EMPS NEWS

Birger Mo

EMPS 2021 activities in brief

- Focus on version 10
  - Support and error corrections

- No new mayor features or EMPS development projects

- Added support for multiple Python versions for LTM API

- Former license LTM_MPS_HOURGRIDCAP available for everybody

- Competence building and code modification of discharge heuristics
  - Because of reported "flomkraft" early in discharge iteration procedure
  - Does not observe any consequences on result.

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EMPS relevant activities at SINTEF

- Many research projects that uses EMPS, EMPSW, FanSi and PriMod
  - SumEffekt (presented by Ingeborg) (IPN)
  - Rakett (presented by Ole martin) (IPN)
  - HydroConnect – consequences of new cables (KSP)
  - Vannfly – information needed for flow based market coupling (IPN)
  - OpenENTRANCE – modelling platform for assessing low-carbon transition pathways in Europe. Priser: (EUR/MWh) (EU-project)

- Several of these projects include error correction and to some extent development of FanSi and PriMod

- Also used in industry financed projects

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November release of version 10

- About 35 corrected errors and improvements
  - Mostly user interface (LTM application and API)
  - Few fixes relevant for special combinations of functionality
  - New ProdRisk features

- No known serious errors

- 4 cases of partially developed features

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Version 10 release – Not just binaries!

Status LTM versions

- First official release of version 10 June 2021

  - Some companies operational by October 2021

  - Second official release November 2021

  - No known "general" serious errors but a list of less serious errors and suggestions for improvements

- Version 9

  - Stop maintenance of version 9 from January 2022.

- Input version (used by Statkraft)

  - Some functionality still not included in version 10

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INTRODUCTION TO V10

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Executive summary of v10!

- New applications

- New possibilities

- New interfaces

- Data preparation simplified through Ltm and Eops/Emps applications and xml.

- Easier to get started for new users compared to previous versions.

- Access/set data programmatically through Python APIs.

- Changed storage formats, results as HDF5.
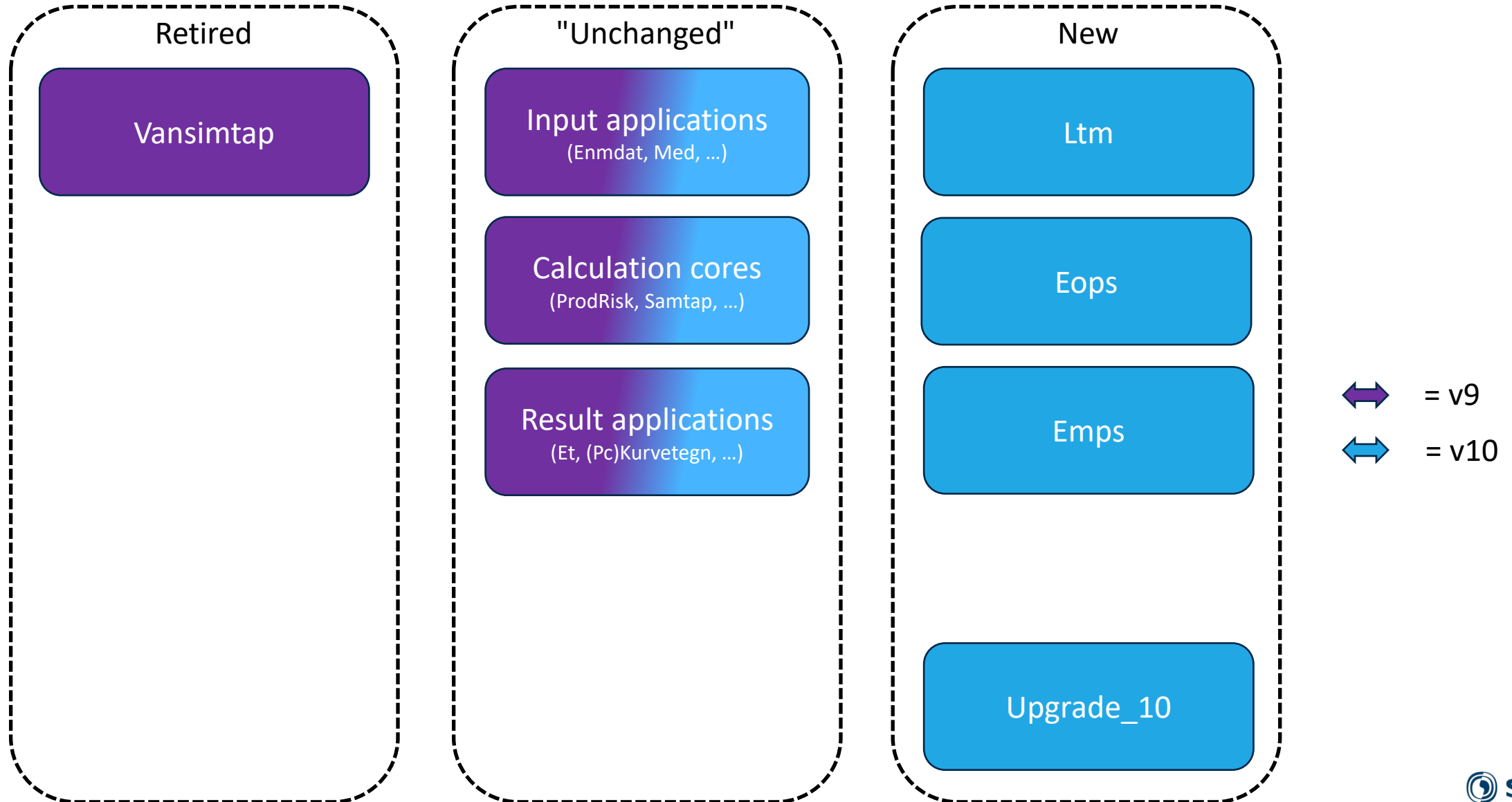
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For model users

- Allows companies to modernize and transform operations.

- Traditional way of working in this field consists of lots of databases and usually Excel to move data between formats.

- New way gives direct control through Python-based API of model, most input and results.

- Modern: most software now has APIs, users stitch together what they want.

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Increased possiblities for running models

- Traditional application oriented

- New task oriented way: Ltm/Emps/Eops

- Both possibly in combination with API for timeseries input/output

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Changes in application suite

Retired

Vansimtap

"Unchanged"

Input applications
(Enmdat, Med, …)

Calculation cores
(ProdRisk, Samtap, …)

Result applications
(Et, (Pc)Kurvetegn, …)

New

Ltm

Eops

Emps

Upgrade_10

⟷ = v9

⟷ = v10

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Changes in applications – New flow and control

- Eops and Emps are task-centered.
  - Example run steps from Eops: Establish model, run water value calculation.

- Defined in xml-file, single or multiple tasks per file, you choose and set up in Ltm ...

- ... or generate your own!
  - Establish model -> LtmSystem_establish.xml
  - Run strategy (water value calculation) -> eops_run_strat_calc.xml
  - Run simulation (draw down model) -> run_my_simulation.xml
  - Multiple combinations possible -> prepare_everyting_for_prodrisk_with_a_single_call.xml

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Changes in applications – Getting started

- Introducing application Upgrade_10.

- This application provides a "fresh copy" of a data set upgraded to version 10.

- Example:

```
mkdir dataset_v10
cd dataset_v10
[set your ltm run environment]
upgrade_10 /path/to/complete/dataset/v9
```

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Key take-aways on version 10

- Clearer separation of input and calculation routines.

- Possible to run daily sims almost entirely based on xml-input.

- Can set input to a much greater detail and control through API.

- API will be expanded in the future.

- Overall, more transparent flow, control and data.

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Long-term development

- Believe LTM will be the main tool 5-10 years ahead even if implementation of next generation tool starts as planned.
  - Supplemented with EMPSW/FanSi/PriMod for special analysis.
  - These models are using the same input, output and internal data structures.

- Important to build and maintain competence and make needed improvements.

- New large research projects, proposed by SINTEF, will be connected, to FanSi and/or PriMod type models/algorithms and version 10 datasets.

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Long-term activities

- Complete API
  - All input through API
  - Error messages
  - Initiate a model setup from scratch through the API

- Scenario (uncertainty) type functionality for all contract types

- Documentation

- Implementation of more automatic testing

- Development based on customer feedback
  - Foresee a lot of new wishes when version 10 is operational and integrated into your own systems

- Customer portal

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70 år

1950-2020

Teknologi for et bedre samfunn