

OCORA

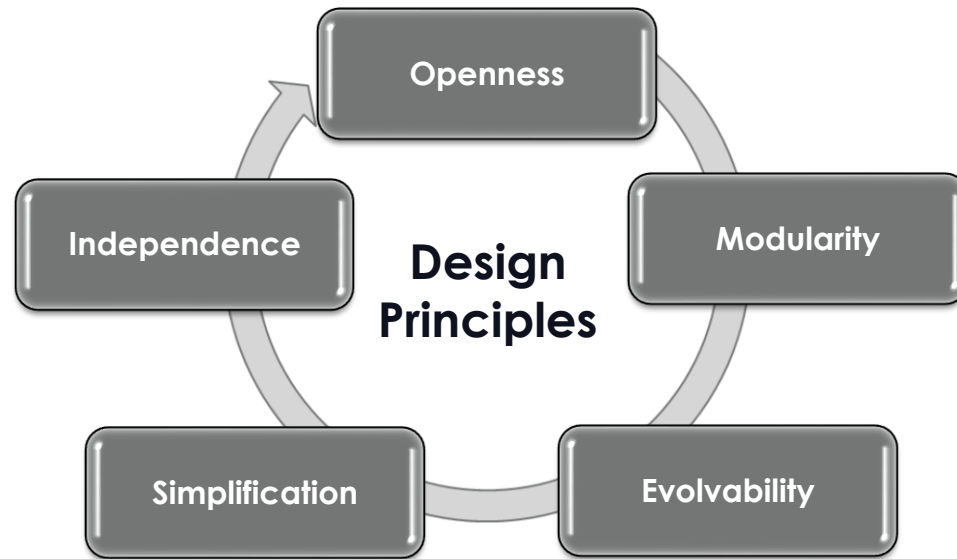
Executive Summary Slide Deck

OCORA Release R1 - OnePager

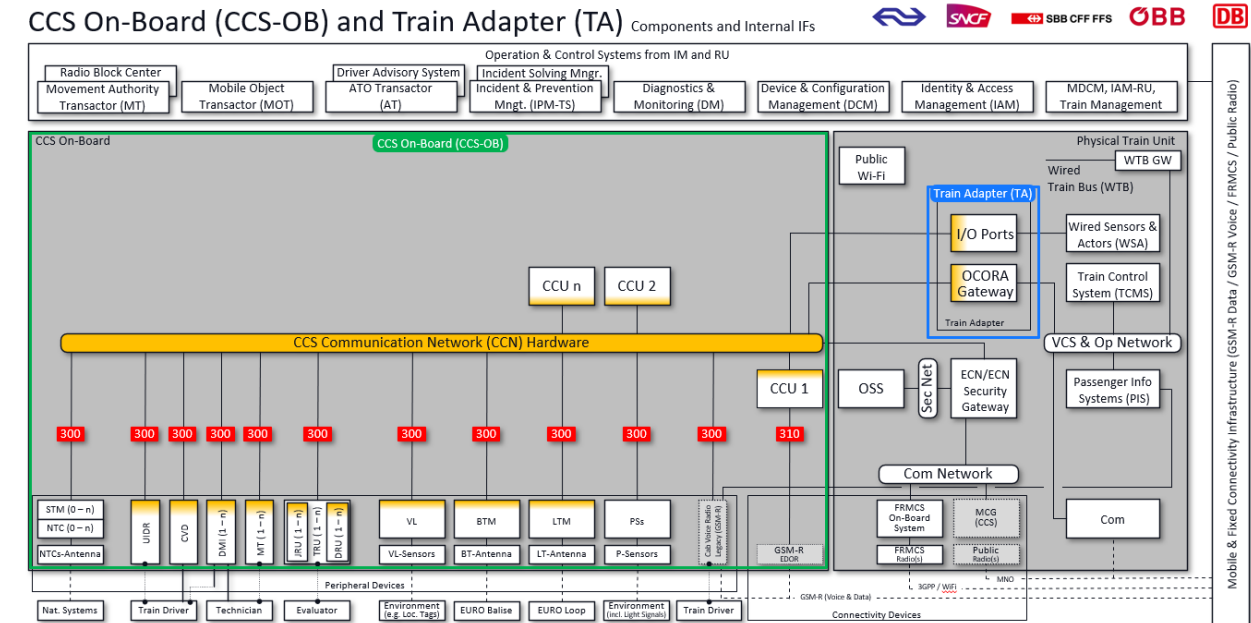
<https://github.com/OCORA-Public/Publication>

OCORA, the “**Open CCS On-board Reference Architecture**” initiative, whose signatory founding Members are NS, SNCF, DB, SBB and ÖBB, has reached a next important milestone with the **Release R1** of the specifications of the OCORA architecture.

OCORA aims to **reduce life-cycle costs** and **facilitate** the introduction of **innovation** and **digital technologies** beyond the current proprietary interfaces, by establishing a **modular, upgradeable, reliable** and **secure CCS on-board architecture**.



The **OCORA Release R1** describes **CCS On-board** and includes **sector feedback**. It is again **feeding TSI-2022** and prepares for **Europe’s Rail Joint Undertakings System- & Innovation-Pillar**.



OCORA deliverables are published under the **European Union Public License (EUPL)** and are consequently available for all stakeholders. The **OCORA Release R2** is planned for **mid of 2022**.

Who is OCORA - Open CCS On-board Reference Architecture



OCORA IS...	OCORA IS NOT...
Open Cooperation	Not a Representative Body/Organisation
A set of public specifications	Not a product
For the On-board CCS	Not for Trackside CCS

Problem Statements - Current ETCS On-board solutions...

1. are based on the **TSI specifications** ensuring interoperability, but the **subset specifications are incomplete and ambiguous**. Therefore, interoperability is not a given.
2. are **more expensive than technologically justifiable**. This seems to be a result of **high integration engineering and certification efforts**, as well as **small batch sizes** and **high project risks**.
3. are **difficult to be integrated into existing vehicles**.
4. are **difficult and time consuming to adapt/change/update/upgrade**:
 - In the case of patching in non SIL area (e.g. cyber- security patching)
 - In the case of error correction in SIL area
 - In the case of baseline upgrade (e.g. ETCS baseline 2 to 3)
 - In the case of functional enrichment (ex. base for game changer introduction is not a given)
5. do **not respect different, non-overlapping life cycles** (e.g. vehicle vs. CCS vs. connectivity).
6. are **difficult to maintain** (e.g. maintenance, monitoring, diagnose possibilities very limited).
7. are **lacking built-in cyber security**, since this is a newer topic, especially in combination with 4 + 6.
8. are **performing below expected availability and reliability** (from overall ETCS system perspective).

In addition:

- The benefit of ETCS On-board only pays off, if the ERTMS rollout progresses in Europe on large scale.
- The ETCS On-board functions as such also need some improvements (e.g. braking curve, odometry accuracy, etc.) to serve current operational needs.
- Difficult, expensive and time consuming ETCS On-board fitments in general, are delaying national deployment plans, impacting trackside investments, and postponing ERTMS rollouts.

OCORA business rational

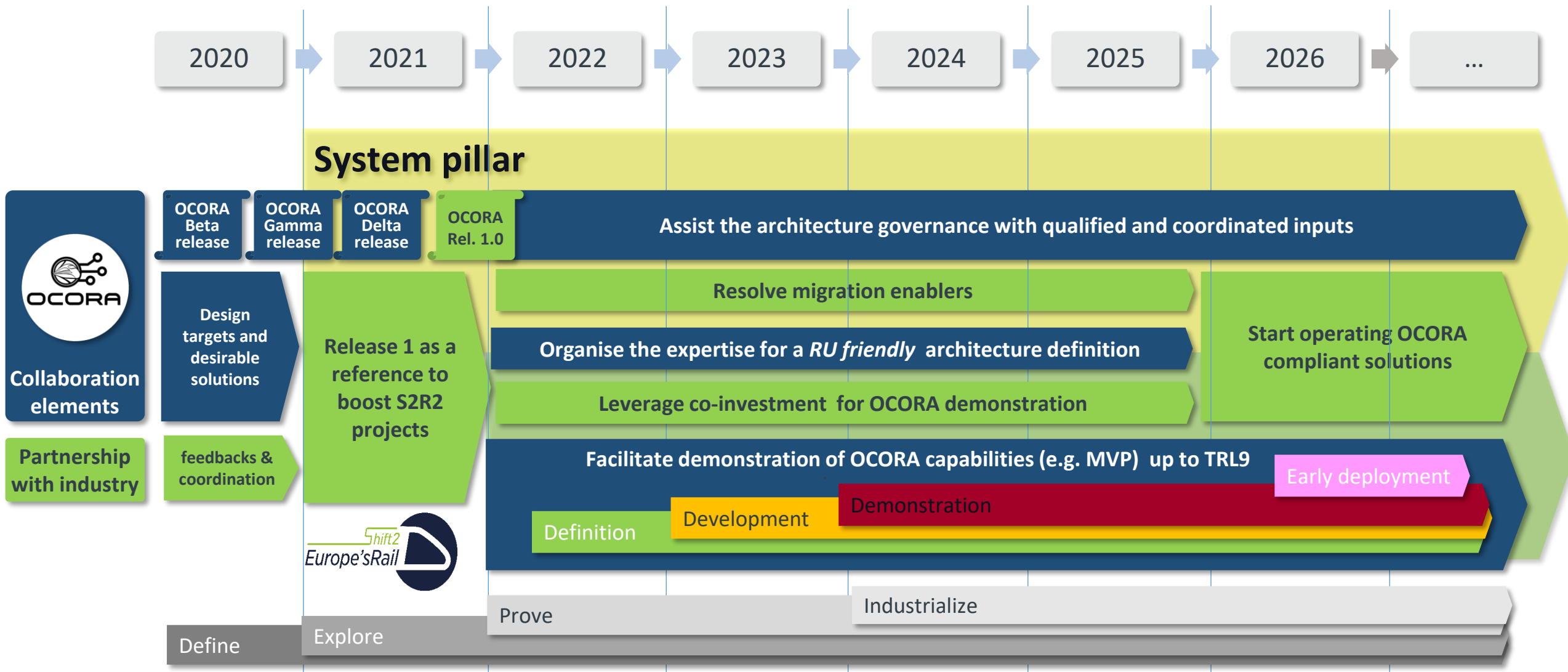
- keep up competition with modal competitors, investing heavily in digitalisation and automation
- embed innovative technologies in railway physical assets, planning systems and operations for boosting productivity, controlling cost and risk levels, and improving performance
- fast and affordable integration of the game changers (ERTMS, ATO, radio, localisation) in the CCS onboard, as a bottleneck for enhanced railway offers
- Anticipate technology lifecycles

Release business rational

- Align operators' vision on design objectives and requirements for CCS On-board architecture
- Intensify the sector dialogue on new generation products and migration's drivers

Roadmap

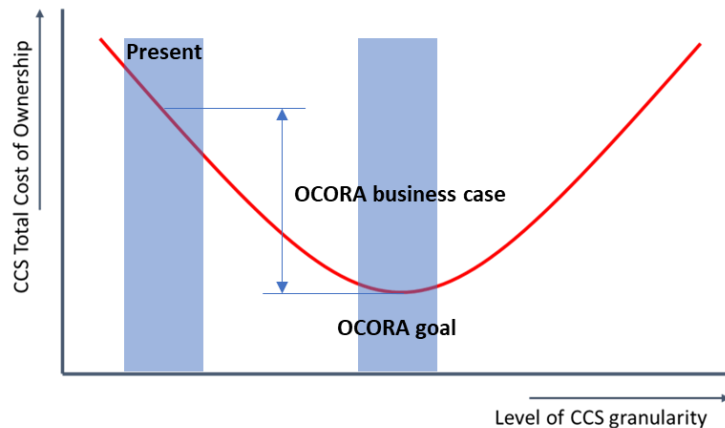
With an architecture framework, the ERJU can be a collaborative platform supporting technological migrations



Release Overview

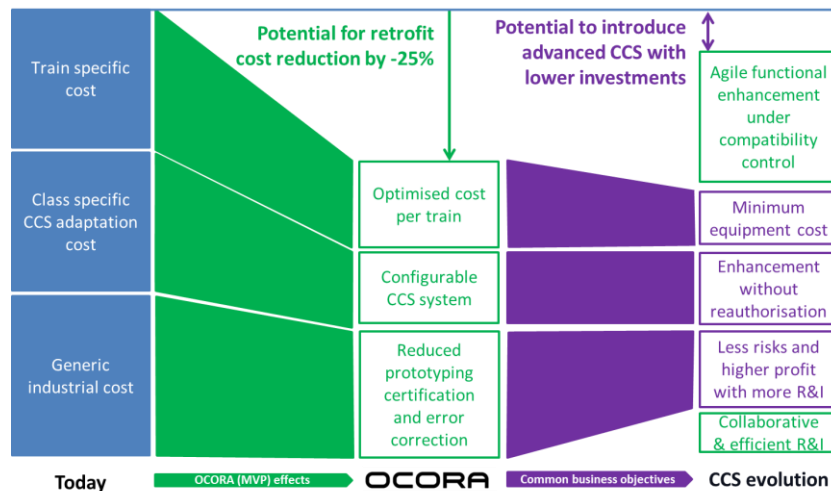


An economic model to discuss the optimal level of granularity



The development of the OCORA economic model, intends to provide tools for:

- Getting a clear view on the economic driver for the modularization of the on-board. To this end the model focus on 3 cost categories:
 - Generic industrial cost for developing certified CCS onboard sub systems
 - Cost for authorising operation with a new CCS configuration in a class of vehicle
 - Train specific cost for fitting or upgrading CCS building blocks
- Studying the impact of technology life cycle on the total cost of ownership. To this end scenario are defined for comparison purpose:
 - Today's situation with slow deployment and small project size, based on reference values derived from EC studies on ERTMS.
 - OCORA MVP scenario to model the economic impact of the modularisation of CCS onboard architecture
 - CCS evolution scenarios allowing to investigate impact of larger market, enhanced functionalities and accelerated upgrade scheme
- Optimising the contribution of OCORA breakthrough to Common business objectives. An open dialogue with the industry creates mutual benefit.



Sector Dialogue

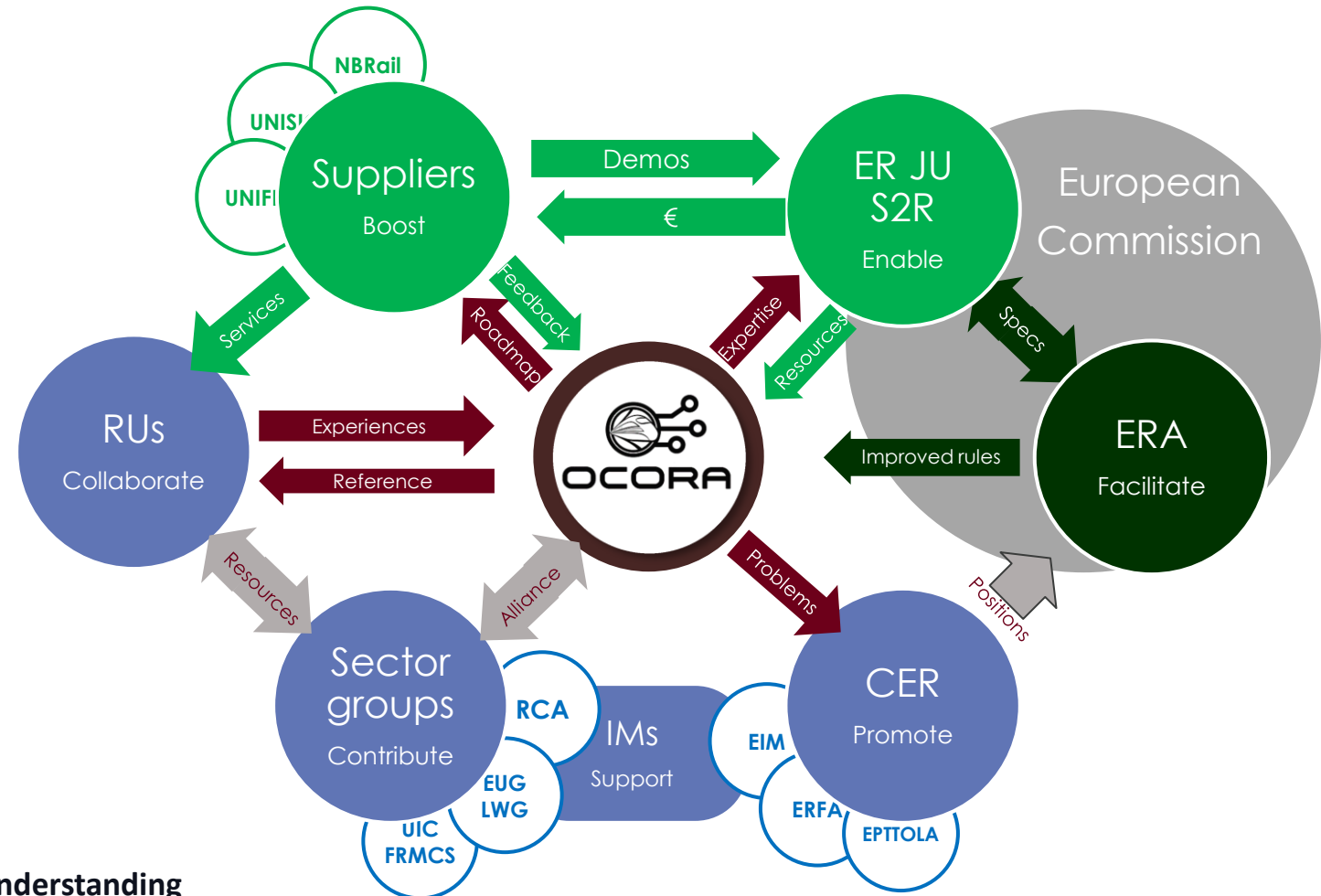


OCORA, as an open architecture reference, support alignment between sector initiatives

OCORA collaboration is open to support:

- ER JU / S2R: financing and an agile frame for industry partnering
- Suppliers : joined activities (e.g. models, PoC, prototype, MVP...)
- ERA : optimised acceptance based on just rules

Other fleet owners and any expert or EU citizen are welcome to join as supporter or contributors.



OCORA liaisons and alliances allow to find common understanding and complementarity at expert, corporate and institutional level.

- Publisher: OCORA Cooperation
- Channel: OCORA publishes exclusively over <https://github.com/OCORA-Public/Publication>
- OCORA liaison partners: UIC TOBA, RCA, CER
- Any feedback for OCORA is welcome!
If you would like to attend a workshop or give a feedback, please contact jean-baptiste.simonnet@sncf.fr.
For specific feedback the OCORA-BWS01-040 Feedback Form shall be used.
- For active collaboration (within the OCORA framework) the OCORA Code of Conduct must be accepted and signed.
In case of interest for active collaboration and you are eligible to become a partner according to the OCORA Code of conduct, please drop a "interest of becoming a OCORA member by mail" to rolf.muehlemann2@sbb.ch.
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