

PP C2I4LC

Establishing COSMO to ICON migration for Licensees' Countries

Bogdan MACO

September 2023

PP C2I4LC

Objectives

- This PP establishes the framework for the support activities that aim for a smooth migration from the COSMO model to ICON-LAM for licensees' countries around the world
- The goal of the PP is to establish a dedicated team that will start the migration process. This includes defining the requirements for a future support framework as well as establishing the necessary tools (hard- and software)

September 2023

Task 1. Extend COSMO/ICON users community - Requirements

Subtask 1.1: With WG4 finalize the COSMO user's Technical Feedback survey

- The survey was made under **PP COMFORT** - (ICON-COMpetence in FORecasting) and it is available in the link:

[COSMO technical survey \(cosmo-model.org\)](https://www.cosmo-model.org/content/support/survey/default.htm)

- Also a cover letter was made and sent to all the countries



October 2022

Dear COSMO users,

For years the COSMO regional model served many users around the world. In 2021 the last COSMO-Model version 6.0 and INT2LM 3.0 were released. With this version, development for the COSMO model has ended. The code is now frozen and we will only do basic maintenance, such as necessary bug fixing. After clarifying some license issues, COSMO users will need to migrate to the regional version of ICON (ICON-LAM) in order to have the best-updated limited area model.

In the last few years, COSMO members have successfully migrated to ICON-LAM and the verification scores indicate the advantage of ICON-LAM over the COSMO model.

Currently, COSMO users purchase and maintain an on-premise HPC to run NWP models. However, HPC maintenance causes huge difficulties in many countries. Over the last year, there has been a breakthrough in running ICON-LAM on [AWS \(Amazon\)](#), [Google](#) and [Azure \(Microsoft\)](#) cloud platforms. First tests with ICON-LAM indicate that cloud solution prices are comparable to on-premise HPC costs and even cheaper. This new achievement may help many countries to reduce their effort to maintain an HPC by themselves and even save money.

In order to understand your current COSMO setup and performance skills, together with your plans for migration to ICON-LAM and the possibility to use a cloud HPC, we will be grateful if you could fill in a survey and upload relevant documents, including current COSMO performance and verification results.

If your documents are not available in English, you can use Google translate and just write on the top of the document "translated by Google translate" so we understand it was written originally in your native language. You can find the Survey at the following link: <https://www.cosmo-model.org/content/support/survey/default.htm>

We are looking forward to receiving your feedback. This will help us set up the migration plan and the support for ICON-LAM implementations in your service.

On behalf of the COSMO consortium and the support team,



Yoav Levi
COSMO STC chair

Dimitra Boucouvala
Survey leader

Bogdan Maco
Support project leader

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PP COMFORT statistics



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COSMO model Users' Technical Feedback

user details

Please fill your real name
The service or institution you work for
What is your contact email

model-setup details

What is your current COSMO model resolution? (in degrees)
(for multiple domains, separate them with '/')
What is the number of grid points of your domain?
(for multiple domains, separate them with '/')
What is your current COSMO version?
v6.0
v5.0-v5.14
v4.0-v4.3
older
What is the COSMO forecast range? (in hours)
24 hrs
48 hrs
72 hrs
other
Do you use a data assimilation (DA) process?
no
yes
Do you run Ensemble Prediction System (EPS) in your local-area model?
no
yes
Are any other local-models in use at your service?
no
yes

computing details

What is your CPU model name?
(you can use the "lscpu" Linux command or "cat /proc/cpuinfo" to check)
What is your operating system?
(you can use "cat /etc/os-release" or "lsb_release -a" or "hostnamectl")
What is your compiler and its version?
How many computer nodes are used for the COSMO run?
How many computer cores are used for the COSMO run?
How long does the COSMO run take (in minutes)?
Would you consider replacing your on-premise computer with a cloud HPC?
yes
no

user support

When was your last interaction with the COSMO support team?
not applicable
When was your last interaction with DWD support for boundary conditions?
not applicable
Are you satisfied with the helpdesk service?
not applicable
Could you please note any unresolved problem?
Can your service send an expert to participate in training at DWD?
yes
Will you have an expert participate in online training courses on ICON-LAM?
yes

The COSMO Model Users' Technical Feedback [survey](#) was sent to 23 COSMO users.

17 users (74%) answered the survey

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Countries' basic information

Country	income	COSMO resolution	nodes	run time	helpdesk satisfaction	comments
Brazil (NMHS)	UPPER-MIDDLE	0.0625/0.025	72	1hr 47min	not applicable	participate in PP C2I, need support for seasonal forecast
Brazil (Navy)	UPPER-MIDDLE	0.0625/0.02	17	2hr 30min	happy	ICON is running
Botswana (NMHS)	UPPER-MIDDLE	0.125	4	5hr 52min	very happy	problem with displaying images when the model has finished running. expert support needed
Georgia (NMHS)*	UPPER-MIDDLE	0.0625	6	35min	not applicable	
Oman (Civil Aviation)	HIGH-INCOME	0.0625/0.025	68	2hr	very happy	Sending Boundary files take long time to be received.
UAE (NMHS)	HIGH-INCOME	0.0625/0.025	67	50min	happy	we are looking for run ART with ICON-LAM and increase the resolution more than 0.025
Nigeria (NMHS)	LOWER-MIDDLE	0.0625	1	10hr	not applicable	
India (Space Lab)	LOWER-MIDDLE	0.0625/0.025	48	5hr	very happy	request a web-enabled service for COSMO users publishe their work, to be shared among all users.
Pakistan (NMHS)	LOWER-MIDDLE	0.11	24	2hr	very happy	not using COSMO since 2015. plan to acquire a new HPC to move on to ICON-LAM.
Uzbekistan (NMHS)	LOWER-MIDDLE	0.06/0.02	20	3hr 28min	happy	Update contact information (e-mail) DWD&COSMO support team
Malawi (NMHS)	LOW-INCOME	15/7 km	1	43min	very happy	We would love to use other visualization tools considering that GrADS
Mozambique (NMHS)	LOW-INCOME	5	2	8hr	not applicable	
Mozambique (Uni)	LOW-INCOME	5	6	1hr 30min	not applicable	
Madagascar (NMHS)	LOW-INCOME	0.13	1	6hr	very happy	need support for server to run COSMO
Zimbabwe (NMHS)	LOWER-MIDDLE	0,025/0.5	2	3hr	not so happy	Stopped running COSMO-need reinstallation-Not so happy from support team
Egypt (NMHS)	LOWER-MIDDLE	0.125	4	?	happy	unable to receive ICON global model data

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COSMO user survey statistics

Question	Answers statistics & info			
use DA	NO: 94%	Only UAE have DA		
use EPS	NO: 100%			
COSMO Ver.	Ver. 6: 35%	Ver. 5: 53%	Older: 12%	
Other local-models	WRF: 53%			
Verification	subjective 58%	objective 12%	both 12%	none 18%
Consider cloud HPC	YES 65%	NO 35%	no: Pakistan, Georgia, Brazil(Navy), Oman, UAE, Egypt	
Last interaction with COSMO/DWD support team	Since 2019 59%	No interaction 41%		
helpdesk service satisfaction	very happy 41%	Happy 24%	not happy 6%	N/A 29%
forecasters satisfaction	YES 100%			
visualize with (more than one is possible)	GrADS 94%	Python 24%	NCL 24%	IBL, R, VWW
Consider migrating to ICON	YES 76%	NO 24%	no: Brazil Navy, Georgia, Pakistan, Oman	

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PP COMFORT statistics

Conclusions

- All forecasters (100%) are satisfied with COSMO model.
- 12% are still running COSMO version 4. or older.
- 41% did not interact with COSMO support since 2019.
- Most countries are happy (24%) or very happy (41%) with COSMO support. However, there is some frustration as Zimbabwe is not happy and 29% did not react, perhaps because they did not contact the COSMO support since 2019.
- Visualization is a major problem and support is expected from COSMO.
- Many countries have a small HPC that is inadequate for NWP in 2023.
- **76% considered migrating to ICON-LAM, Only the Brazilians have experience with ICON.**
- Only a few users provided some kind of verification. The requirement for feedback in order to use ICON may be problematic.
- **65% would consider using a cloud HPC. Should COSMO provide a cloud-based solution for ICON-LAM including a visualization package?**
- **To conclude –for a successful migration of COSMO users to ICON, a substantial increase in the support efforts is required from the support team.**

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Still NON RESPONDED (7)

Paying LC:

Namibia

Turkmenistan

Free LC:

Indonesia

Philippines

Saudi-Arabia, King Abdulaziz University

Tanzania

Ukraine

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Task 2. Support scheme for Licensees

Subtask 2.1: Web page design and tracking software

- **E-mail address for a single point of contact**, ideally using a dedicated top-level domain

icon.support@cosmo-model.org

bogdan.maco@meteoromania.ro

claudia.dumitrache@meteoromania.ro

stefan.gabrian@meteoromania.ro

daniel.rieger@dwd.de

ulrich.schaettler@dwd.de

theodore.andreadis@yahoo.com

(will be completed with other
people who will join)

- Setting up a suitable **tracking software**, which could be one of the following: Jira (proprietary),
Request Tracker (open source) **Request Tracker is installed!!!**

Request Tracker (RT)

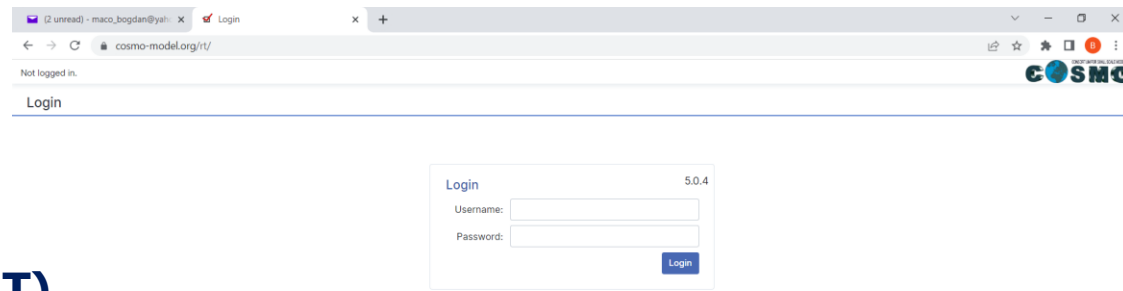
- Request Tracker is used to track and manage customer requests, internal project tasks, and workflows of all sorts. Among other things, RT offers custom ticket lifecycles, seamless email integration, configurable automation, and detailed permissions and roles.
 - RT was built to track tasks in a centralized web-based system
 - Tickets contain task details, roles (who asked for it, who is responding for it), and other information
 - Users can still interact via email
 - Queues, rights, other configuration allow you to deploy for large teams
- ! We are at the beginning of using this software*
- ! Also, this year we will develop a step-by-step guide which will be shared to the other peoples involved in the project*

It is for the first time when the COSMO-ICON community will have this kind a software 😊 😊

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Request Tracker (RT)



Browser tabs: (2 unread) - maco_bogdan@yahoo.com - Login

Address bar: cosmo-model.org/rt/

Not logged in.

Login

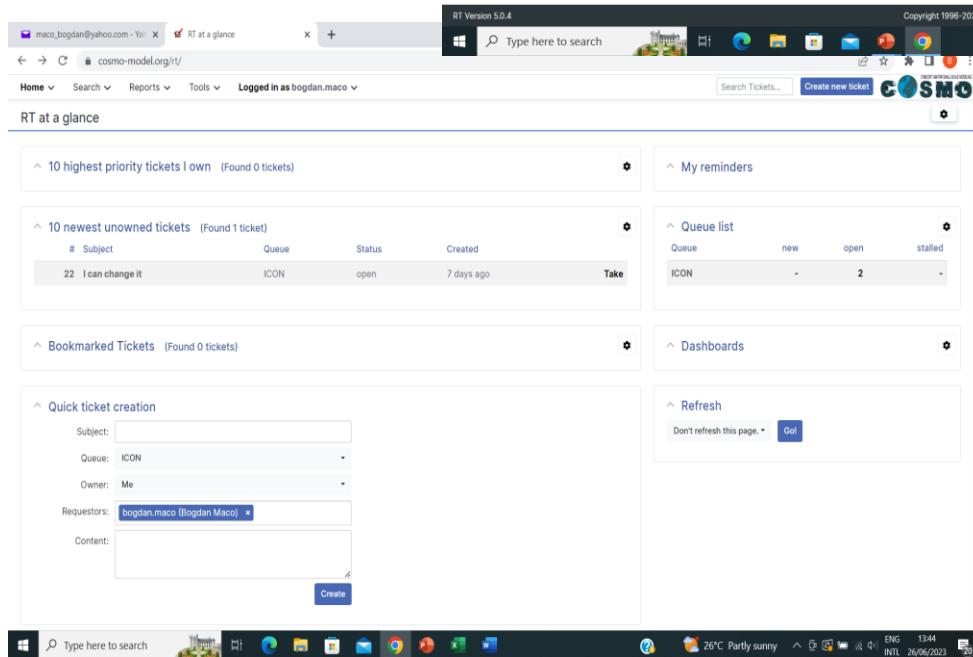
5.0.4

Login

Username:

Password:

Login



RT Version 5.0.4 Copyright 1996-2023 + by Best Practical Solutions, LLC.

Home Search Reports Tools Logged in as bogdan.maco

RT at a glance

10 highest priority tickets I own (Found 0 tickets)

10 newest unowned tickets (Found 1 ticket)

#	Subject	Queue	Status	Created	
22	I can change it	ICON	open	7 days ago	Take

Bookmarked Tickets (Found 0 tickets)

Quick ticket creation

Subject:

Queue: ICON

Owner: Me

Requestors: bogdan.maco (Bogdan Maco)

Content:

Create

My reminders

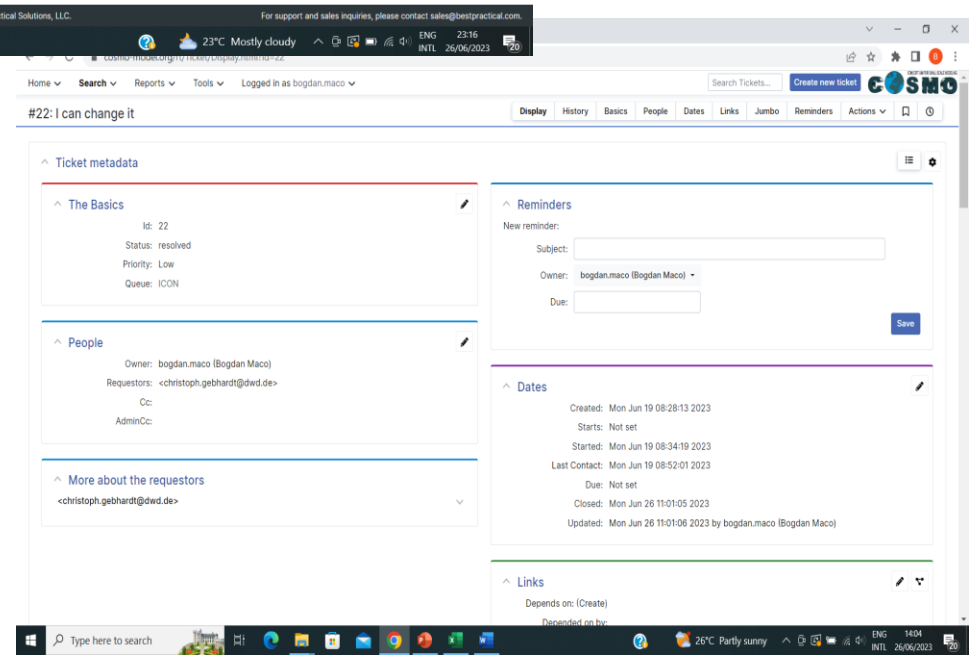
Queue list

Queue	new	open	stalled
ICON	-	2	-

Dashboards

Refresh

Don't refresh this page. Get



Home Search Reports Tools Logged in as bogdan.maco

#22: I can change it

Display History Basics People Dates Links Jumbo Reminders Actions

Ticket metadata

The Basics

Id: 22

Status: resolved

Priority: Low

Queue: ICON

People

Owner: bogdan.maco (Bogdan Maco)

Requestors: <christoph.gehardt@dwd.de>

Cc:

AdminCc:

More about the requestors

<christoph.gehardt@dwd.de>

Reminders

New reminder:

Subject:

Owner: bogdan.maco (Bogdan Maco)

Due:

Save

Dates

Created: Mon Jun 19 08:28:13 2023

Starts: Not set

Started: Mon Jun 19 08:34:19 2023

Last Contact: Mon Jun 19 08:52:01 2023

Due: Not set

Closed: Mon Jun 26 11:01:05 2023

Updated: Mon Jun 26 11:01:06 2023 by bogdan.maco (Bogdan Maco)

Links

Depends on: (Create)

Dependent on by:

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Request Tracker (RT)

- The suggested system has the significant advantage of making requests internally accessible to everyone who offers assistance.
- Although help requests are divided by support providers and priority, individual requests are still available to all support providers. This eliminates the need for duplicating effort

➤ **Subtask 2.1.1: Testing the Request Tracker by COSMO colleagues (new task) – deadline – end of autumn 2023**

For this new subtask we will NOT need additional FTEs

Web page design status

Subtask 2.1: Web page design and tracking software

***Planned:** Creating a dedicated web page including a FAQ page which should point out the main implementation steps and the most common errors. This web page will also include links to documentation and ICON set-up info*

- At the previous on-line meetings, it was proposed that the “paper plan” of the web page to be discussed including at General Meeting
- Also, it was discussed the importance of developing a new web page, from technical point of view being necessary to allocate more time than initially planned
- *Next step: maybe to engage a **web designer?***

Subtask 2.2: Assign a COSMO expert to each support level and possible problems

- Create a list of potential problems in the C2I process according to the participants' experience
- Create a list of experts and assign possible problems to them (either management decisions or PL, depending on the exact context at the moment of the task fulfilment)
- Investigate the need for a “load balancing” system by tracking the load of individual experts.

Task 3. User Support Activities

Subtask 3.1: Training courses

- Was held in March in Germany (DWD) - first time since 2020 (with more than 20 participants) + first course held for ICON
- The practical sessions were held on ATOS machine from ECMWF through the training accounts
- It required **more than 2 months** of preparation
- More details will be presented by Uli



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Task 3. User Support Activities

Subtask 3.2: Documentation - **delayed**

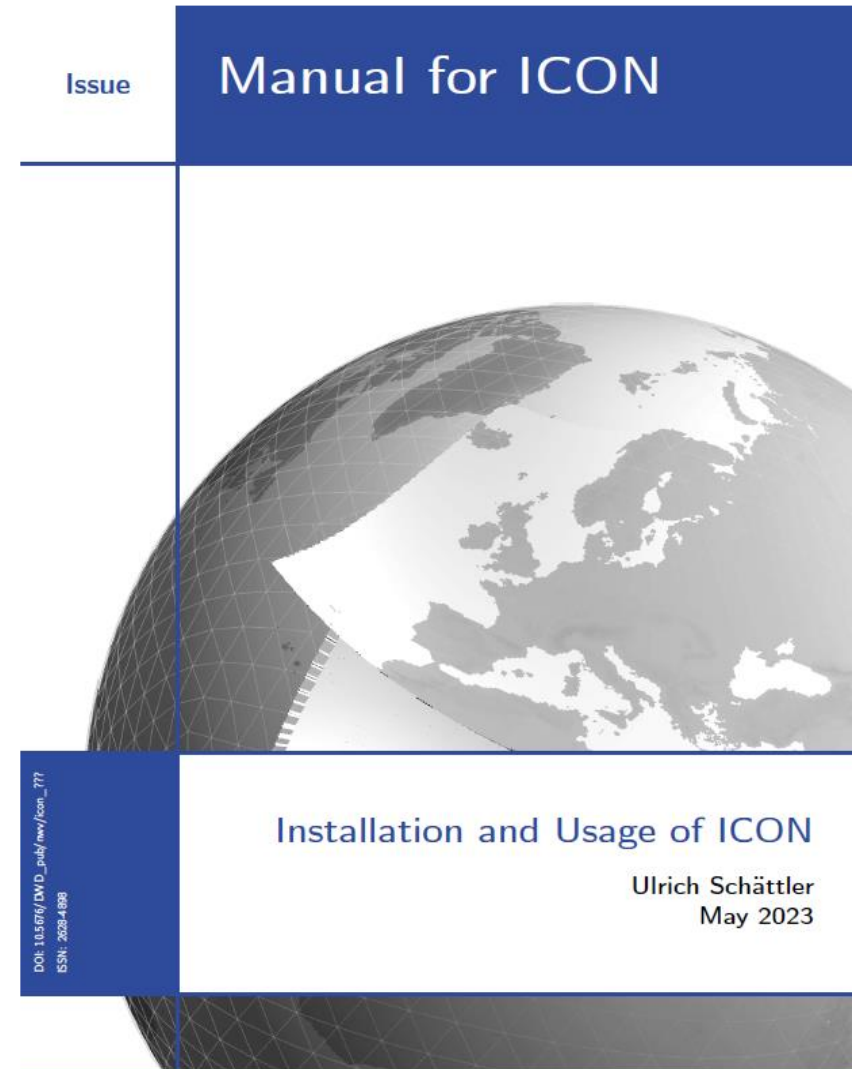
- The final version of the user guide **will be done after web page design will be approved!**
- **Until the end of 2023 maybe we will have an extended draft version !**

Subtask 3.3: ICON setup information – **delayed**

The exercises from the training course can be used as test data set to check if the model is running in principle.

Subtask 3.4: Setup a concept of how to handle data supply requests

Discussions are needed in order to split the tasks !



Task 4. Establish the framework for verification

- By 2024 some countries will have semi-operational ICON-LAM runs.
- Understand the users' needs
- Help the users to perform verification that will be useful for both the users and the ICON developers
- Define the way how to prepare the minimum verification required to fulfil the obligation of verification, based on the performance of their model over their area.

Deliverable: Establish a method of verification of the NMHS to fulfil the licence condition

Task 5. Implementation of the migration plan to ICON-LAM

Deliverables: By the end of 2024 paying countries should have the possibility to migrate to ICON-LAM and the other countries until 2026.

! Considering the delays, **we proposed an extension of the project for one more year - September 2024 -**

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More things to be discussed...

1) Possibility of giving a training in Central Asia for ICON-LAM:

- Someone from the COSMO Support Group could do?

2) Possibility of holding an online workshop with information on ICON-LAM, administrative issues (license), technical issues (training)

- Online workshop (duration: 2-3 hours?) - for all partners and weather services interested in ICON-LAM: **we could add another task in the extension for C2I4LC, preparing such a workshop.**

It should not be held for every single partner, instead can be done in Africa, Central and South East Asia, South America, in order to group together some time zones.