CERN IT Department

IT Strategy and Target Operating Model

Enrica Porcari

Successes within existing IT Operating Model

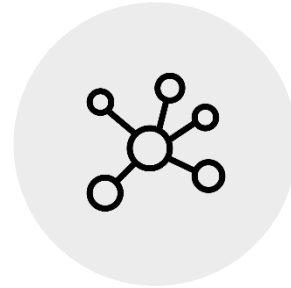## SUCCESSES WITHIN THE EXISTING IT OPERATING MODEL

Effective and reliable operations

On the whole, IT runs a **robust infrastructure** with services that support the Organisation. There have **been no significant data losses or outages** and the **technology** used is widely adopted and **respected**

Delivery of a comprehensive WLCG infrastructure

Whilst there are opportunities for improvement, CERN and IT have **established a strong relationship** with partners through the **provision of an effective WLCG infrastructure**

Pockets of examples of great collaboration

Where **effective collaboration has taken place** between the business and IT, there have been **success stories** of great collaboration. An example of this is the database services for ATS which were designed with end users and leverages existing IT platforms

Drive and commitment to contribute to CERN's success

A common theme throughout interviews was the **pride individuals had in working for CERN**, with a genuine **drive and commitment to support** the institution to achieve its mission

'Standard services IT provide are really excellent. There are no complaints at all'

'Things have been quite stable for the past 10 years and WLCG operations run smoothly'

'The Liaison Representative is really effective at understanding the needs of experiment'

'IT at CERN has some of the best people, so it is one of the best existing IT departments'

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Business stakeholder interview findings

Ensure greater business collaboration

Today: There is limited coordination and collaboration between IT and end users, and the business does not consistently feel that IT understand and recognise their priorities

Improve communication

Today: There is a lack of clarity between IT and the business on who to engage, and a perception that communication is one-way and often not timely. Official communication channels are also perceived as inefficient and circumvented
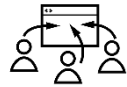
Structure services to user needs

Today: The approach to developing new services does not consistently recognise the needs of users, with services not effectively monitored and evaluated, leading to a proliferation and duplication of services and solutions across CERN

Align R&D to innovation continuum

Today: R&D is fragmented, and it is unclear what role IT plays when it comes to innovation in computing. This results in a duplication of solutions / effort and a lack of alignment between the business and IT

Establish holistic solution design approach

Today: IT needs to be able to build services when the business has unique requirements, however, off-the-shelf solutions and total cost of ownership are not consistently considered when making build vs. buy decisions

Recognise operational risks

Today: IT disaster recovery and business continuity procedures are not adequate. Although failures are limited, the risk is significant to ongoing operations

INTERVIEW QUOTES FROM AS-IS ASSESSMENT

'It's clear for everyone that we need to work better across the institution'

'I don't really know what IT are meant to provide'

'We don't have a proper disaster recovery and business continuity plan'

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IT group stakeholder interview findings

Align to business needs

Today: There are pockets of examples of successful collaboration across IT and the business, however service managers are often distant from users' needs

Align innovation to overall business objectives

Today: There is great enthusiasm for innovation across IT, however this is conducted with minimal governance, sponsorship or alignment to the CERN strategy and objectives

Improve communication

Today: There is frustration over the alignment between the business and IT over how communication channels are structured, with limited business engagement with IT tools

Improve change and release management approach

Today: Although change management exists, it is not sufficient for the organisation's needs as timelines are often short, with late identification of down-stream impacts

Establish security protocols

Today: There is a security risk as, although security policies are in place, the implementation and enforcement of these are delegated to Service Managers, posing a risk for the business

INTERVIEW QUOTES FROM AS-IS ASSESSMENT

'Some teams are too disconnected from users to know what they want'

'Our change management board is very short term, it doesn't manage change properly'

'Security don't work with us to implement the right security measures for our services'

Strategic directions

PEOPLE FIRST

ENHANCING STRATEGIC ENGAGEMENT AND ALIGNMENT WITH USERS

HOLISTIC SOLUTION DESIGN APPROACH

DEFINING IT'S ROLE IN INNOVATION

FOCUSSING RESOURCES EFFECTIVELY

PROVIDING A SECURE FRAMEWORK

Logical organisational model

ENGAGEMENT:

User groups will have a dedicated Business Manager responsible for understanding user needs and establishing two-way communication channels

SECURITY:

The Security team will be reviewed to ensure a more mature security capability, to better safeguard the environment and reduce operational risks

DATA & ARCHITECTURE:

A Data & Architecture team will be formed to establish a clear framework for CERN and reduce operational risks

GOVERNANCE:

Governance will be put in place for oversight over service delivery and new initiatives, to increase efficiency and strategic alignment
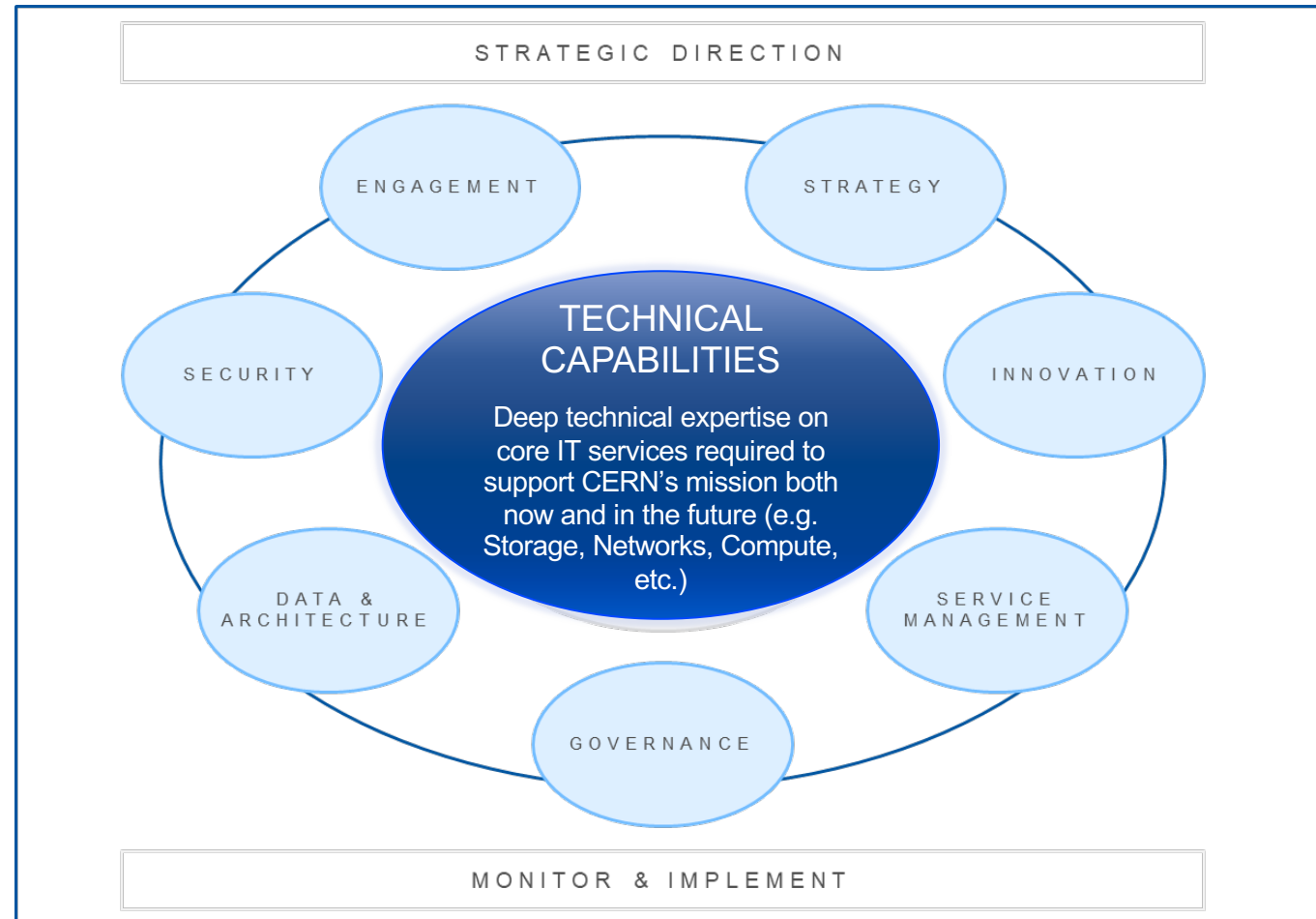
STRATEGY:

The IT strategy will be used to promote inter-departmental collaboration and alignment, delivering the right experience for internal and external stakeholders

INNOVATION:

IT's role within innovation and new initiatives will be clearly defined and understood, to deliver the greatest value to users through increased engagement and TCO consideration

SERVICE MANAGEMENT:

Services will continue to be delivered to a high standard, through maintenance of a robust service stack that is measured against alignment with user needs and adherence to SLAs

STRATEGIC DIRECTION

ENGAGEMENT   STRATEGY

SECURITY

TECHNICAL CAPABILITIES

Deep technical expertise on core IT services required to support CERN's mission both now and in the future (e.g. Storage, Networks, Compute, etc.)

INNOVATION

DATA & ARCHITECTURE

SERVICE MANAGEMENT

GOVERNANCE

MONITOR & IMPLEMENT

Focus Area Key: Transformation   Evolution

IT roles framework
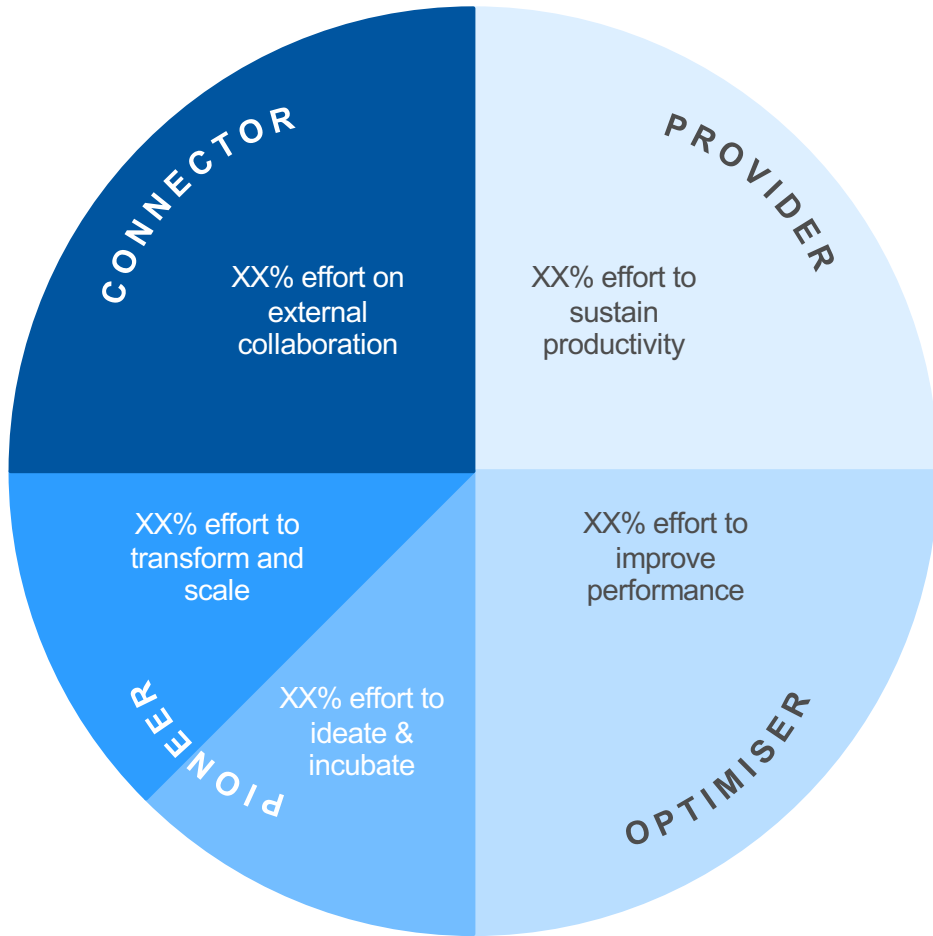
WHAT IS IT?

- The framework shows the roles that are **involved in delivering IT services**
- It highlights the role that IT plays as an honest broker by **connecting all areas of focus** with **internal and external stakeholders**
- It is designed to be **flexible**, depending on individual's **roles**, **skills** and **current business objectives**

OBJECTIVE OF THE FRAMEWORK

- To enable individuals and teams to **focus their time / effort for maximum impact**
- To solve the problem of **other departments not being clear on the roles** that IT play
- Roles are **assessed separately** as part of the **MERIT process**

EXAMPLES

Storage Team Member

openlab Team Member
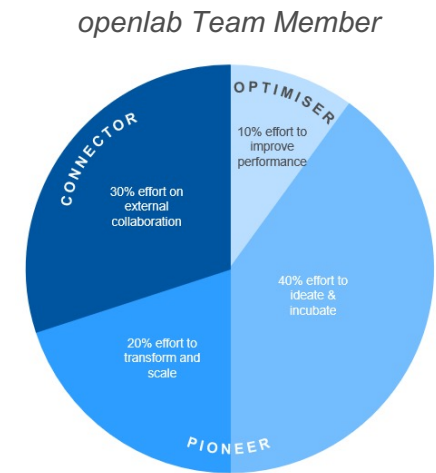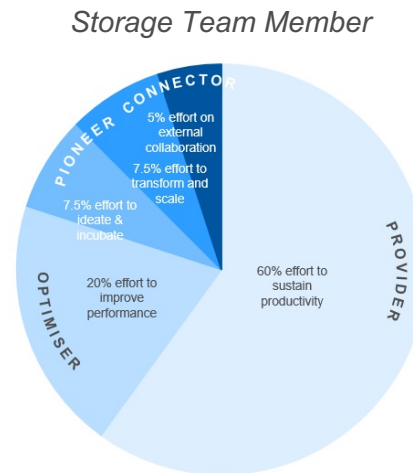
How does IT role framework answer IT's pain points?

- Matrix structure enhances **collaboration** – understand what others do. HOW: part-time roles made publicly available for expressions of interest
- A role should be **temporary** by definition. HOW: a **mandate of limited duration**.
- Sustained training and access to more opportunities to support the **career development** of personnel and allow longer term career goals.

Establishing a talent management team to focus on this objective

Collaboration → Transparency → Empowerment → Inclusion → Career development
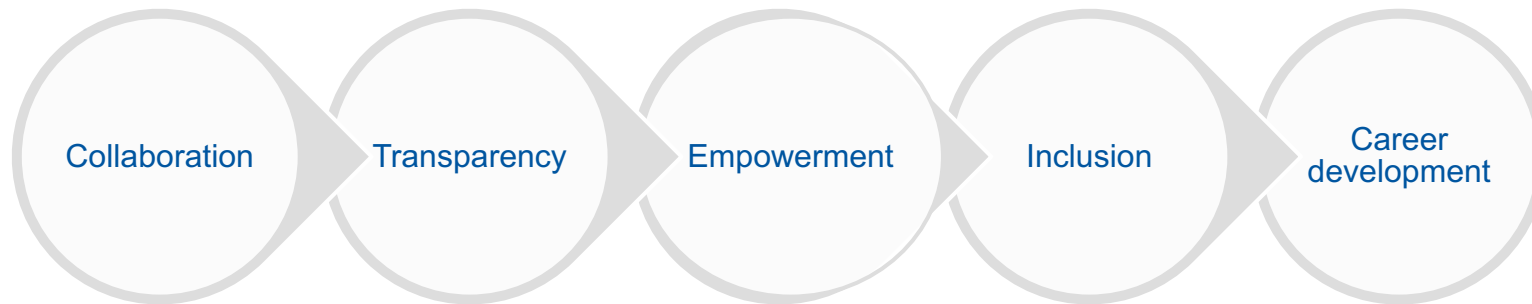
How do we address transparency and accountability?
Strengthened governance forums in IT

PORTFOLIO LEVEL GOVERNANCE				
DEPARTMENT LEVEL	**BUSINESS ENGAGEMENT**	**INNOVATION**	**TECHNICAL DELIVERY**	**PROJECT PORTFOLIO**
Ensures IT's macro-level **alignment with strategic objectives** of the wider organisation and **oversight of the performance of the department** as a whole against the IT strategy	Ensures **collaboration with other sectors** and departments to **align IT services** to the wider needs of CERN, proposing **new service opportunities** that would benefit the CERN community	Governance of IT's innovation portfolio **focuses the innovation pipeline** towards partnerships and projects that **provide the most value** to CERN	Service and operations management ensures services are **well maintained** and **align to user needs,** as well as identifies any **improvement opportunities** that can be pursued as service development projects	Manages the **resourcing, budgeting, and progress** of all projects in IT in line with their project plans. Projects are **input from three pipelines**: business engagement, innovation and technical delivery

PROJECT LEVEL GOVERNANCE

PROJECT GOVERNANCE

Governance for individual projects monitors **progress against project plans** and ability to **integrate with existing IT architecture**. It also manages the **deployment of new services** and associated change management activities

How do we address transparency and accountability? New project governance

PROJECT INITIATION PATHWAYS

Business engagement

Inputs user and business development needs from engagement forums

Innovation

Inputs project ideas and requirements from innovation governance activities

Technical enhancement

Inputs optimisation projects from service delivery requests

Ideate → Incubate

Demand Management Review Board
- ✓ Validate use cases
- ✓ Approve prioritised project proposals and evaluate resource needs

Outputs published to all of CERN

Recurring project governance

Incubate and Scale stage gates defined within each project

Architecture Review Board
- ✓ Verify integrates well into existing IT architecture

Recurring project governance

Scale → Provide

Change and Release Management Board
- ✓ Approve deployment & schedule transition

Outputs published to all of CERN

G O L I V E

Ongoing collaboration with Data & Architecture and Security team to ensure integration and compliance

Recurring operational governance

Problem & Incident Management, Operations Review

What does the new organisational structure look like?

IT Department Head — Enrica Porcari

Security — Stefan Lueders
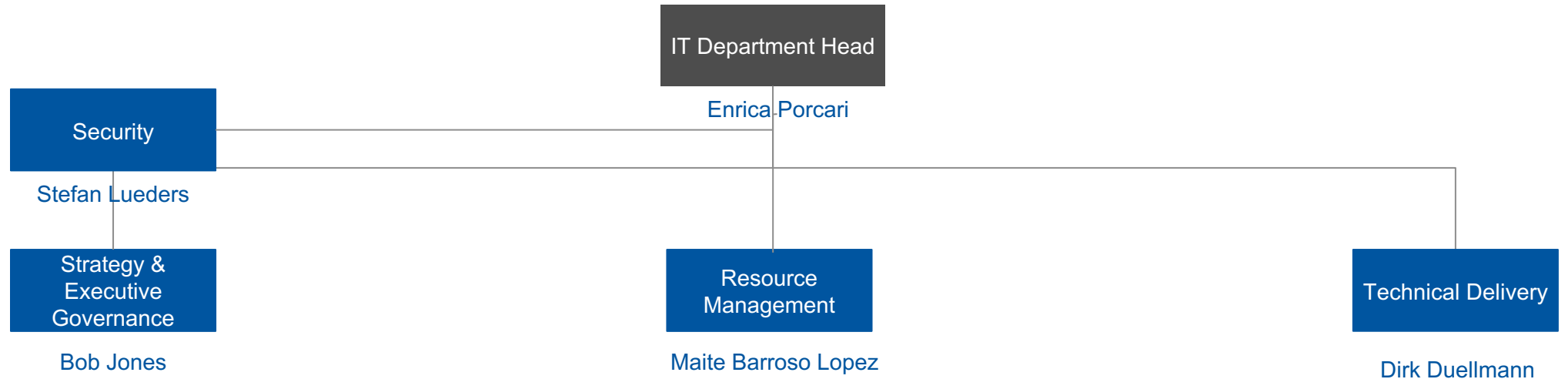
Strategy & Executive Governance — Bob Jones
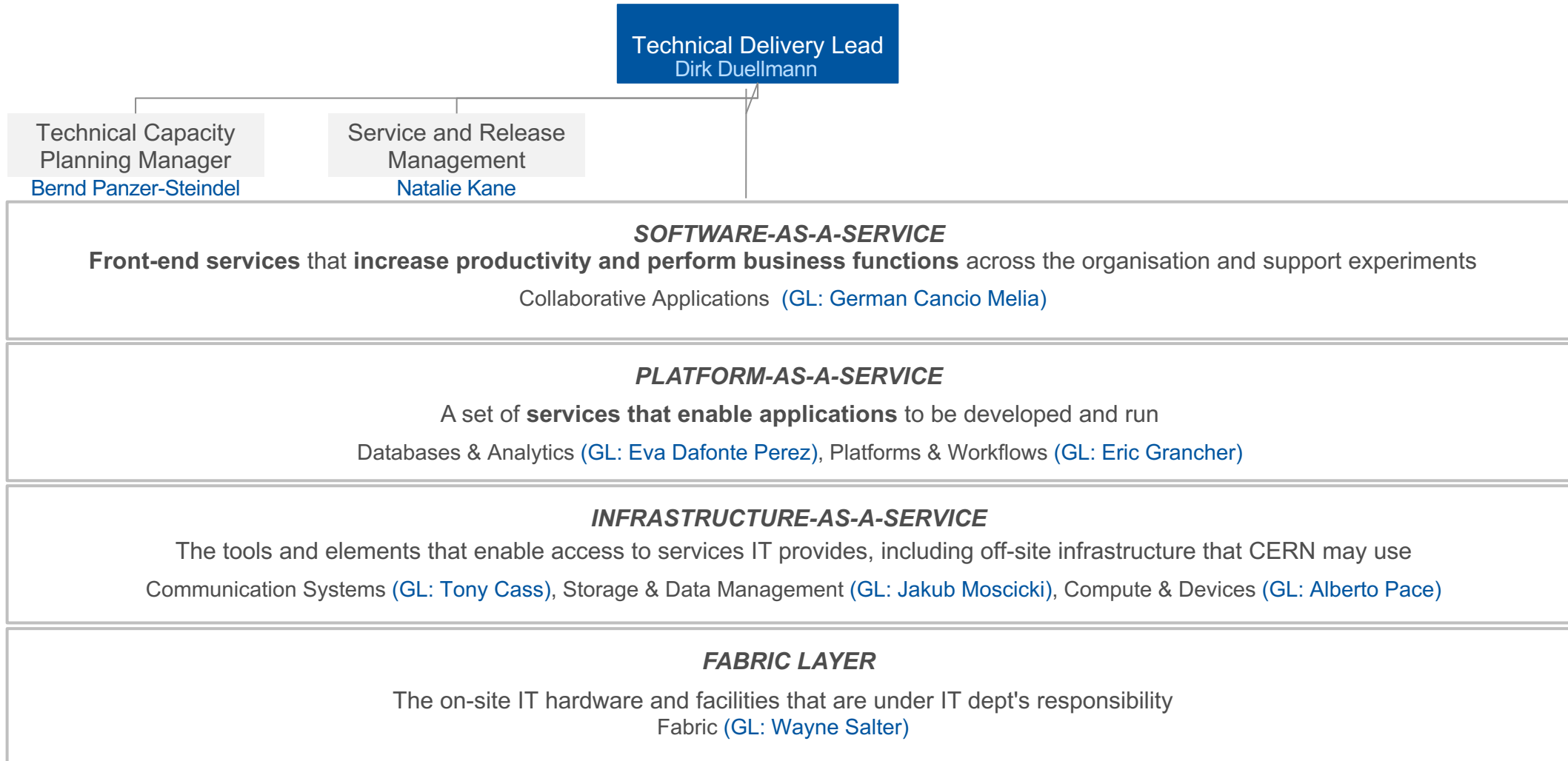- Data & Architecture = Dan Van Der Steer
- Business Engagement = Simone Campana
- Innovation = Alberto Di Meglio
- Education & Outreach = Tim Smith
- Communications = Melissa Gaillard
- Risk Management = Tim Bell
- Disaster Recovery & Business Continuity = Tim Bell

Resource Management — Maite Barroso Lopez
- Programme Management = TBC
- Supplier & Contract Management
- Talent Management = Nathalie Del Vicario
- Finance & Accounting = Gianni Deroma
- Vendor Management = TBC
- Facilities Management = TBC

Technical Delivery — Dirk Duellmann
- Technical Capability Delivery & Development
- Technical Capacity Planning & Management
- Service Management
- Release and Change Management

Technical Delivery: Organisation structure

Technical Delivery Lead
Dirk Duellmann

Technical Capacity Planning Manager
Bernd Panzer-Steindel

Service and Release Management
Natalie Kane

SOFTWARE-AS-A-SERVICE

Front-end services that **increase productivity and perform business functions** across the organisation and support experiments

Collaborative Applications (GL: German Cancio Melia)

PLATFORM-AS-A-SERVICE

A set of **services that enable applications** to be developed and run

Databases & Analytics (GL: Eva Dafonte Perez), Platforms & Workflows (GL: Eric Grancher)

INFRASTRUCTURE-AS-A-SERVICE

The tools and elements that enable access to services IT provides, including off-site infrastructure that CERN may use

Communication Systems (GL: Tony Cass), Storage & Data Management (GL: Jakub Moscicki), Compute & Devices (GL: Alberto Pace)

FABRIC LAYER

The on-site IT hardware and facilities that are under IT dept's responsibility
Fabric (GL: Wayne Salter)

CERN IT Department

IT Business Engagement in the Research and Computing Sector

Simone Campana

As-Is assessment: success and pain points

"Where **effective collaboration has taken place** between the communities and IT, there have been **success stories** of great collaboration"
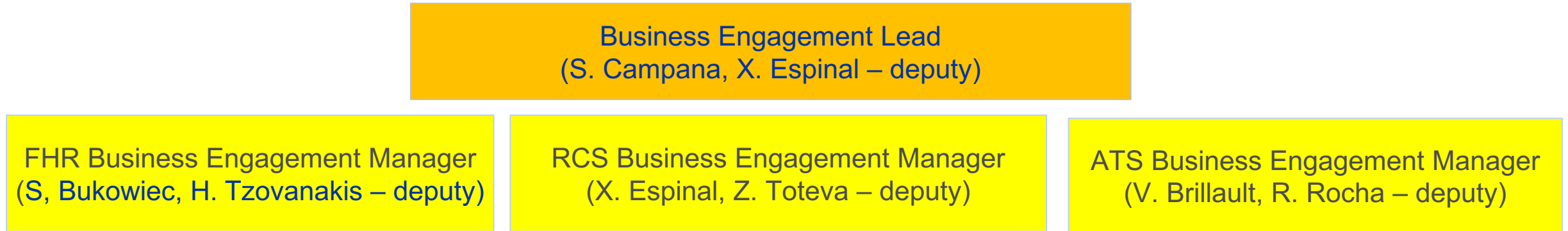
Some identified pain points:

- Lack of clarity between IT and the communities on who to engage, and a perception that communication is one-way and often not timely
- Limited collaboration between IT and users, with services developed without consistent recognition of user needs
- Fragmented approach to R&D, with no clear roadmap resulting in duplication of effort and services

Roles and Responsibilities of Business Engagement

- Lead engagement with user groups to **proactively** understand demand, provide guidance, gather feedback on existing services and understand evolving needs

- Identify shared dependencies across user groups as an input when defining the innovation and projects roadmaps and service enhancements

- Feed inputs from user groups to collaboratively define innovation roadmap

The "Business" are the communities we provide a service to, and we collaborate with

Business Engagement Structure

Business Engagement Lead
(S. Campana, X. Espinal – deputy)

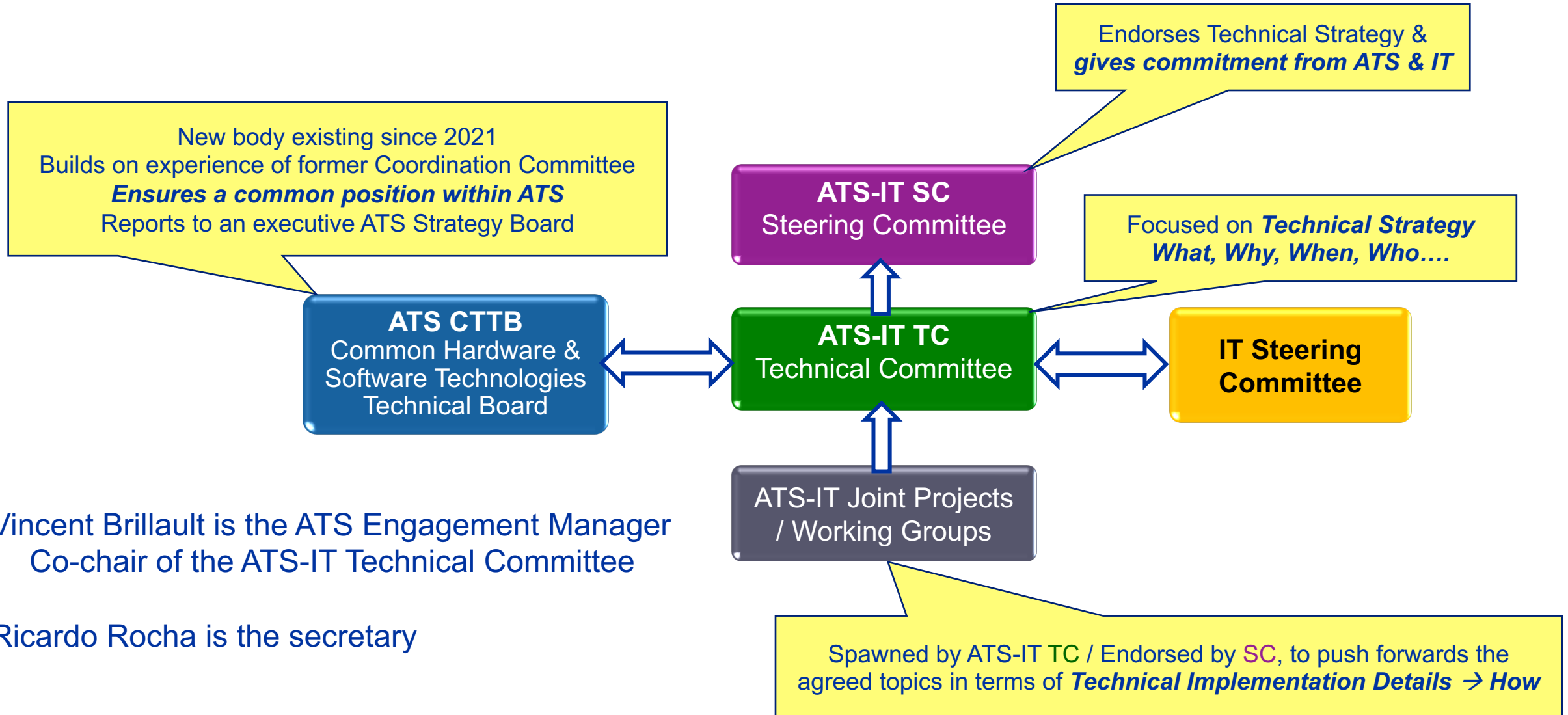| FHR Business Engagement Manager (S, Bukowiec, H. Tzovanakis – deputy) | RCS Business Engagement Manager (X. Espinal, Z. Toteva – deputy) | ATS Business Engagement Manager (V. Brillault, R. Rocha – deputy) |

A **Business Engagement Manager** and a **Deputy** has been appointed for each community

- At the least: Accelerator and Technology Sector (ATS), Research and Computing Sector (RCS), Finance and Human Resources (FHR)

The Business Engagement Managers will own the relationship with key user groups to reduce duplication of effort and increase standardisation where appropriate

The **Business Engagement Lead** oversees the engagement process ensuring its functioning, understands the shared requirements and drives the prioritisation across the communities

ATS-IT Engagement Structure as an example

Endorses Technical Strategy & *gives commitment from ATS & IT*

New body existing since 2021
Builds on experience of former Coordination Committee
Ensures a common position within ATS
Reports to an executive ATS Strategy Board

ATS-IT SC
Steering Committee

Focused on *Technical Strategy*
What, Why, When, Who….

ATS CTTB
Common Hardware &
Software Technologies
Technical Board

ATS-IT TC
Technical Committee

IT Steering Committee

ATS-IT Joint Projects
/ Working Groups

Vincent Brillault is the ATS Engagement Manager
• Co-chair of the ATS-IT Technical Committee

Ricardo Rocha is the secretary

Spawned by ATS-IT TC / Endorsed by SC, to push forwards the
agreed topics in terms of *Technical Implementation Details → How*

ATS-IT Engagement as an example

GPU/hardware accelerators for ATS

Purpose (Why?) **Why?**

ATS is facing an increasing need for GPU and hardware accelerators to cover its computing needs.

- IT offers dedicated (virtual machines, baremetal) and shared (via several services) access to GPU resources, but might be missing visibility from ATS communities;
- There have already been cases of direct procurement of GPU resources within ATS. Such isolated cases do not scale well and generate complex maintenance issues over time.

ATS requirements should be reviewed and offers from IT adjusted to take them into account.

Scope (What?) **What?**

- Access to shared accelerator hardware through services (Batch, Swan, …)
- Access to capacity provisioned through public cloud (bursting, special hardware, ...)
- Provisioning of dedicated continuous access to hardware managed by IT
- Provisioning of hardware installed and managed by ATS

Objectives (When?) **When?**

- Q3 2022. Effort: 0.2 FTE
  - Catalogue the ATS requirements for GPUs and/or hardware accelerators
    - Including existing ATS usage of accelerator resources in IT services
    - Including existing ATS resources not managed by IT
    - Including expectations from ATS for the coming years
- Q3/Q4 2022. Effort: 0.1 FTE
  - Review existing IT service offering and their compatibility with ATS requirement
- Q3/Q4 2022. Effort: 0.1 FTE
  - Review IT tendering process to improve compatibility with ATS requirement
- Q4 2022. Effort: ? Depends on how extensive the catalogue above turns out
  - Identify the best workflows to provide the GPUs and/or hardware accelerators for each different use-case, implement them while minimising duplication of efforts
- Q4 2022. Effort: ? Depends on the outcome of the above
  - Evaluate best options to overcome current lead times for resources (supply chain issues) and power density restrictions of 513 and CCR until we have the PCC
  - Prototype hybrid options (on-premises and public cloud) for accelerator resources in the different GPU service offerings

Other Information

- Project Participants: **Who?**
  - Eric Bonfillou
  - Frank Gerigk
  - Giovanni Iadarola
  - Ricardo Rocha

The ATS-IT Technical Committee produces POCs (description of Purpose-Scope-Objective)

The ATS-IT Steering Committee agrees that a dedicated ATS-IT team looks at the technical implementation details (the How?)

4) **GPU hardware**

- ATS has immediate GPU needs for simulation activities. This can be accommodated in the current IT GPU service offering and will be followed up by the IT GPU service managers. Action on Ricardo.
- The more general GPU needs of the ATS sector were not discussed at the time of defining the IT GPU service. The ATS sector should produce an inventory of use cases and requirements for GPUs by Q3 2022. IT should produce a paper describing the model for cloud resource provisioning (covering procurement model and costing) by Q3 2023 and that will include GPUs.

Example: https://indico.cern.ch/event/1142396/

Engagement for other sectors and communities

- We believe the ATS-IT engagement model can be modeled for other sectors

- For the Research and Computing sector, the community is more heterogeneous
  - LHC experiments
  - WLCG
  - Non-LHC experiments
  - The EP teams (experiments) and general-purpose groups (SFT, ESE, DT)
  - The CERN Library
  - The Theory department

RC-IT Engagement proposal

The discussion with the communities is ongoing and we are here to gather your feedback
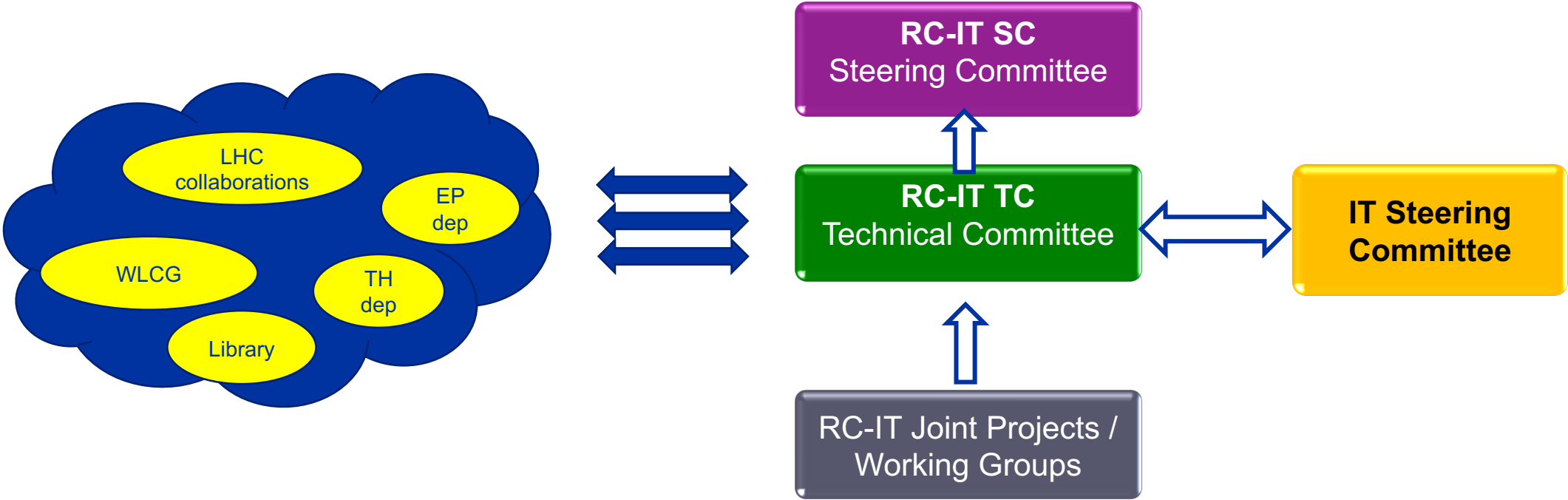
From IT, Xavier Espinal is the Engagement Manager for RCS and Zhechka Toteva is the deputy

RC-IT Engagement

- **IT Technical Coordination meetings for ALICE, ATLAS, CMS, LHCb, non-LHC exp., Online Communities (~ CNIC meeting). New chairs and secretaries appointed**

  - Dialog with the communities and triage the needs (for a short-term solution or medium-term engagement)

- **Experiment Liaisons, hosted in IT-GOV-ENG**

  - Embedded in the experiment activities, capture issues and opportunities early in the process

- **WLCG Coordination: capture the needs from the WLCG partners and the collaboration as a whole.**

  - Input from the WLCG Operations Coordination, the Grid Deployment Board, the Management Board and the various review bodies (RRB, LHCC)

- **Technical Contacts to a community, focusing on specific aspects**

  - E.g. contact for the CERN Library on the review and the evolution of the Document Services

IT Technical Users Meeting (ITUM)

- **ITUM is a very important part of the engagement process**
  - Broadcasts information about IT services and their evolution
  - But also, collects feedback and follows up with the technical teams

- **In the future, ITUM should evolve even more in the direction of feedback and iterative dialog with the communities. Will provide input to the engagement process**

- **New ITUM chairs and secretary appointed**

Informal Meetings

- **Informal discussions with the communities are an essential building block of the way we operate. Many groups in Technical Delivery organise or attend these meetings.**

- **We rely on the people organising/attending these meetings to bring up any item that deserves attention and follow up at the engagement level**

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