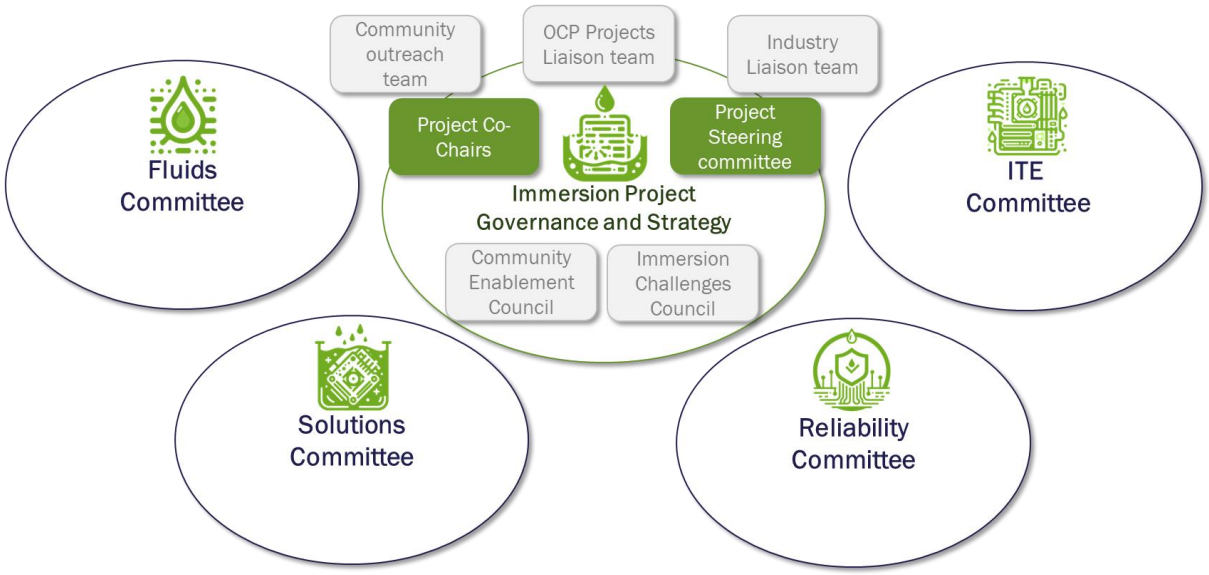
Long-Term Support and Maintenance

The project will not be responsible for the long-term support, maintenance, or troubleshooting of immersion cooling systems implemented by adopters. This remains the responsibility of the implementing organization or their chosen vendors.

4. Project structure

For detailed information regarding the project's governance structure, including the roles and responsibilities of the various committees, teams, and leadership positions, please refer to the comprehensive governance document. This document provides an in-depth overview of the governance framework, outlining how the project is managed and supported, and ensuring transparency and accountability in all project activities.

4.1 Governance



The governance structure of the project consists of the following elements:

- **Project Leadership:** Serves as the driving force behind the project's initiatives, overseeing its strategic direction and ensuring alignment with the broader goals of the Open Compute Project. Project leaders are responsible for high-level decision-making, resource allocation, and representing the project within the broader community and industry.
- **Project Steering Committee:** Comprised of the project leaders, chairs, and co-chairs of technical committees, and leaders of the supporting teams, this committee provides strategic guidance, oversees the integration of various project components, and ensures the project's alignment with its objectives.
- **Technical Committees:** Oversee specific areas of technology within the project, such as fluids, solutions, reliability, and IT equipment. These committees provide strategic oversight, resource management, and quality assurance for the workstreams under their purview, ensuring that the project's outputs are both innovative and practical.

- **Workstreams:** Operate under the technical committees and are focused on detailed, tactical work in specific areas of the project. Workstreams drive the development of new technologies, methodologies, and standards, and are where much of the project's technical progress is made.
- **Focus Groups:** Temporary entities formed by workstreams to address specific, narrowly-defined tasks that require concentrated expertise. These groups tackle intricate challenges and develop specific deliverables related to larger project goals.

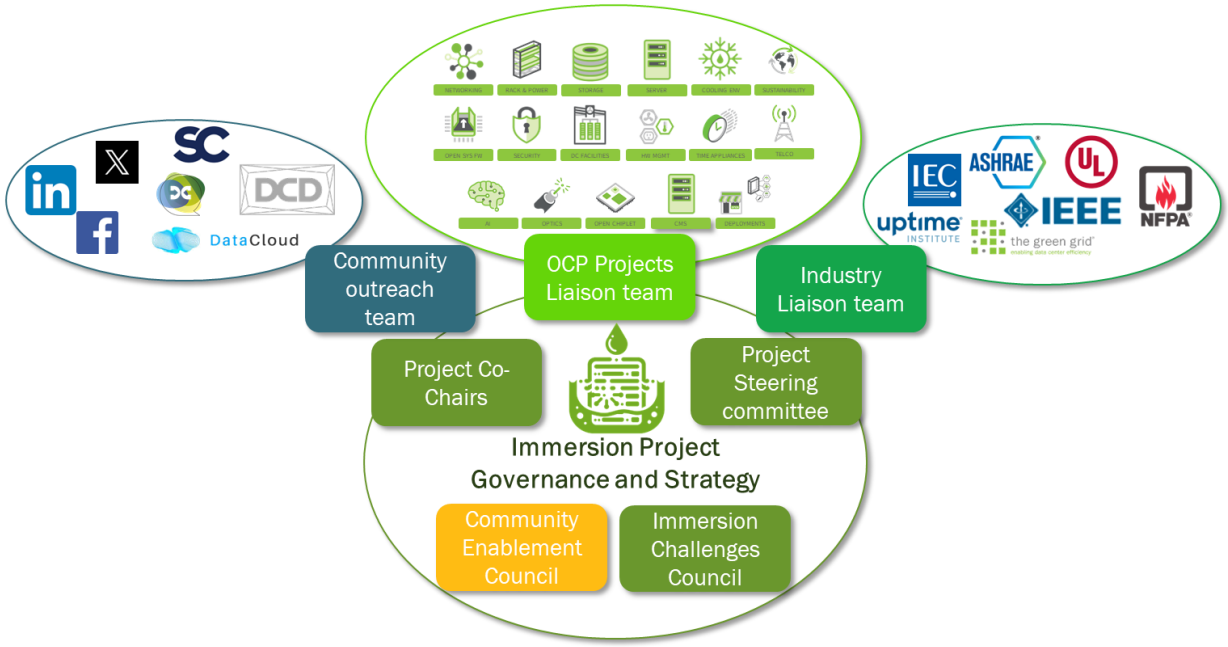
This combination of leadership, committees, workstreams, and focus groups facilitates a network model for the management and coordination of the project. The overall purpose of this structure is to foster an environment of collaborative innovation, streamline decision-making processes, and ensure the effective and efficient advancement of project goals. By integrating various levels of governance and operational focus, the structure supports a dynamic approach to project management that adapts to the evolving needs of the technology and market, ensuring that the project remains at the forefront of technology development. This governance model not only facilitates project oversight but also promotes active participation and engagement from a diverse set of stakeholders, leveraging their expertise to achieve common objectives and address shared challenges.

4.2 Decision Making Process

The decision-making process within the Project's committees prioritizes consensus-building to ensure decisions are made collaboratively and reflect the collective wisdom of the members. Each committee is required to establish a quorum, defined as at least 50% of its members, to conduct official business and promote active participation. Decisions are typically made with a simple majority vote of members voting (either by presence or by email), once a quorum is met. However, for critical matters requiring a supermajority, such as significant changes to governance or strategic direction, two-thirds of the votes are necessary. The committees strive for consensus on all decisions and consider a close tie as an opportunity to further discuss and refine proposals rather than forcing a resolution. This approach encourages open dialogue and aims to address all concerns before moving forward. In the rare event that consensus cannot be reached and a vote results in a tie, the matter may be tabled for further discussion or revisited in subsequent meetings to explore alternative solutions or compromises.

4.3 Support structure

The support structure represents a strategic enhancement designed to improve the project's capabilities in engagement, coordination, and problem-solving. Governed by the Project Steering Committee, this structure comprises specialized groups and councils that address key areas critical to the project's success and sustainability. These entities are tasked with fostering community engagement, ensuring seamless interaction with other OCP projects, aligning with broader industry initiatives, empowering community members, and addressing specific technological and adoption challenges.



This includes the following teams:

- **Community Outreach Team:** Focuses on enhancing the visibility and impact of the project through coordinated marketing, public relations, and community engagement efforts. This team plays a crucial role in promoting the project's achievements and opportunities for involvement across various platforms and events.
- **OCP Projects Liaison Team:** Acts as the bridge between the Project and other OCP projects. This team ensures that efforts are harmonized, resources are leveraged effectively, and collaborations are fostered within the OCP ecosystem to enhance the project’s contributions and influence.

- **Industry Liaison Team:** Engages with external industry and regulatory bodies, as well as standardization organizations to ensure that the Project's outputs are aligned with industry standards and practices. This team is key to advocating for the project's interests and integrating external insights into the project's strategic direction. It is important there is two way communication in this process, meaning that recommendations from OCP are going to the standards bodies and guidance from the standards bodies funnels back into this team.
- **Community Enablement Council:** Dedicated to activating the broader community by encouraging participation, sharing knowledge, and fostering an environment where all members feel empowered to contribute. This council addresses the barriers to active involvement and works to harness the full potential of the community's expertise and enthusiasm.
- **Challenges Council:** Identifies and addresses specific challenges that hinder the adoption and advancement of the project's domain. By focusing on these challenges, the council facilitates targeted problem-solving and innovation, ensuring that the project tackles the most pressing issues facing the industry.

The overall purpose of this structure is to enhance the operational effectiveness and strategic reach of the Project. By creating dedicated teams and councils focused on specific functions, the project can more effectively manage its internal and external engagements, foster a more active and involved community, and address technical and market challenges more efficiently. This support structure not only aids in achieving the project's technical and operational goals but also strengthens its capacity to influence and lead within the industry.

5. Technical committees

5.1 Fluids Committee

Overview

The Fluids Committee focuses on all aspects related to the definitions, use and management of fluids in cooling systems within the project's domain. This includes the selection, testing, and standardization of cooling fluids, oversight of fluid-related technologies, and advancements in fluid engineering. The committee works to ensure that fluid solutions are efficient, sustainable, and aligned with the latest industry standards and environmental guidelines.

Scope

In-scope items include:

- Dielectric Fluids which are used for direct exposure with electronics.
- Fluid specifications.
- Guidelines that relate to the use and storage of fluids.
- Lifecycle management.
- Single phase and two phase fluids for immersion cooling.

Out-of-scope items include:

- Any fluids which are not exposed to the electronics, whether dielectric or not (e.g. Facility water).
- Material compatibility and reliability (see Reliability Committee scope).
- Specifications that include fluid properties but are focussed on other areas are not included in the scope of the Fluids Committee (e.g. a specification for a tank or CDU).
- Two phase cold plate (see OCP Cold Plate Sub-Project).

Way of work

Workstreams form the basis of the collaborative work efforts across the different areas within the scope of the Fluids Committee.

Efforts should be made to consider all in-scope fluids in the work carried out.

Collaboration and Integration

Each workstream lead serves as a member of the Technical Committee, which meets regularly to ensure alignment on activities, harmonization of efforts, and adherence to the committee's strategic objectives. Discussions often extend beyond committee meetings to include broader community interactions. Some of these discussions may take place with a larger community.

- On a pre-defined schedule, the committee chair delivers a concise update during the Immersion Project's community calls or at OCP summits. This update informs the entire community about ongoing progress and key activities.
- Technical committees will organize regular meetings with the committee leaders and others as invited to discuss alignment and facilitate workstream harmonization.
- Should have regular community calls to disseminate community efforts, provide relevant materials, solicit feedback from committee members or host progress reports.
- Topics intersecting with other OCP projects are coordinated through the OCP Project Liaison team to ensure seamless integration and resource alignment.
- Topics emerging from workstreams that are relevant to other industry bodies are relayed to the Industry Liaison team for appropriate dissemination.
- Issues relevant to the immersion project brought forth by the Liaison teams are managed through the Steering Committee and Technical Committees, ensuring proper engagement or creation of relevant workstreams.
- When collaboration across committees is necessary, respective committee chairs are engaged to foster joint activities.

Deliverables and output

- Guidelines to share best practices
- Specifications
- Reports (performance, compatibility)

Long term goals

- Provide guidelines and requirements for immersion fluids that can be adopted by industry standards bodies.
- Reduce barriers to adoption via guidance and sharing best practices.
- Drive the industry towards adopting more sustainable fluid lifecycle practices.

5.2 Solutions Committee

Overview

The Solutions Committee is dedicated to the holistic integration of cooling, ITE and structural solutions at the system level. The intent for this group is to accelerate industry adoption by synthesizing component-level insights into meaningful systems-relevant guidance. Diverse community representation of experience, expertise and position in the value chain is critical for this group to appropriately represent and prioritize our efforts. Overall, our activities seek to benefit a broad audience: business & technical personnel, vendors & customers, and associated industry bodies.

Scope

In-scope items include:

- "Solutions" is differentiated from other Technical Committees as it includes in scope the entirety of the "immersion solution" for the user.
- Rather than focus at the component level (e.g., Fluid, ITE), the group instead focuses on how those components can be utilized together as a system to ensure safety, performance and interoperability. For instance, this includes the enclosure, its management systems, its performance and its connectivity to the datacenter infrastructure and the consequences related to such deployments (financial, operational and otherwise), where the focus is primarily derived from the enclosure level, not the IT equipment or the fluids.
- Requirements, Specifications and best practices for Immersion Cooling, as well as best practices associated with safety and performance at the systems-level
- Responsibility for facilitating compliance with Immersion Requirements for any of the contributions relating to immersion in OCP. This may include, e.g., Product Recognition, Specifications and OCP Marketplace vendor submissions.
- Tools that enable business and technical assessment: financial modeling, systems-level monitoring, product fit assessments, etc.
- Recommendations intended for industry standards and codes bodies.
- Design of non-ITE components to support immersion cooling environment and engineering of New component designs that are non-ITE.

Out-of-scope items include:

- Non-immersion technologies which do not interact with the tank or solution.
- Facilities-level support equipment that extends beyond the system interface or interconnection point.
- Solutions Committee lead and/or workstream leads may serve as consulted Stakeholders but not primary Accountable for immersion community initiatives that are not focused at the solutions- or systems-level (e.g., component-driven initiatives).

Way of work

The committee consists of multiple Workgroups focusing on enabling systems-level implementation in an immersion environment. Workgroups develop specifications, best practices, whitepapers and other materials which are relevant for the industry around their specific subject matter for community release.

Collaboration and Integration

Each workstream lead serves as a member of the Technical Committee, which meets regularly to ensure alignment on activities, harmonization of efforts, and adherence to the committee's strategic objectives. Discussions often extend beyond committee meetings to include broader community interactions. Some of these discussions may take place with a larger community.

Bi-monthly, the committee delivers a concise update during the Immersion Project's community calls or at OCP summits. This update informs the entire community about ongoing progress and key activities.

Topics intersecting with other OCP projects are coordinated through the OCP Project Liaison team to ensure seamless integration and resource alignment.

Topics emerging from workstreams that are relevant to other industry bodies are relayed to the Industry Liaison team for appropriate dissemination.

Issues relevant to the immersion project brought forth by the Liaison teams are managed through the Steering Committee and Technical Committees, ensuring proper engagement or creation of relevant workstreams.

When collaboration across committees is necessary, respective committee chairs are engaged to foster joint activities.

Deliverables and output

- Guidance documents: best practices, Requirements and Specifications
- Reports: benchmarks, use cases, safety assessments, etc.
- Tools: cost models, etc.

Long term goals

Workstream outputs are largely technical in nature but are intended to broadly support business enablement. Our long term goals are to maintain and refine guidance that reduces barriers to entry and encourages right-sized adoption of immersion cooling. To do this, all efforts will address one or several of the following:

- Help customers navigate the financial and/or technical implications of different deployment approaches and product offerings
- Create opportunities to connect vendors, customers and/or industry bodies
- Provide meaningful guidance to users, vendors and Codes & Standards bodies
- Provide focused targets to inspire future product innovation
- Address challenges associated with design and integration of non-ITE components and/or components traditionally used in an air-cooled environment

5.3 Reliability Committee

Overview

The Reliability Committee concentrates on the specific needs and challenges associated with assessing the thermochemical quality and reliability of IT hardware deployed in an immersion solution. The team will deliver testing guidance to understand the compatibility of materials and hardware components, the reliability of hardware components, and the reliability of a server in an immersion fluid.

Scope

In-scope items include:

This committee focuses on developing industry standardized testing guidance to measure and detect thermochemical reliability failures and risks, or hardware failure modes related to the interaction of materials and hardware with an immersion fluid.

Out-of-scope items include:

This committee will not address reliability testing for failure modes that are not due to a deleterious interaction between the IT hardware and the immersion fluid.

Way of Work

The committee consists of multiple Workgroups focusing on developing test guidance and standardization on thermochemical quality and reliability. Workgroups develop specifications, best practices, and whitepapers around their specific subject matter for community release.

Collaboration and Integration

Each workstream lead serves as a member of the Technical Committee, which meets regularly to ensure alignment on activities, harmonization of efforts, and adherence to the committee's strategic objectives. Discussions often extend beyond committee meetings to include broader community interactions. Some of these discussions may take place with a larger community.

Bi-monthly, the committee delivers a concise update during the Immersion Project's community calls or at OCP summits. This update informs the entire community about ongoing progress and key activities.

Topics intersecting with other OCP projects are coordinated through the OCP Project Liaison team to ensure seamless integration and resource alignment.

Topics emerging from workstreams that are relevant to other industry bodies are relayed to the Industry Liaison team for appropriate dissemination.

Issues relevant to the immersion project brought forth by the Liaison teams are managed through the Steering Committee and Technical Committees, ensuring proper engagement or creation of relevant workstreams.

When collaboration across committees is necessary, respective committee chairs are engaged to foster joint activities.

Deliverables and Output

The Committee and its Workgroups will publish thermochemical reliability test guidance, standards and white papers to the OCP community.

- Material Compatibility will publish guidance, standards, and methodologies that address the compatibility of a single uniform metal, ceramic, plastic or composite bulk material in an immersion fluid. The OCP whitepaper “Material Compatibility in Immersion Cooling”, published in 2022, will be maintained and updated with new guidance and test methodologies by the workstream contributors.
- Component Compatibility will publish guidance and test methodologies to assess the material compatibility of an assembly of multiple bulk materials into a component with a specific functionality or workload.
- Component Reliability will develop guidance and test methodologies to measure the probability that a component will not fail due to interactions between the component and the immersion fluid over the service lifetime.
- Server Reliability will provide guidance and test methodologies to understand the probability of a server failure due to interactions between the server hardware and the immersion fluid over the service lifetime.

Long Term Goals

Collaboration with the OCP Immersion Community will establish, propagate, and promote standardized thermochemical test methodologies for IT hardware in immersion solutions. Standardized test methodologies will provide confidence to increase the adoption, reliability, performance, and supportability of immersion solutions in both enterprise and datacenter environments.

5.4 ITE Committee

Overview

The ITE Committee concentrates on the specific needs and challenges associated with integrating IT equipment with immersion cooling technologies. This includes designing IT hardware that is optimized for advanced cooling methods, modifying existing non-immersion IT equipment for use in immersion environments, assessing the impact of cooling technologies on IT equipment performance, and developing guidelines for IT equipment installation, configuration, and maintenance in environments using immersion cooling solutions. Additionally, the committee explores performance improvements for IT equipment within the IT chassis in immersion cooling setups, aiming to enhance performance, efficiency and effectiveness.

Scope

In-scope items include:

The committee focuses on the design, validation, implementation, support and maintenance of IT equipment used in immersion solutions. IT equipment includes servers, storage and networking equipment designed for use in immersion solutions.

Out-of-scope items include:

Everything which is not directly attached (in)to the immersed IT equipment. Power delivery, immersion solutions (e.g. tanks, CDUs, and related equipment), fluid specifications, and devices intended for use outside of immersion are beyond the scope of this committee.

Way of work

The committee consists of multiple Workgroups focused on different elements of ITE design and implementation in immersion environments. Workgroups in turn develop design guidelines, specifications, best practices and whitepapers and contribute such materials around their specific subject matter for community release.

Collaboration and Integration

Each workstream lead serves as a member of the Technical Committee, which meets regularly to ensure alignment on activities, harmonization of efforts, and adherence to the committee's strategic objectives. Discussions often extend beyond committee meetings to include broader community interactions. Some of these discussions may take place with a larger community.

Bi-monthly, the committee delivers a concise update during the Immersion Project's community calls or at OCP summits. This update informs the entire community about ongoing progress and key activities.

Topics intersecting with other OCP projects are coordinated through the OCP Project Liaison team to ensure seamless integration and resource alignment.

Topics emerging from workstreams that are relevant to other industry bodies are relayed to the Industry Liaison team for appropriate dissemination.

Issues relevant to the immersion project brought forth by the Liaison teams are managed through the Steering Committee and Technical Committees, ensuring proper engagement or creation of relevant workstreams.

When collaboration across committees is necessary, respective committee chairs are engaged to foster joint activities.

Deliverables and output

The Committee and its Workgroups will publish ITE related design guidelines, specifications, best practices and white papers recommendations to the OCP community. This includes, but is not limited to, immersion thermal solution reference designs, analysis of different dielectric fluids' cooling performance under varying flow conditions, methodology for designing/testing immersion ITE for multi-vendor Immerion Solutions, and required modifications to maintain proper signal integrity when ITE is immersed in dielectric fluids.

Long term goals

The establishment of standards, best practices and regulatory requirements for the development and use of IT equipment in immersion solutions. Through common standards, increase the adoption, reliability, performance, and supportability of immersion solutions in both enterprise and datacenter environments.

6. Support teams

6.1 Community Outreach

Overview

The community outreach team aims to enhance the immersion cooling project's visibility and impact by leveraging coordinated marketing, public relations, and community engagement efforts. The goal is to promote the project's activities and immersion cooling technology as a widely accepted and verified solution in the data center industry, driving greater adoption and participation through strategic outreach and collaboration while working closely with the OCP Foundation.

Scope

The Community Outreach team focuses on enhancing the visibility and impact of the immersion cooling project within the global community interested in liquid and immersion cooling technologies.

The scope items include:

- **Event Participation:** Coordinating and participating in OCP-sponsored and other industry events to stimulate the awareness of the immersion cooling project activities which are targeted at the global community.
- **Marketing and PR:** Implementing strategies to raise awareness and highlight achievements of the immersion cooling project in collaboration with the OCP Leadership.
- **Community Engagement:** Facilitating community outreach and involvement through regular meetings and active online and offline engagement.

Out-of-scope items include:

- **Policy Advocacy:** Engaging in lobbying or policy-making activities which are beyond the promotional scope of the team.
- **Unrelated Objectives:** Activities or initiatives that do not align with the strategic goals or the overarching mission of the Immersion Project.
- **Individual Membership Management:** Handling individual membership issues or subscriptions, as these are managed by the OCP membership team.

Way of Work

1. **Hosting Events and Campaigns**
    - Develop and execute events and marketing campaigns tailored to the target audience.
    - Utilize various formats such as webinars, workshops, and digital content to engage and educate.
2. **Community Outreach**
    - Identify and connect with key stakeholders in the data center and technology sectors.
    - Share valuable content and engage in meaningful discussions to build relationships and promote immersion cooling.
3. **Team Coordination**
    - Lead bi-monthly meetings with team members and volunteers to strategize and plan activities.
    - Engage in the Steering Committee Meetings to gather input and assess platform and event support.
4. **Promotion and Visibility**
    - Working closely with the OCP Marketing Director and team to promote immersion project related activities and organize events. Use digital and traditional marketing channels to highlight project achievements and involvement opportunities.
    - Engage in public relations efforts to secure media coverage and thought leadership opportunities.
5. **Evaluation and Adaptation**
    - Track performance metrics and collect feedback to continuously improve strategies and approaches.

Collaboration and Integration

- **Internal Teams:** Work closely with the OCP marketing and PR teams to ensure a harmonized messaging towards the industry.
- **External Partners:** Collaborate with industry associations, technology providers, and academic institutions for joint events and sponsorship opportunities.
- **Community Involvement:** Engage with community members, industry experts, and stakeholders to foster a collaborative environment and gather diverse perspectives.

Deliverables and Output

- **Event Execution:** Successful organization and participation in industry events with positive feedback and engagement.
- **Marketing Materials:** Creation and distribution of content such as case studies, white papers, and multimedia assets.
- **PR Coverage:** Press releases, media mentions, and thought leadership articles showcasing project milestones and innovations.
- **Community Reports:** Regular updates on community engagement activities, feedback, and participation statistics.

Long-Term Goals

1. **Increased Adoption:**
    - Establish immersion cooling as a standard solution in the data center industry through widespread recognition and usage.
2. **Enhanced Visibility:**
    - Achieve significant media coverage and industry presence, positioning the project as a leading authority in cooling technology.
3. **Strong Community Network:**
    - Build and maintain a robust network of industry professionals, stakeholders, and enthusiasts actively engaged with immersion cooling.
4. **Sustainable Growth:**
    - Develop and sustain ongoing partnerships and collaborations to support the continued advancement and promotion of immersion cooling technology.

6.2 OCP Project Liaison

Overview

The OCP Project Liaison team serves as a bridge between the Immersion Project and other projects within the Open Compute Project (OCP) community. Its primary purpose is to ensure that the Immersion Project does not operate in isolation but integrates seamlessly with broader OCP initiatives. This team actively identifies and addresses overlaps, facilitates collaboration, and aligns efforts across different projects to optimize the collective output and impact.

Scope

In-scope items include:

- Identifying and addressing overlaps between the Immersion Project and other OCP projects.
- Facilitating collaborative efforts that involve multiple OCP projects.
- Ensuring that the Immersion Project aligns with the strategic objectives of the broader OCP community.
- Managing activities related to other OCP projects that impact or could enhance the Immersion Project's goals.

Out-of-scope items include:

- Engaging with external industry organizations or individual stakeholders not part of the OCP framework, as these fall under the purview of the Industry Liaison team.
- Direct involvement in the technical development of projects, which is managed by the respective project teams and technical committees.
- Resolution of conflicts within individual projects, as this responsibility is reserved for the project leads and the OCP Community Director.

Way of work

The OCP Project Liaison team adopts a systematic approach to track and align with other OCP projects. This involves:

- Regular meetings to discuss ongoing projects and potential overlaps.
- participate in Project Steering Committee meetings to ensure alignment with the Immersion Project's strategy, goals and progression.

- Maintaining an overview of all current OCP projects and their scopes to identify potential synergies or conflicts.
- Engaging with relevant project leads across OCP to gather updates and coordinate efforts.
- Develop engagement models which facilitate effective communication and collaboration between different project teams.

Collaboration and Integration

To drive cross-project collaboration effectively, the team:

- Acts as the central point of contact for any OCP project inquiries related to the Immersion Project.
- Coordinates with technical committee chairs to ensure that any inter-project activities are well integrated with the workstreams of the Immersion Project.
- Facilitates regular joint sessions between different project teams to brainstorm, align strategies, and initiate collaborative workstreams.
- Identifies opportunities for collaboration with the Immersion project across all of OCP.

Deliverables and output

The key deliverables of the OCP Project Liaison team include:

- A bi-monthly report in the project community call, outlining all aligned projects and the status of ongoing collaborative workstreams.
- Best practices and lessons learned from inter-project collaboration.
- Initiation and oversight of joint projects that involve multiple OCP project teams.
- The Liaison Team shall provide OCP community input to the projects within their responsibility.

Long term goals

The long-term goal of the OCP Project Liaison team is to establish a harmonization framework that:

- Ensures all OCP projects which may have overlap with the immersion project are aligned with the overarching goals of the community.
- Promotes a culture of collaboration and open communication across different projects.
- Maximizes the collective impact of the OCP's efforts by avoiding duplication and leveraging synergies.

6.3 Industry Liaison

Overview

The Industry Liaison Team is a critical component of the OCP Immersion Project, dedicated to bridging the gap between the project's initiatives and the broader industry standards and practices with the goal to accelerate adoption of liquid cooling. The team is outwardly focused on engaging with other industry bodies and ensures that the project remains aligned with, and influential in, the wider industry by leveraging existing relationships and engagements in various industry and government bodies.

Scope

In-scope items include:

- The team will align with and contribute guidance to existing and relevant industry standard bodies including but not limited to ASTM, ASHRAE, LCC, UL, NIST and others to facilitate the two way communication of strategic information from the immersion project and keep both sides apprised of relevant guidance, developments, opportunities, and challenges.
- The team will collaborate with appropriate government agencies and groups to facilitate policies that will enable adoption of liquid cooling technology.
- The team will make appropriate recommendations and engage in policy discussion with standards bodies and ensure that the immersion project is well represented in broader industry initiatives.
- The team will keep track of immersion related developments or topics in connected industry organizations and government agencies and report these back to the Project Steering Committee, Technical Committees and/or relevant workstreams.
- Where necessary and possible with the team's members and work efforts, the team will facilitate the interests of other Cooling Environments related sub-projects in addition to the Immersion related topics.

Out-of-scope items include:

- **OCP Standards creation:** The team will be focusing on facilitating and contributing to standards, but OCP is not a standards body and will not unilaterally create standards by itself.
- **Non-relevant standard bodies:** The team will not liaise with any standard bodies which do not facilitate any relevant materials to the Cooling Environments related projects.

- **Internal OCP liaison:** The team will not liaise internally with other groups within OCP, unless there is overlap with existing work efforts with external industry bodies.
- **Policy Advocacy:** Engaging in lobbying or policy-making activities which are beyond the alignment scope of the team.
- **Unrelated Objectives:** Activities or initiatives that do not align with the strategic goals or the overarching mission of the Cooling Environments related projects.

Way of work

There will be a team leader and representatives from the community who will engage with both the standards bodies and appropriate policy discussions to ensure objectives are met. There will be a monthly meeting to collaborate with the broader team and align on objectives, and next steps.

To facilitate relations with other industry bodies, the team chairs will work closely with the OCP foundation's representative who is responsible for maintaining formal OCP alliances with other industry bodies.

Any joint activities which publicly refer to collaboration between the Industry Liaison Team and other industry bodies will be aligned with the OCP foundation to ensure that formal relations are facilitated.

For any challenges presented to the industry liaison team that require engagement from workstreams in place, chairs will identify the challenge and provide feedback to the appropriate committee as well as discuss in steering committees as relevant. The items can be tracked in relevant monthly calls and updates within the relevant committees.

Collaboration and Integration

On a monthly basis, both outbound and inbound topics are shared with the Project Steering Committee to ensure awareness and facilitate dissemination and support throughout the Immersion Community.

Bi-monthly, the team chairs deliver a concise update during the Immersion Project's community calls or at OCP summits. This update informs the entire community about ongoing progress and key activities.

The team members will either participate in the relevant workstreams which are dealing with relevant subject matter or work with the respective workstream leaders and/or Technical Committee chairs to ensure that alignment on technical content is facilitated and consistently represents the community views.

Topics intersecting with other OCP projects are coordinated through the OCP Project Liaison team to ensure seamless integration and resource alignment.

The Project Leaders will facilitate alignment for the team chairs with the Cooling Environments Project to enable harmonization with adjacent sub-projects under Cooling Environments.

Deliverables and output

The team will publish its recommendations to appropriate industry bodies as well as consider relevant information coming from bodies. The group will work across the OCP community to ensure its positions are considered when standards and policies are issued. When appropriate, will ensure that any OCP contribution is captured and formally documented before publication of any content by an external organization is complete.

The team will track and publish ongoing action items with the community.

Industry standards which are supported by OCP Immersion Project community and align with the work efforts and products of the project.

Long term goals

- The long term goal is to build standards that will support the long term growth of immersive technologies.
- Establishing the OCP Immersion Project as the central point of contact for the creation of standards across the industry.
- Ensure readiness for adoption by the datacenter industry of immersion technologies.

6.4 Community enablement council

Overview

The community enablement council improves the awareness and contributions of every OCP volunteer engaging in the Immersion project through direct contact, polling, interviews, context sharing, training resources, feedback design and data collection. It uses data science to assess categorization, segmentation, related overlaps, gaps and areas for potential confusion and/or frustration among volunteers. We seek to increase volunteer hours per year by lowering churn amongst new entrants who can become overwhelmed and check out– not knowing what to do or how they can participate more fully in the Immersion project and how that relates to the larger OCP community.

Scope

In-scope items include:

Focusing exclusively on the OCP Immersion project, enhance volunteer engagement through:

- Designing and implementing feedback collection mechanisms and data systems.
- Conducting polls and direct interviews, particularly targeting new community and project members, to gather detailed feedback.
- Developing and distributing training resources, including contextual video clips and social media posts, to address immediate knowledge gaps.
- Providing onboarding materials and learning resources to help new volunteers quickly climb the learning curve.
- Regular reporting to the Immersion project community on findings, trends, and actionable insights.
- Participating and organizing in-person meetings with volunteers in various relevant industry venue trade shows including OCP summits.

Out-of-scope items include:

- Involvement with other OCP projects outside the Immersion project.
- Direct involvement with external industry bodies unless they directly relate to Immersion project workgroup activities.
- Leading onboarding processes for community leadership roles.

Way of work

This team works closely with the Community Outreach Team to coordinate efforts. As new interested parties are brought into the community, this team provides them a safe, professional and comprehensive first impression of the Immersion project to assist them in determining their choices for personal investment.

Direct engagement with new entrants and volunteers to the Immersion project, may include initiatives such as a welcome meeting every month for interested parties. This is updated monthly with new information as the Immersion project grows and evolves. This occurs in at least three time zones to attract true global participation.

Collaboration and Integration

We report insights to all Immersion project Chairs and Co-Chairs on what we are observing in the Volunteer population in activity and mix to promote their consideration of new options

As requested, we report back to the steering committee on findings relating to perceived participation hurdles and issues. This feedback will support the steering committee to map out, investigate and address barriers and demotivators for community engagement.

Deliverables and output

- Count of volunteers in Immersion project by person, time zone and other categories
- Volunteer membership hours in Immersion project and how they are increasing annually. Average volunteer hours per month contributed by person, time zone, corporate affiliation (if any), nationality, age in months as volunteer, source of first contact, etc.
- Recommendations as required on suggested adjustments to way of working.
- Suggestions of new resources deemed by the community to be lacking e.g. onboarding steps.
- Quality of self-reported experience by Immersion project volunteers goes up annually
- Churn in new entrants to Immersion project reduces

Long term goals

- Provide greater understanding to community leaders on effectiveness of the community and areas for improvement to facilitate community growth.
- Ensure resources and workgroups are addressing the community driven roles and applications to support community development.

About Open Compute Project

The Open Compute Project (OCP) is a collaborative Community of hyperscale data center operators, telecom, colocation providers and enterprise IT users, working with the product and solution vendor ecosystem to develop open innovations deployable from the cloud to the edge. The OCP Foundation is responsible for fostering and serving the OCP Community to meet the market and shape the future, taking hyperscale-led innovations to everyone. Meeting the market is accomplished through addressing challenging market obstacles with open specifications, designs and emerging market programs that showcase OCP-recognized IT equipment and data center facility best practices. Shaping the future includes investing in strategic initiatives and programs that prepare the IT ecosystem for major technology changes, such as AI & ML, optics, advanced cooling techniques, composable memory and silicon. OCP Community-developed open innovations strive to benefit all, optimized through the lens of impact, efficiency, scale and sustainability.

Learn more at www.opencompute.org.