8.3
cloud roadmap

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agenda

1. 8.3: the new web frontend
2. 8.3: Material Handling Library
3. the Cloud: new functionality, Subscription Plan, Private Cloud
4. roadmap
the new web frontend
from Java Swing to HTML5

- **100% standard HTML5** is used for the AnyLogic model frontend: animation is implemented with scalable vector graphics (SVG) and WebGL on an HTML5 canvas
  - no plugins needed
the model location is transparent to the user

- as long as a standard browser is used to view an AnyLogic simulation animation and to control the model execution via HTTP/HTTPS, it does not actually matter where the model is running:
  - on the same machine where animation and controls are displayed
  - on a colleague’s machine
  - on a corporate server
  - in the Cloud

* One connection per model
exporting a model as a standalone application

- the function is there: standalone models now include the Spark webserver and Chromium browser (both are lightweight components)
customizing the frontend

• now you can build your own HTML5 frontends (much richer, more advanced, and up-to-date than Java Swing), embed AnyLogic animation and control model execution from JavaScript
  – …instead of embedding your custom controls and charts into model animation
material handling library*

*Special thanks to: SIMPLAN, amazon, BMW, TESLA, AIRBUS, MOSIMTEC, FedEx, and others who participated in putting together the requirements specs!
AnyLogic library set

since 8.3:

- **Material Handling**: handling of material items with conveyor networks, AGVs, robots, cranes, …
- **Pedestrian**: detailed physical-level (micro) simulation of pedestrians, cars, and trains movement and interaction
- **Rail**: fundamental generic libraries for logical processes with discrete items and bulk/liquid transfer
- **Road Traffic**
- **Fluid**
- **Process Modeling**

of course, all AnyLogic libraries interoperate
what’s in AnyLogic Material Handling Library (8.3)?

• **conveyor networks**
  - roller, belt, fixed-cell conveyors
  - turn table, transfer table, turn station connecting elements
  - automatic routing with optional custom restrictions
  - priorities at merges
  - photo-eyes (position on conveyor)
  - acceleration and deceleration
  - stations with default and custom logic
  - callbacks (extension points) at all important events

• **transporters (man-driven or AGVs)**
  - path-based movement with automatic & custom routing
  - speed limits, transporters on path limits
  - acceleration and deceleration
  - basic collision avoidance
  - fleet mgmt. (seize policies, task priorities, custom logic)
  - interaction with conveyor networks
  - callbacks
and this is planned for the next releases — 8.4 and 8.5:

<table>
<thead>
<tr>
<th></th>
<th>8.4 (November 2018)</th>
<th>8.5 (2019)</th>
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<tbody>
<tr>
<td>Conveyors</td>
<td>• Multi-tier networks, elevators and lifts</td>
<td>• Smart routing depending on availability of the paths</td>
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<td>• Route recalculation</td>
<td>• Bi-directional conveyors</td>
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<td>• Lockout zones</td>
<td>• Dynamic creation of conveyor networks from database</td>
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<td>• Work schedule of conveyor network</td>
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<td>Transporters</td>
<td>• Free-space and grid-based movement, obstacles</td>
<td>• Multiple loads carrying</td>
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<td></td>
<td>• Routing strategies (shortest path, minimum turns, etc.)</td>
<td>• Tug trains</td>
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<td></td>
<td>• Priorities</td>
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<td>• Advanced collision avoidance</td>
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<td>• Restricted zones</td>
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<td>• Backward movement</td>
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<td></td>
<td>• Charging logic</td>
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<tr>
<td></td>
<td>• Heat maps</td>
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<td>Robots, cranes</td>
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<td></td>
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<td>• Shared space for cranes, transfer cars</td>
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<td>• Collision avoidance</td>
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<td>• Deadlock detection</td>
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<td></td>
<td></td>
<td>• Integration with conveyor and transporter networks</td>
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<tr>
<td>Rack systems</td>
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<tr>
<td></td>
<td></td>
<td>• Slotting strategies</td>
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<tr>
<td></td>
<td></td>
<td>• Integration with conveyor and transporter networks</td>
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<tr>
<td>Other</td>
<td>• Failure and maintenance profiles</td>
<td>• Custom storage and retrieval logic</td>
</tr>
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<td></td>
<td>• Statistics of equipment states</td>
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the cloud
simulation modeling is migrating to the cloud

• the simulation modeling landscape these days is sort of static:
  – methodology / languages: nothing new since the emergence of Agent Based modeling in early 2000s
  – tools: gradual improvements, if any; some vendors have discontinued updates and focused on consulting, some are trying to look trendy by saying something like “we’re Industry 4.0 ready” while offering same stuff as years ago

• cloud is the ONLY interesting thing that is happening today
  – in engineering or scientific simulation, Cloud is becoming mainstream
  – our sector (dynamic simulation for business) is behind, but catching up

• the good news is that AnyLogic is far ahead everybody else and already offering a fully-featured powerful AnyLogic Cloud solution
what exactly is moving to the Cloud?

- everything else is moving to the Cloud

lifecycle of a simulation model

DEVELOP

- conceptual modeling
- model "coding"
- debugging
- verification / validation

USE

- experiment design
- experiment execution
- output analysis and export of results
- Dashboard design
- experiment execution
- output analysis and export of results

the development of simulation models includes intensive graphical editing, text input, working with multiple windows, etc. Keyboard and mouse are needed. Will not benefit much from Cloud. It will stay offline.
Leveraging Cloud for multiple run experiments

- AnyLogic Cloud squeezes the most from Cloud computing by remembering and reusing every (Input / Output) pair of every executed run.

run Monte Carlo with 100 replications

which runs have been done already? we will skip them and reuse the results

independent runs are executed on all available cores of (dynamically) allocated nodes
cloud as the best way to deliver your model

• if you wanted to leave your model with the client, previously you had to schedule a meeting, copy files, install some software, etc.

• not any more! with AnyLogic Cloud you can instantly deliver the latest version of your model to the client using secure private model sharing. and the client will be able to run it on any device!

Delivery time is 20 sec
work collaboratively on the same model
- share source files, use Cloud for version control
- create and run experiments, share and discuss results online
- given the AnyLogic Cloud run reuse technology, collaborative work with the model will be the most efficient!

create your online model portfolio
- if you are a consulting company, an individual consultant, or simply a student looking for a job, publish your best models in AnyLogic cloud and let others run them

search for models, meet other modelers, publish, run, leave your comments and ❤️’s!
### Introducing AnyLogic Cloud Subscription (June 2018)

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<th>User Type</th>
<th>Benefits</th>
<th>Limitations</th>
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| anybody (even not an AnyLogic user)          | + run any models and any experiments in public space | – limited parallel nodes  
- limited simulation time  
- no access to external Internet |
| PLE user or UR / Pro user not under maintenance | + upload models to public space               |                                                                             |
| UR or Pro user under maintenance              | + upload & share models privately             |                                                                             |
| a user under subscription                     | + high availability of parallel nodes  
+ unlimited simulation time  
+ open API for custom frontends and scenarios  
+ access to Internet / external resources    |                                                                             |
Although AnyLogic public cloud has a private sector, which is a secure space, still security policies of many companies require that data should not leave their own private network

For such clients we offer AnyLogic Private Cloud product: a software that is installed on a local network or company’s own cloud and provides exactly the same functionality as the AnyLogic cloud – including parallel runs, load balancing, DB of input/output pairs, etc.

AnyLogic model editor then will be able to upload to private cloud

In addition, we will provide Java, python, and JS API to set inputs, run, and retrieve outputs of the uploaded models w/o the default frontend: that will allow to build simulations into larger custom analytical workflows
the roadmap
AnyLogic roadmap

December 2018
8.4 release:
- MHL: AGVs in free space, robots/cranes, storages
- Management of files associated with the model
- Standard navigation panel
- Cloud: DB editing, Excel as model input

June 2018
- AnyLogic Cloud Subscription Plan
- AnyLogic Private Cloud release

end of 2018
- The Big Book 2.0
- AnyLogic textbook

April 2018
- 8.3 beta available for download

June 2018
- 8.3 release

summer 2018
- JS API for embedding animation into custom HTML
- JS / Java / python API to control model execution on a server / in the Cloud

- Optimization in the Cloud
- “More English less Java”
- Web UI for model editor
- Integration with AI
thank you!