



TWO-PART WEBINAR

PART 1

MathWorks Toolboxes: How to Optimize in any Licensing Model



20 July 2022, Wednesday



Malou Albendia

Solutions Architect

About the Speaker

- 10+ years of experience in the software industry
- Highly experienced in software development, business intelligence development, data analysis, and software asset management and optimization
- Help companies achieve their software optimization goals in various industry verticals such as Engineering, Energy, Automotive, Manufacturing, Aerospace, and more.
- Enjoys traveling and recently visited the wonders of Spain



Malou Albendia

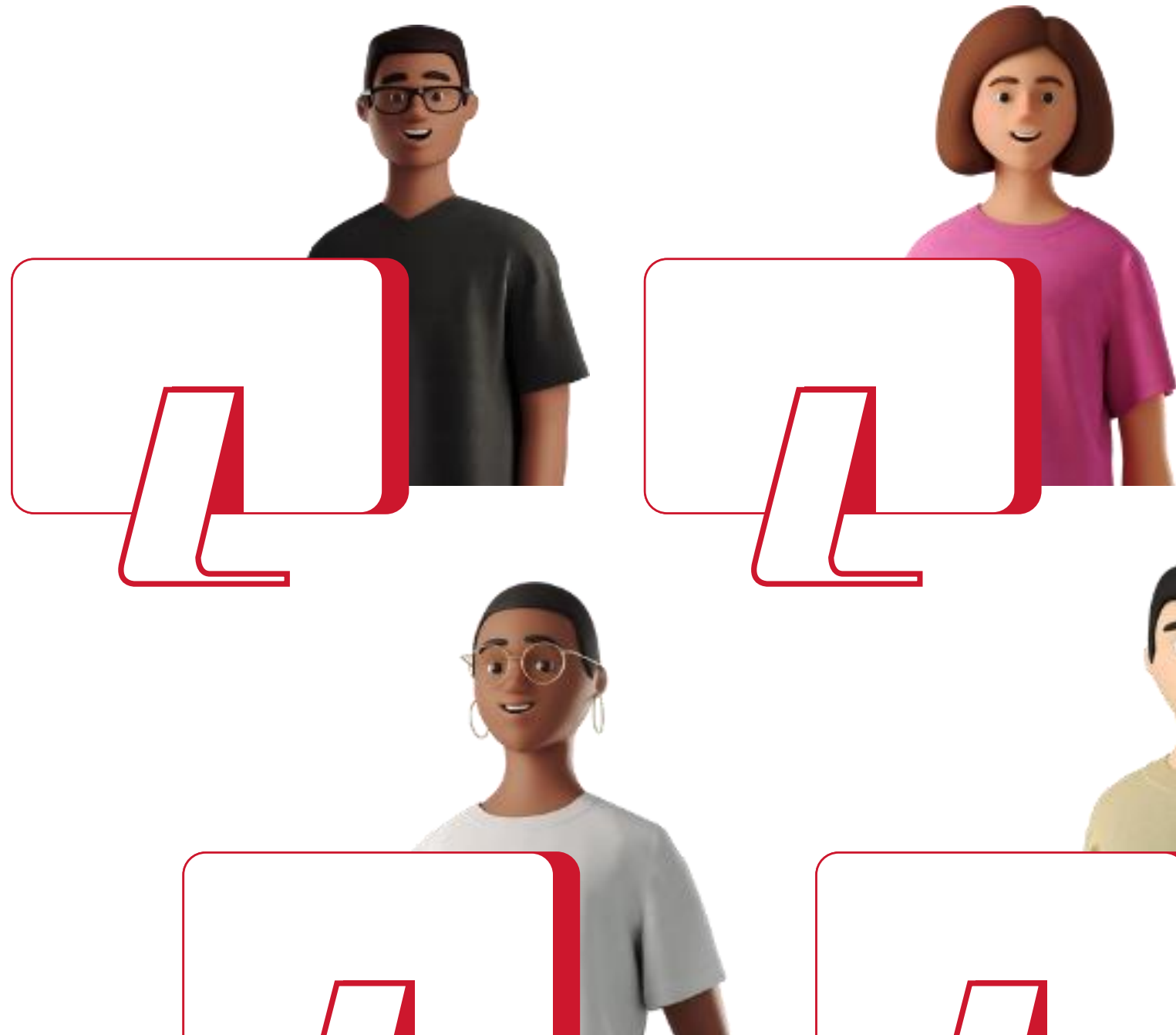
Solutions Architect, Open iT Norge AS

Agenda

- Introduction to MathWorks Licensing
- Optimization strategies per license type
 - Individual license
 - Concurrent Users
 - Network Named Users
 - Prorated Users
- Customer Examples

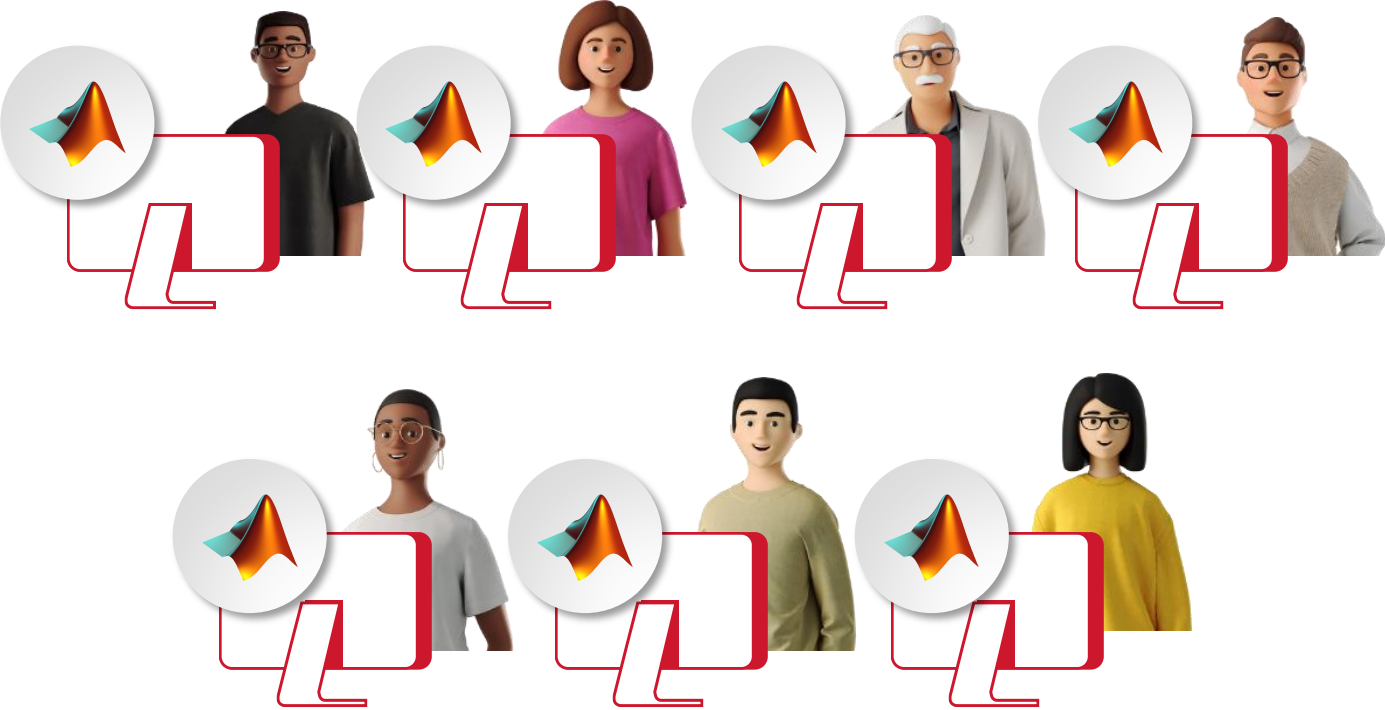
License Types

- Individual
- Designated Computer
- Network Named-User
- Concurrent User
- Prorated User



License Types

Individual License



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License Types

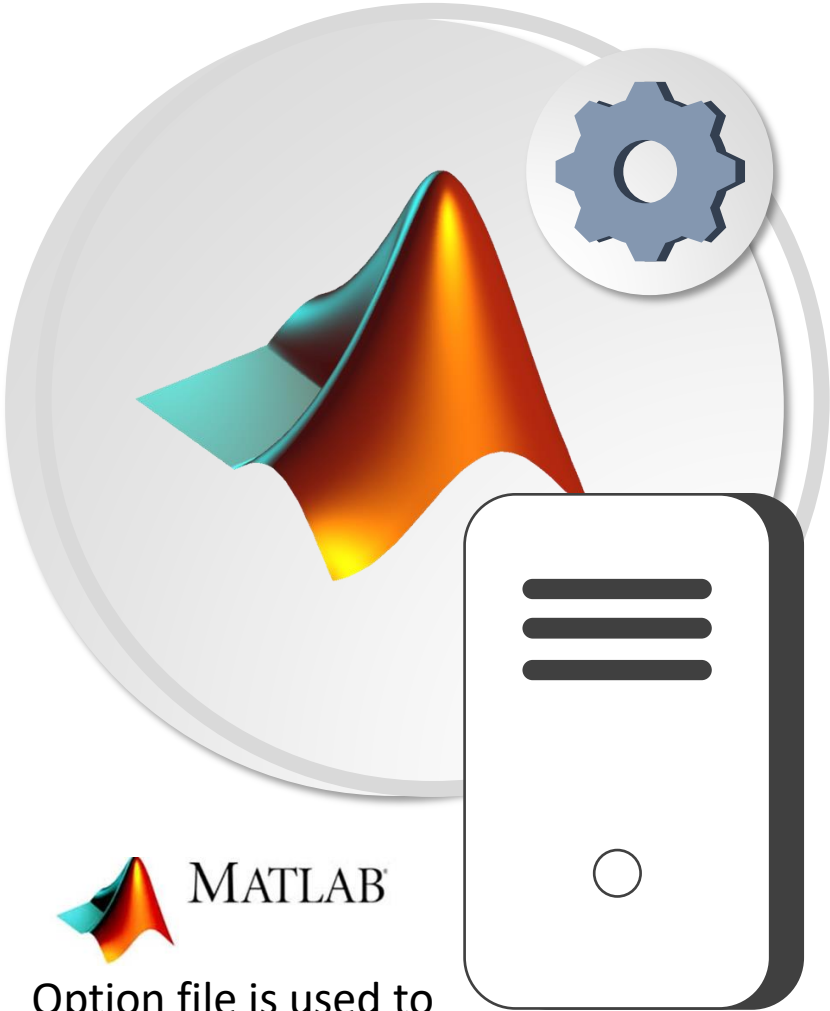
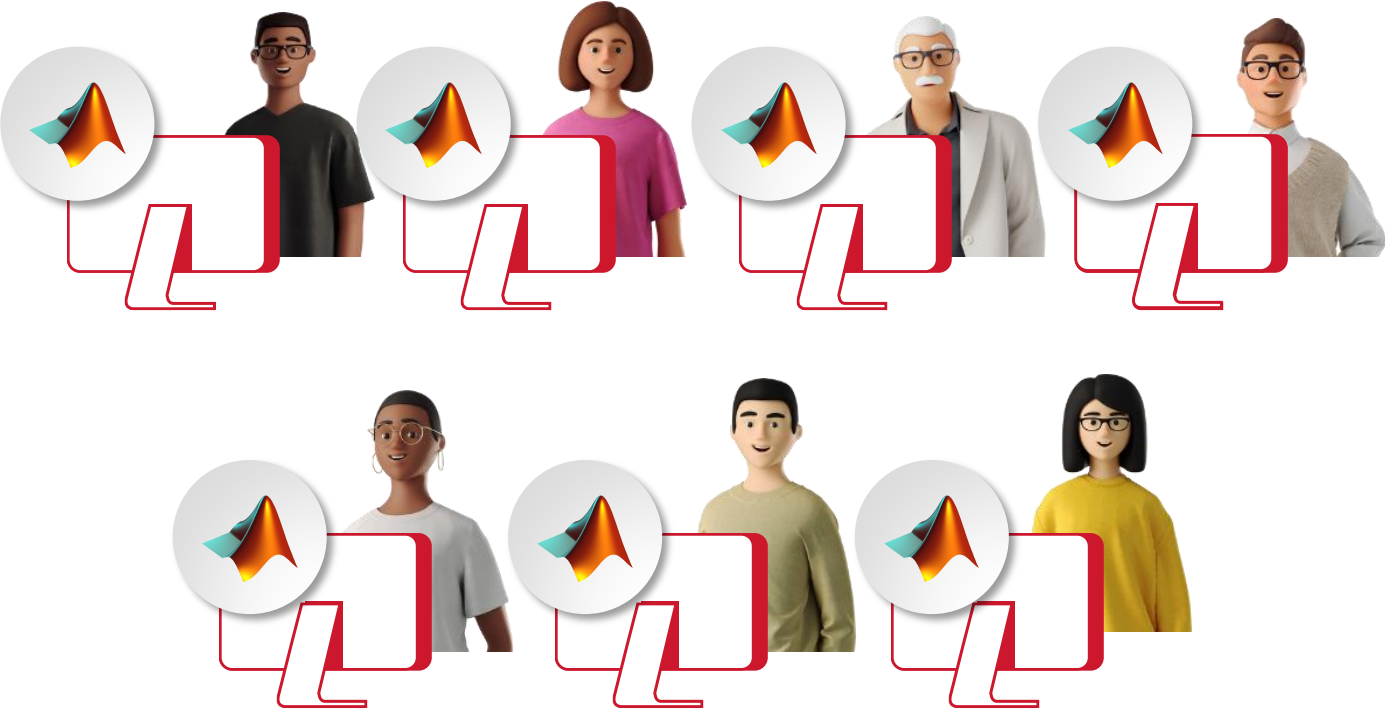
Designated Computer License



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License Types

Network Named Users

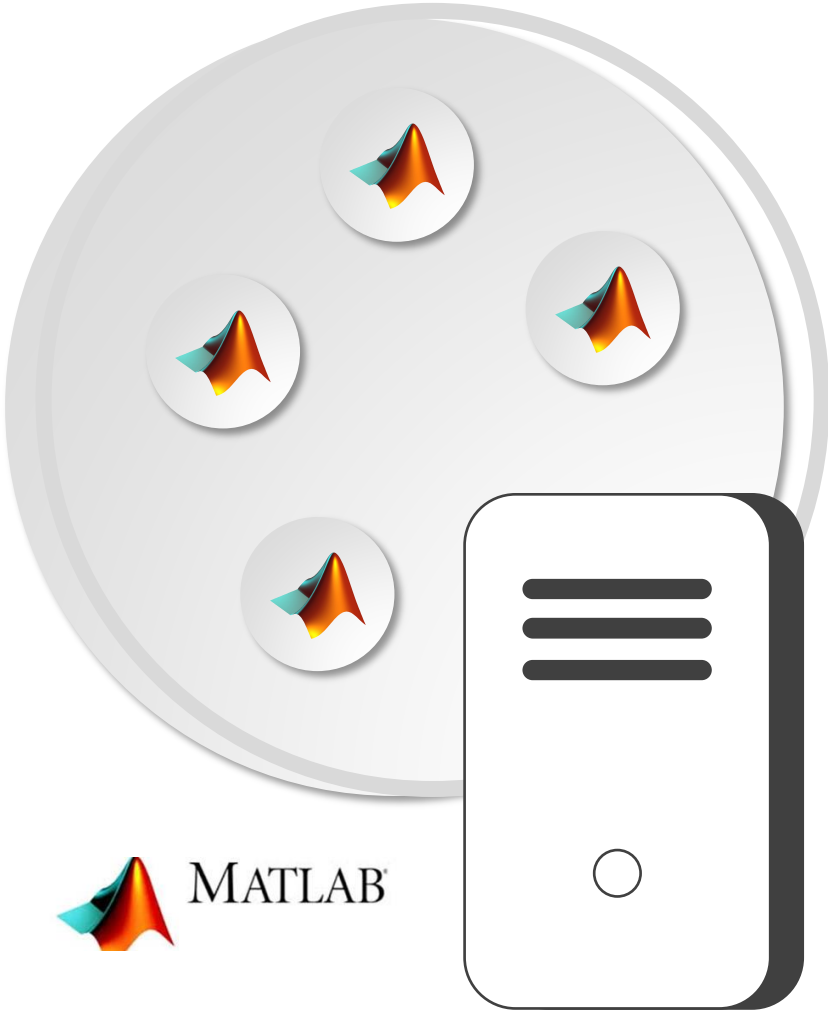
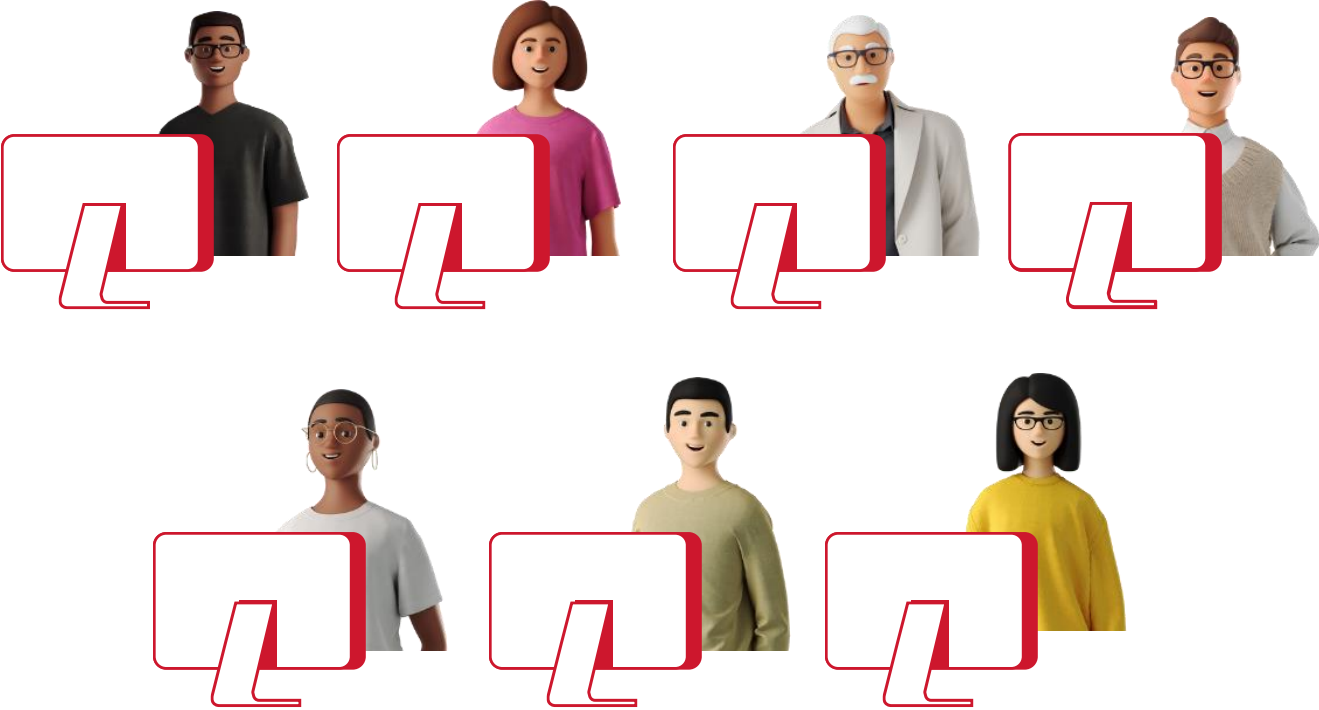


Option file is used to list users allowed to access applications

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License Types

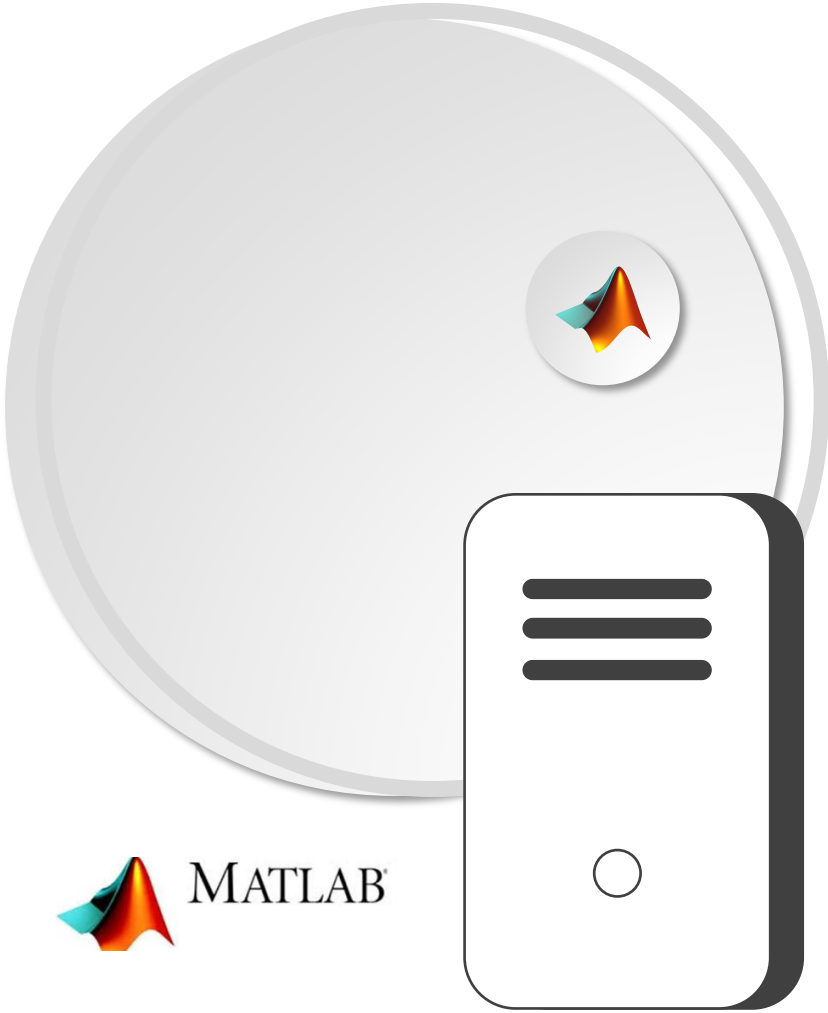
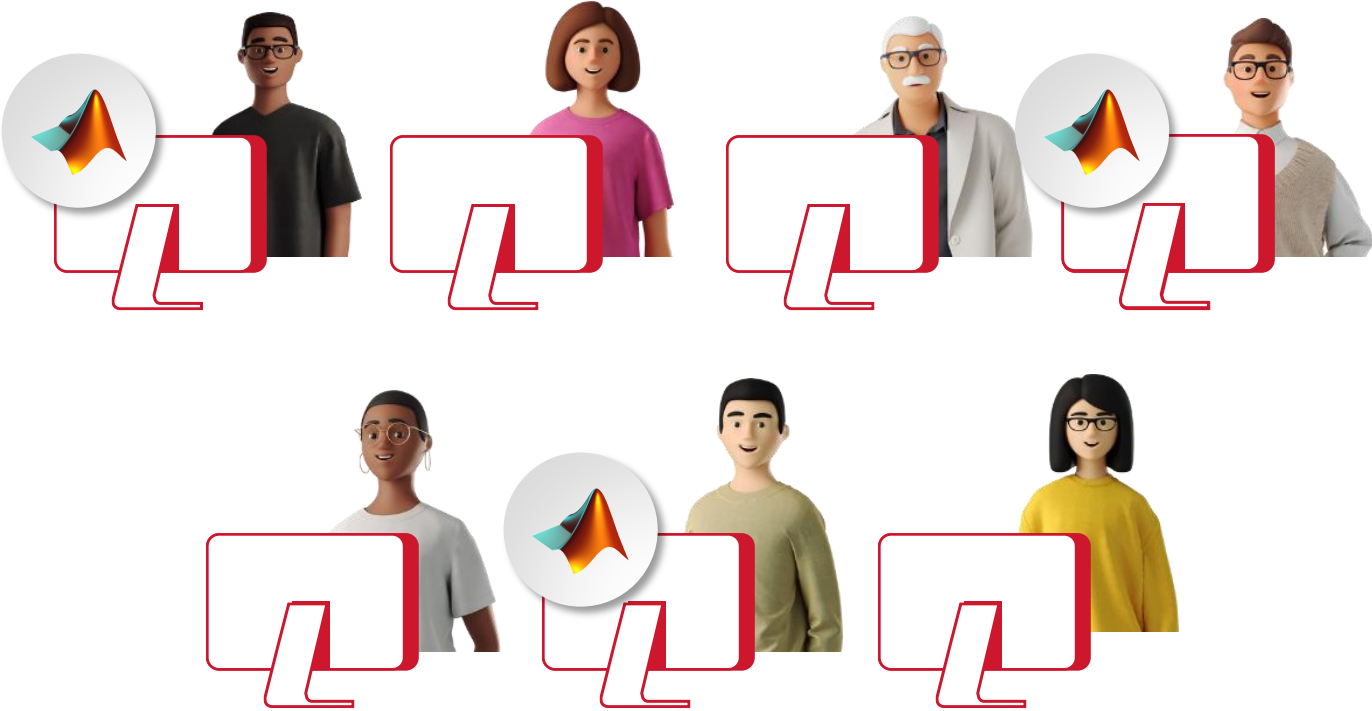
Concurrent Licensing



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License Types

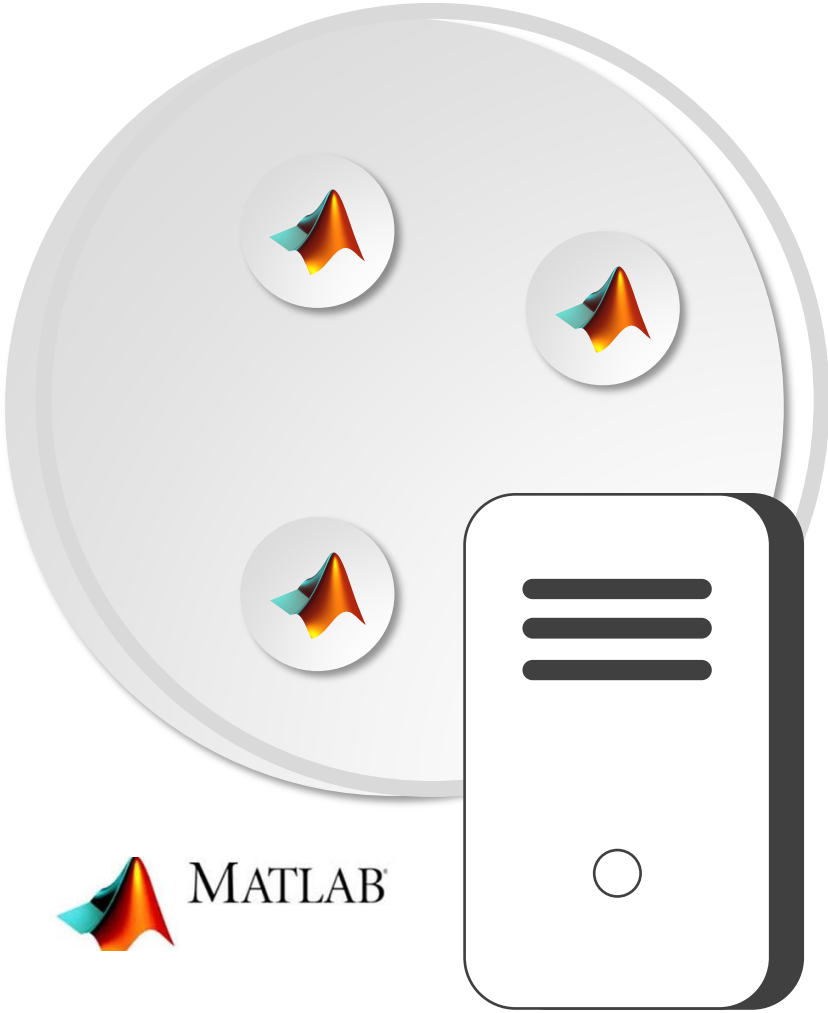
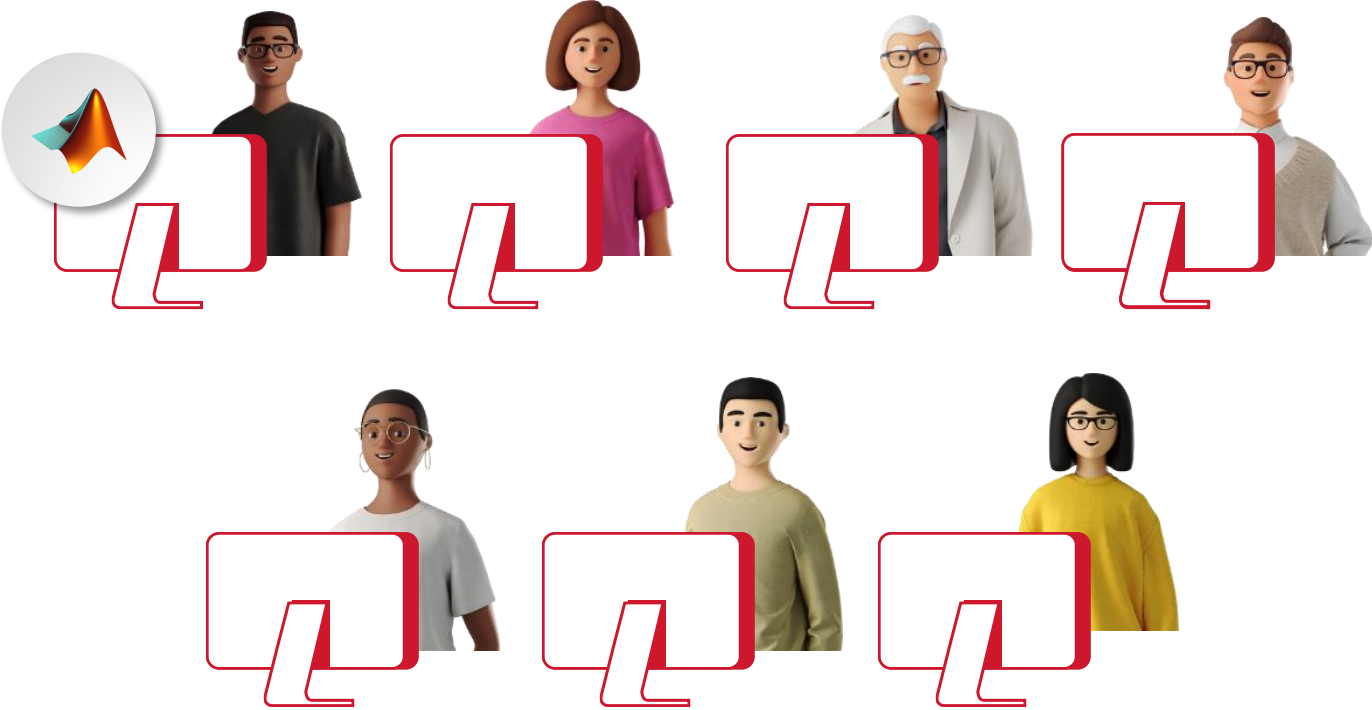
Concurrent Licensing



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License Types

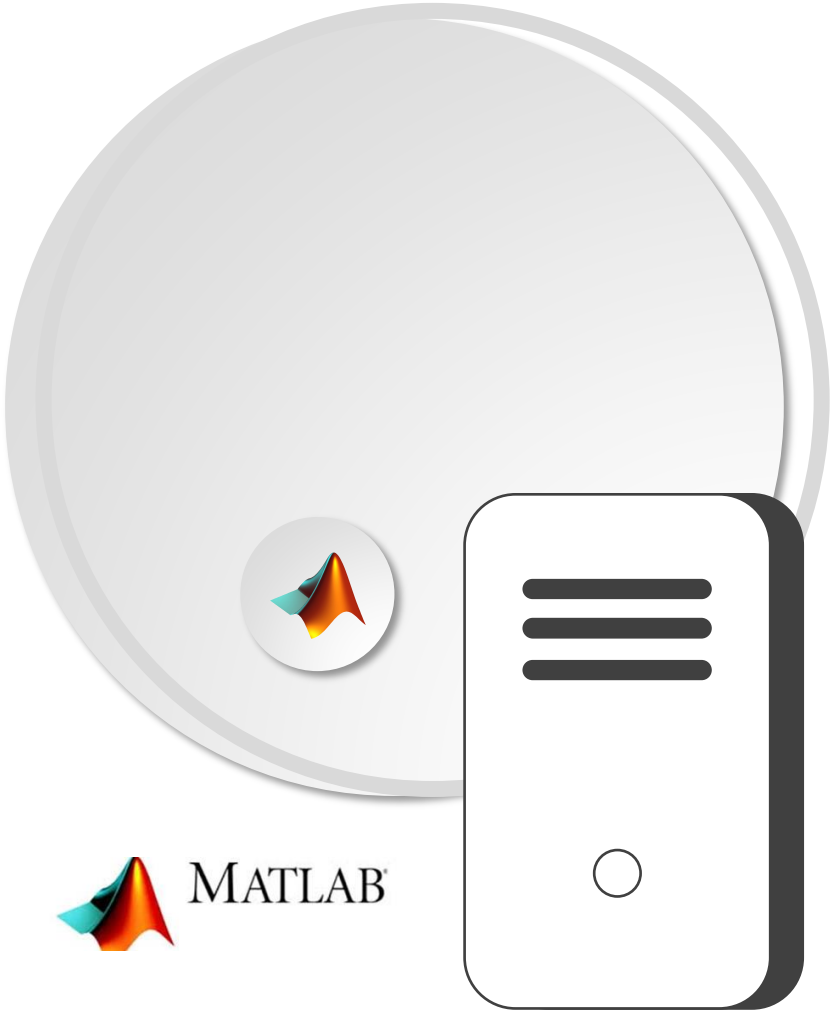
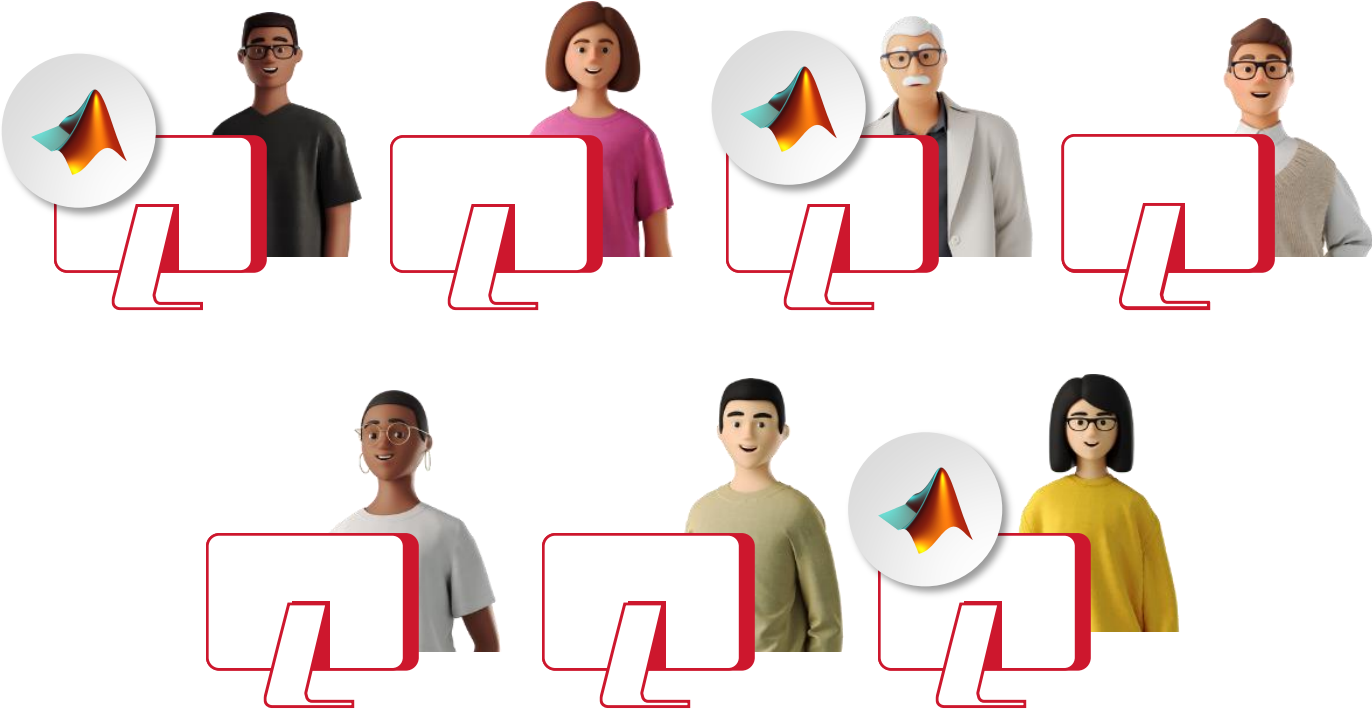
Concurrent Licensing



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License Types

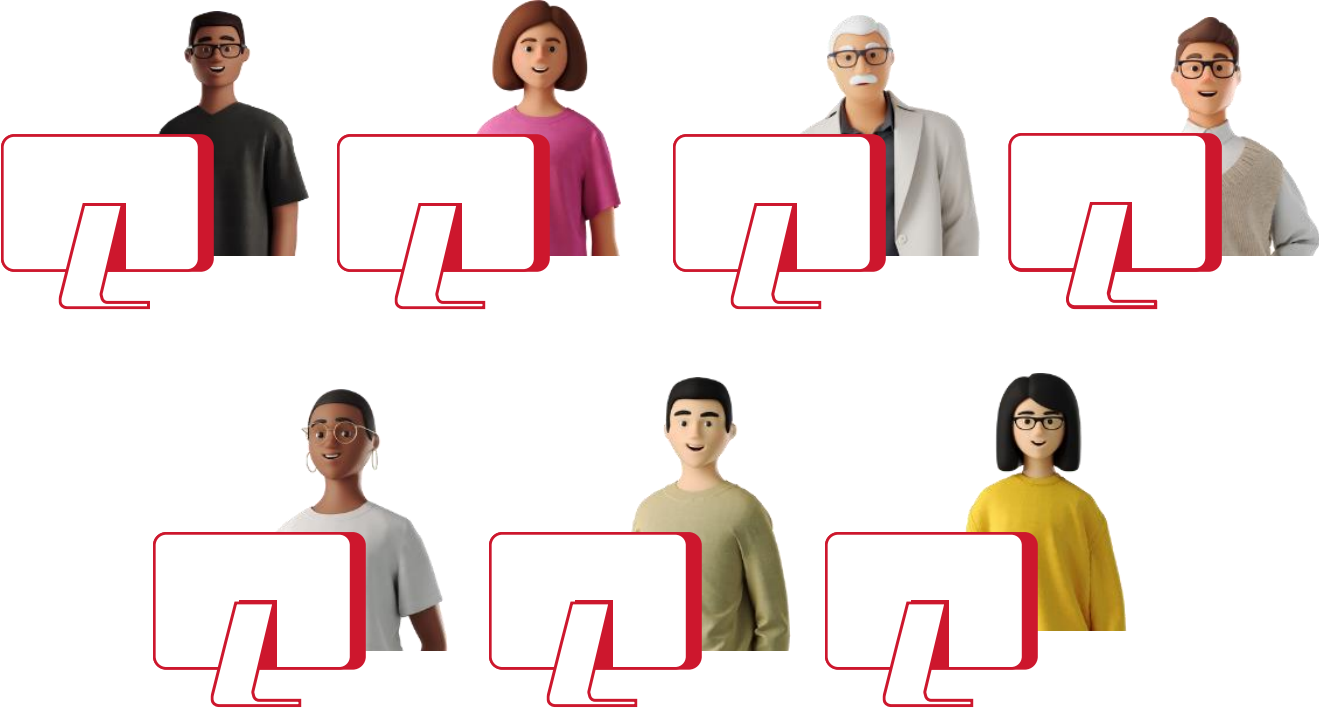
Concurrent Licensing



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License Types

Prorated User Licensing



MATLAB

| Hours / 12 months | | Full User Equivalents | |
|-------------------|-----|-----------------------|-----------|
| From | To | Matlab & Simulink | Toolboxes |
| 0 | 7 | 0% | 0% |
| 8 | 15 | 9% | 19% |
| 16 | 31 | 19% | 38% |
| 32 | 63 | 38% | 75% |
| 64 | 127 | 75% | 100% |
| 128 | - | 100% | 100% |

The complex block features the MATLAB logo at the top left, a large grey infinity symbol in the center, and a stylized white server rack with three horizontal bars and a circular indicator on the right. Below the infinity symbol is a table detailing the prorated user licensing model.

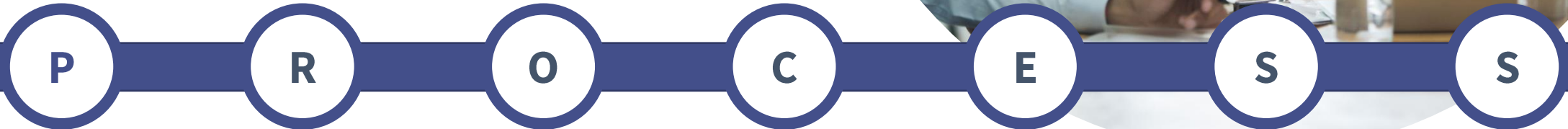
MatLab logo, mentioned/used in this material are registered trademarks or trademarks of MathWorks, and/or its subsidiaries and/or affiliates in the USA and/or other countries.

Consider combining license types

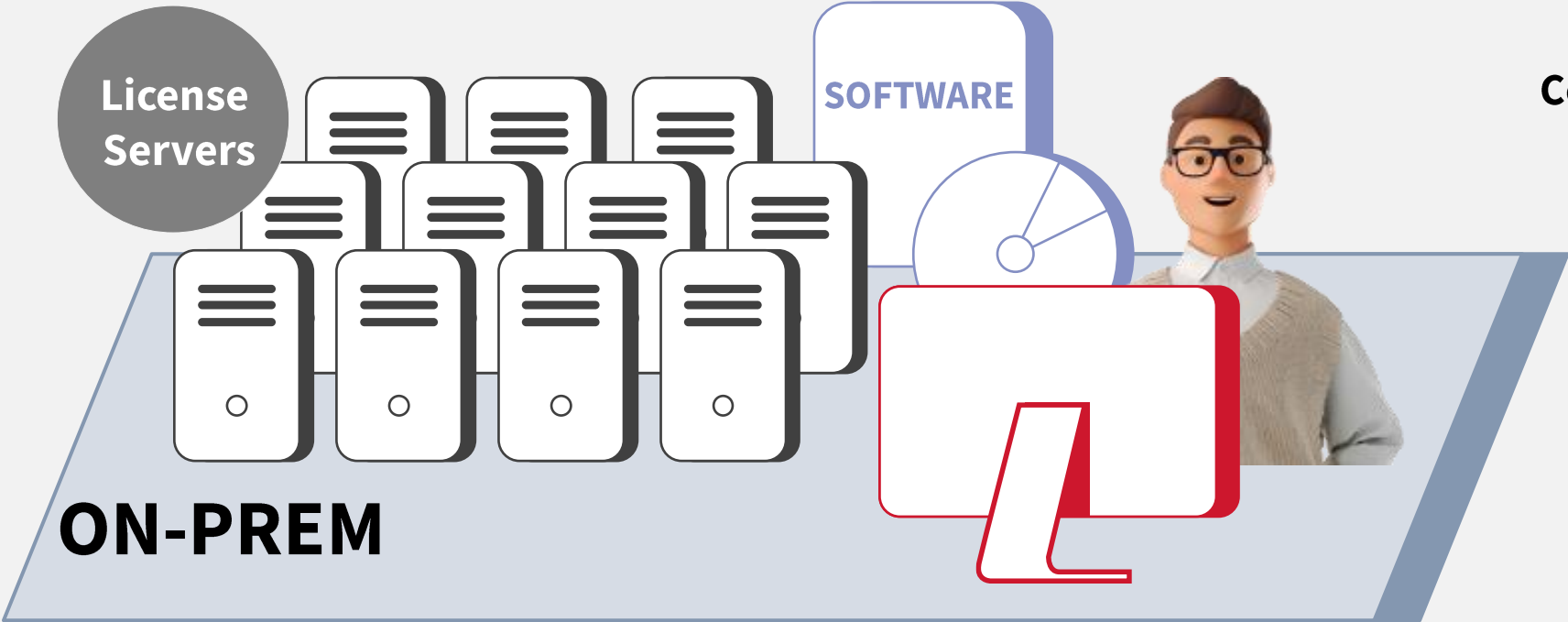
- Named Users must be reserved to Power Users.
- Power Users should have Named User licenses
- Concurrent licenses must be shared among infrequent users

Optimization process

- Set goals
- Understanding your license agreement and its nuances
- Collect data
- Consolidate data
- Analyze of data in relation to your agreement and goals
- Implement of actions points from your analysis



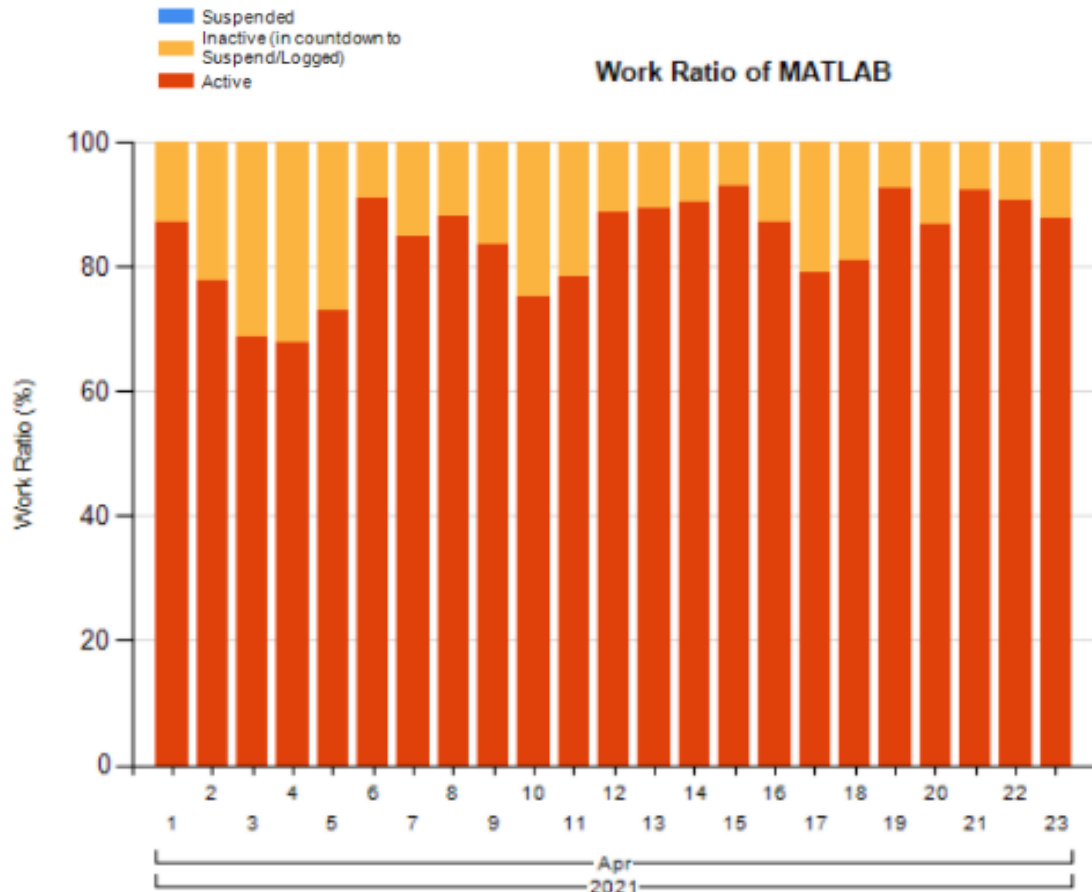
Collecting data



Collect data from both:

- License Servers
- Workstations

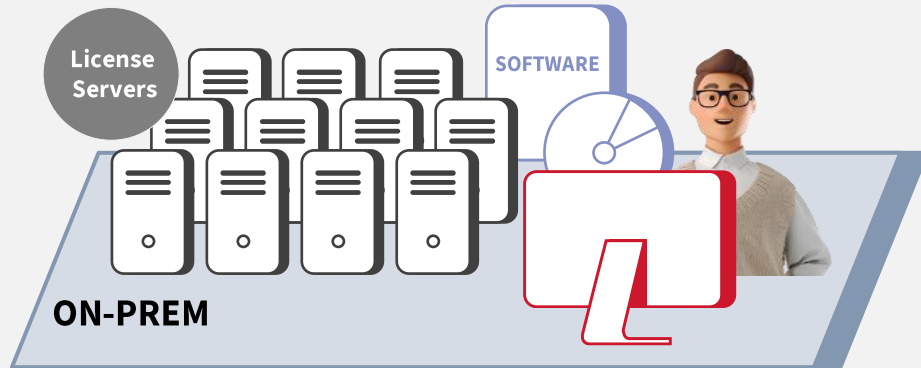
Metering from application host will only provide usage of *matlab.exe*



| Row Labels | Matlab Toolbox host-bound | Matlab Toolbox user-bound | b307adils110;mlm |
|---------------------------------|---------------------------|---------------------------|------------------|
| Control Systems Toolbox | 0.00 h | 0.00 h | 314.50 h |
| Curve Fitting Toolbox | 0.50 h | 0.00 h | 614.66 h |
| Deep Learning Toolbox | 0.00 h | | 444.66 h |
| Embedded Coder | 0.00 h | 0.00 h | 444.66 h |
| Fixed-Point Designer | 0.00 h | 0.00 h | 444.66 h |
| Global Optimization Toolbox | 0.00 h | 0.00 h | 444.66 h |
| MATLAB | 441.50 h | 0.50 h | 20,906.34 h |
| MATLAB Coder | 0.00 h | 0.00 h | 2,105.34 h |
| MATLAB Compiler | 0.00 h | 0.00 h | 444.66 h |
| MATLAB Compiler SDK | 0.00 h | 0.00 h | 444.66 h |
| MATLAB Report Generator | 0.00 h | 0.00 h | 444.66 h |
| Model-Based Calibration Toolbox | 0.00 h | 0.00 h | 444.66 h |
| Optimization Toolbox | 0.00 h | 0.00 h | 476.66 h |
| Powertrain Blockset | 1.50 h | | |
| Signal Processing Toolbox | 109.50 h | 0.00 h | 526.34 h |
| Simscape | 0.00 h | 0.00 h | 22.50 h |
| Simulink | 217.50 h | 0.00 h | 7,856.00 h |

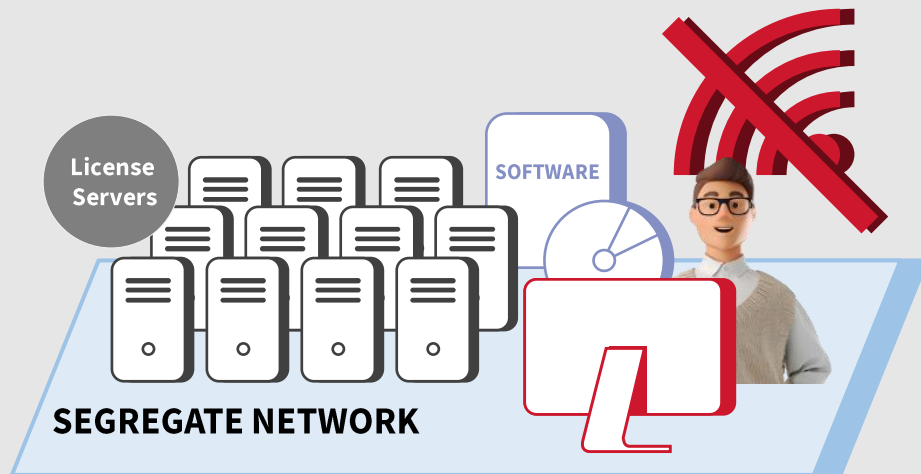
matlab.exe can be checking out 1 or more of these licenses

Collecting data



Collect data from both:

- License Servers
- Workstations

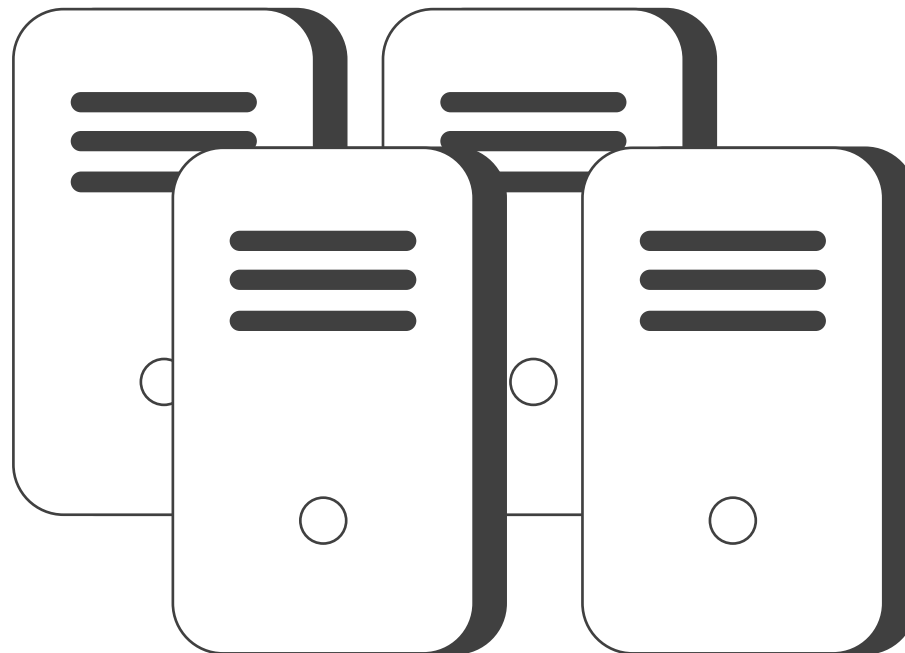


Challenges:

- Segregated Network
- Work from home set-up

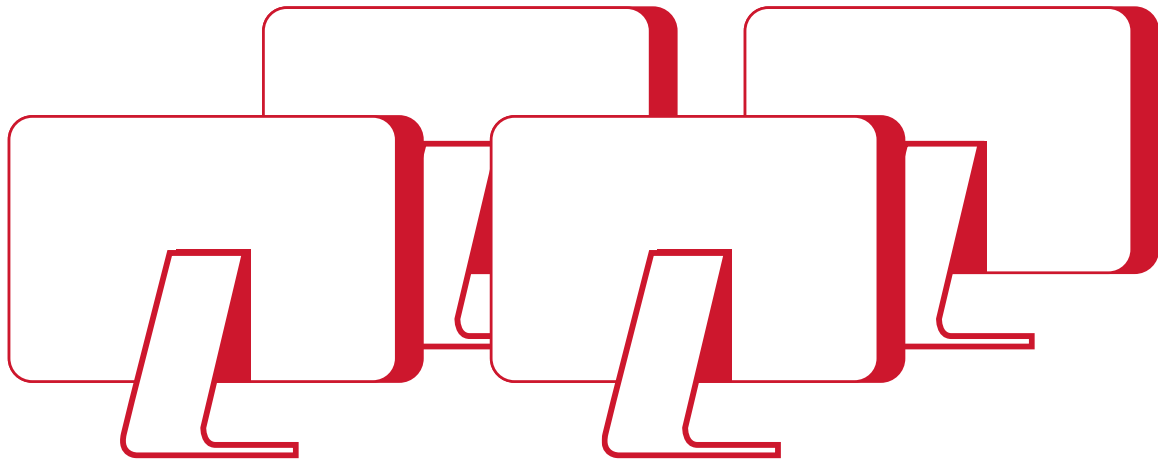
Consolidating of data

Data from several license servers including segregated ones



Consolidating of data

Data from workstations and license servers



Optimizing Concurrent Users



- Home
- LM Portal
- Dashboard
- Analysis
- Reporting
- Administration
- Resources

License Monitor Portal

Real-time license utilization view.

License Usage

Product Search...

Sort by Name

 Reset

Current Users: **84** Collection Time: **2020-12-14 13:05** Reload

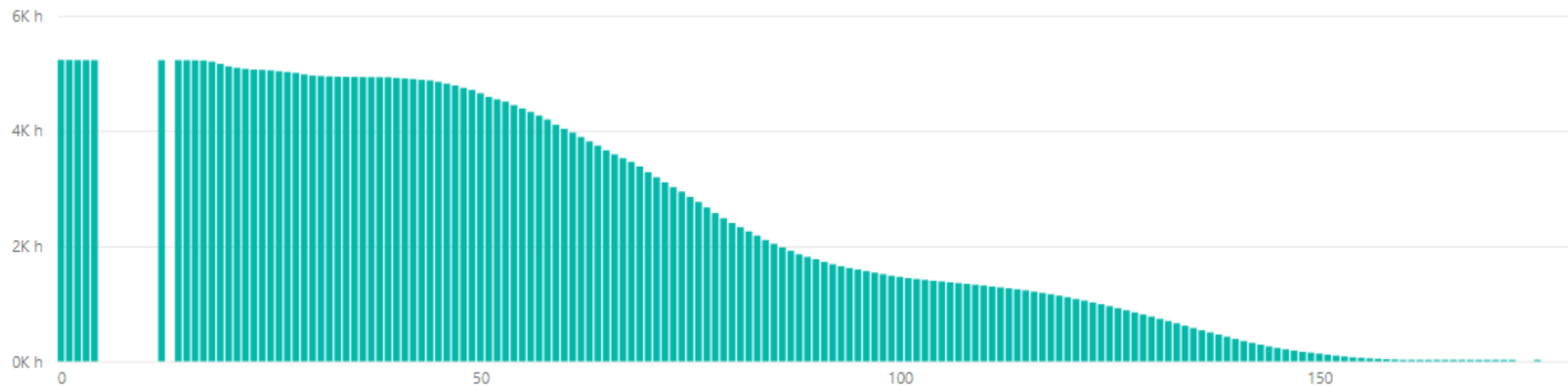
- M MathWorks [licserv001]
 84 ▼
- M MathWorks [licserv002]
 1 ▼
- M MathWorks_Combined
 84 ▲

| Feature | Usage |
|--|--|
| M MATLAB (20000) | 19902 / 98 <div style="width: 100px; height: 15px; background: linear-gradient(to right, #ccc, #9ccc65);"></div> |

| User Name | Host | Usage Time | In Use |
|------------------|------------------|---|--------|
| Aaron Gordon | oit-0009 | 2020-12-14 13:04:01 2 minutes ago | 1 |
| Bruce Howard | oit-0943 | 2020-12-14 13:04:01 2 minutes ago | 1 |
| Amy Wheeler | oit-0170 | 2020-12-14 12:56:01 10 minutes ago | 1 |
| Amanda Harper | oit-0140 | 2020-12-14 12:55:01 11 minutes ago | 1 |
| Catherine Powell | ip-10-223-13-170 | 2020-12-14 12:54:01 12 minutes ago | 1 |
| Adam Frazier | oit-0154 | 2020-12-14 12:54:01 12 minutes ago | 1 |
| Angela West | oit-0271 | 2020-12-14 12:54:01 12 minutes ago | 1 |
| Andrea Lawrence | oit-0186 | 2020-12-14 12:54:01 12 minutes ago | 1 |
| Adam Greene | oit-0156 | 2020-12-14 12:54:01 12 minutes ago | 1 |
| Catherine Powell | ip-10-223-13-170 | 2020-12-14 12:54:01 12 minutes ago | 1 |

Go to page: 1 Show rows: 10 1-10 of 98

License Efficiency



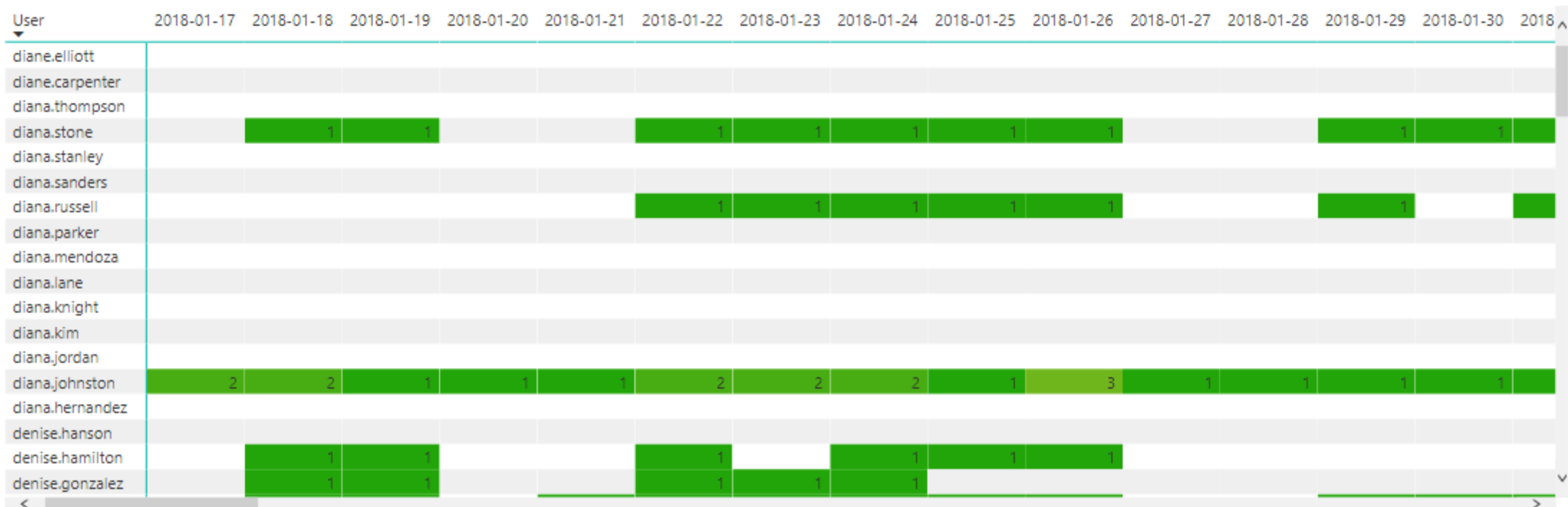
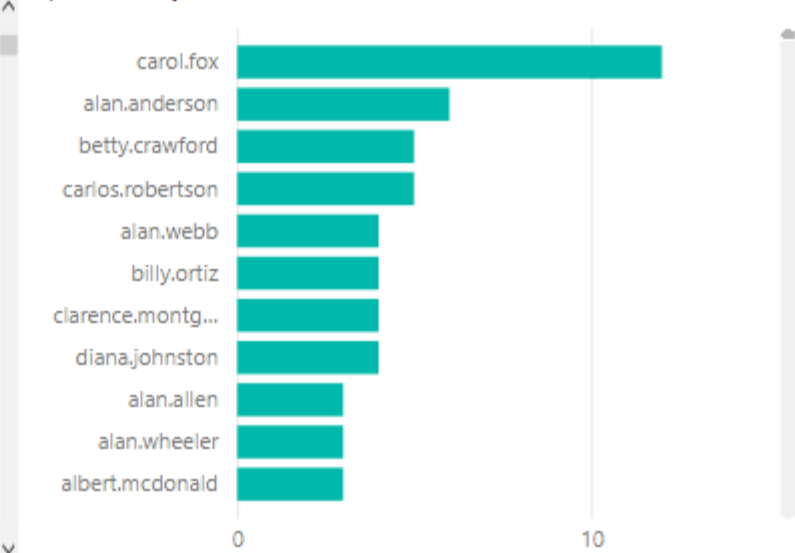
| Minimum # of Licenses | Duration in Hours | Duration in % of Total |
|-----------------------|-------------------|------------------------|
| 176 | 0.08 h | 0.00% |
| 173 | 0.25 h | 0.00% |
| 172 | 0.92 h | 0.02% |
| 171 | 1.33 h | 0.03% |
| 170 | 1.83 h | 0.04% |
| 169 | 2.75 h | 0.05% |
| 168 | 3.75 h | 0.07% |
| 167 | 4.33 h | 0.08% |
| 166 | 5.33 h | 0.10% |
| 165 | 7.58 h | 0.15% |
| 164 | 9.67 h | 0.18% |
| 163 | 12.33 h | 0.24% |
| 162 | 16.92 h | 0.32% |
| 161 | 21.33 h | 0.41% |
| 160 | 24.83 h | 0.47% |
| 159 | 31.25 h | 0.60% |
| 158 | 37.08 h | 0.71% |
| 157 | 44.17 h | 0.84% |
| 156 | 51.75 h | 0.99% |
| 155 | 60.50 h | 1.16% |

| | | | |
|---------------|------------|----------------|----------------|
| 200 | 176 | 156 | 144 |
| Max Available | Max in Use | Within 99% use | Within 95% use |

"Within 95% (or 99%) use" means that at a minimum of 95% (or 99%) of the time, the license usage is at or below the reported value.

| User | Date Last Use | Days Since Last Use | Elapsed Time | Max in Use | |
|----------------------|-----------------------|---------------------|--------------|------------|---|
| adam.freeman | 4/11/2018 12:00:00 AM | | 995 | 0.08 h | 1 |
| angela.davis | 5/9/2018 12:00:00 AM | | 967 | 0.08 h | 1 |
| brandon.hill | 2/25/2018 12:00:00 AM | | 1040 | 0.08 h | 1 |
| carl.hill | 1/23/2018 12:00:00 AM | | 1073 | 0.08 h | 1 |
| carlos.gutierrez | 1/23/2018 12:00:00 AM | | 1073 | 0.08 h | 1 |
| carlos.myers | 1/23/2018 12:00:00 AM | | 1073 | 0.08 h | 1 |
| charles.arnold | 7/9/2018 12:00:00 AM | | 906 | 0.08 h | 1 |
| chris.hunt | 1/26/2018 12:00:00 AM | | 1070 | 0.08 h | 1 |
| christine.gardner | 6/4/2018 12:00:00 AM | | 941 | 0.08 h | 1 |
| christopher.franklin | 2/7/2018 12:00:00 AM | | 1058 | 0.08 h | 1 |
| daniel.bates | 2/1/2018 12:00:00 AM | | 1064 | 0.08 h | 1 |
| debra.watkins | 4/6/2018 12:00:00 AM | | 1000 | 0.08 h | 1 |
| alice.riley | 6/6/2018 12:00:00 AM | | 939 | 0.17 h | 1 |
| andrew.nguyen | 7/5/2018 12:00:00 AM | | 910 | 0.17 h | 1 |
| carlos.edwards | 8/13/2018 12:00:00 AM | | 871 | 0.17 h | 1 |
| catherine.black | 5/28/2018 12:00:00 AM | | 948 | 0.17 h | 1 |

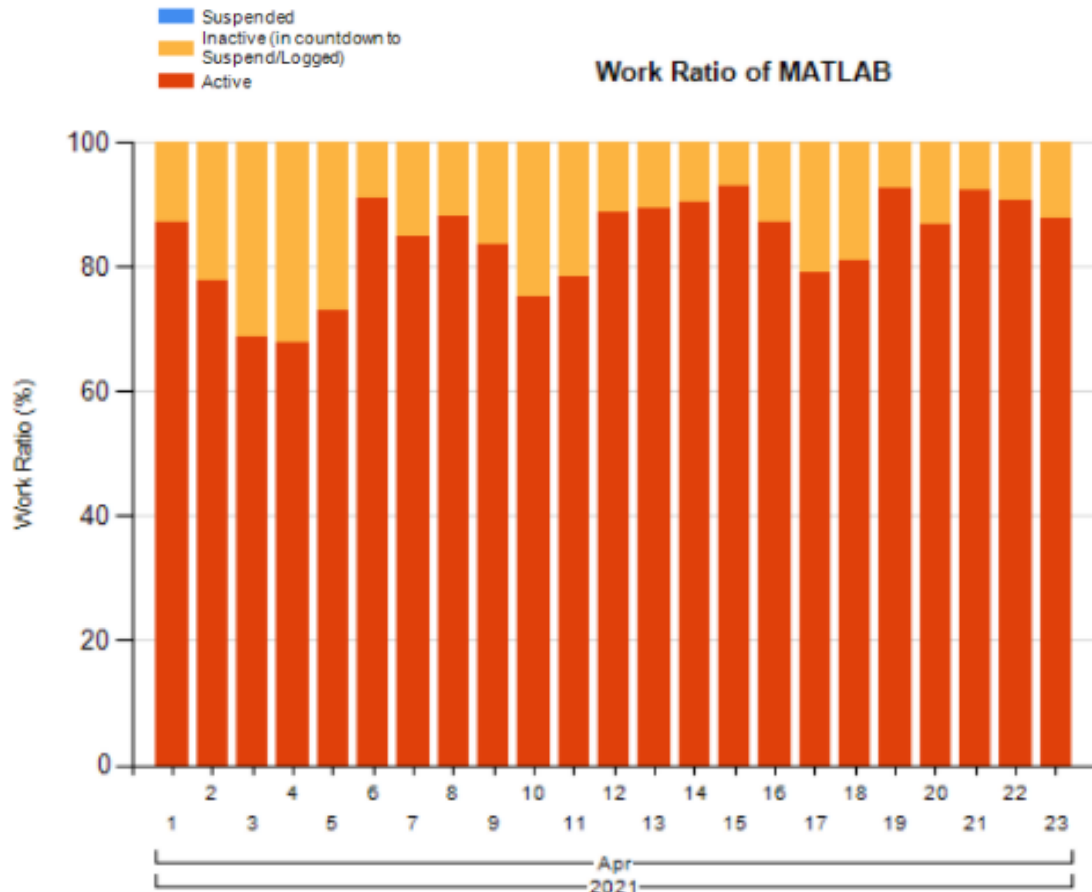
Top 10 User by Max in Use



Optimizing Individual License



Metering from application host will only provide usage of *matlab.exe*



| Row Labels | Matlab Toolbox host-bound | Matlab Toolbox user-bound | b307adils110;mlm |
|---------------------------------|---------------------------|---------------------------|------------------|
| Control Systems Toolbox | 0.00 h | 0.00 h | 314.50 h |
| Curve Fitting Toolbox | 0.50 h | 0.00 h | 614.66 h |
| Deep Learning Toolbox | 0.00 h | | 444.66 h |
| Embedded Coder | 0.00 h | 0.00 h | 444.66 h |
| Fixed-Point Designer | 0.00 h | 0.00 h | 444.66 h |
| Global Optimization Toolbox | 0.00 h | 0.00 h | 444.66 h |
| MATLAB | 441.50 h | 0.50 h | 20,906.34 h |
| MATLAB Coder | 0.00 h | 0.00 h | 2,105.34 h |
| MATLAB Compiler | 0.00 h | 0.00 h | 444.66 h |
| MATLAB Compiler SDK | 0.00 h | 0.00 h | 444.66 h |
| MATLAB Report Generator | 0.00 h | 0.00 h | 444.66 h |
| Model-Based Calibration Toolbox | 0.00 h | 0.00 h | 444.66 h |
| Optimization Toolbox | 0.00 h | 0.00 h | 476.66 h |
| Powertrain Blockset | 1.50 h | | |
| Signal Processing Toolbox | 109.50 h | 0.00 h | 526.34 h |
| Simscape | 0.00 h | 0.00 h | 22.50 h |
| Simulink | 217.50 h | 0.00 h | 7,856.00 h |

matlab.exe can be checking out 1 or more of these licenses

Optimizing Prorated Users



Prorated Users:

| Hours / 12 months | | Full User Equivalents | |
|-------------------|-----|-----------------------|-----------|
| From | To | Matlab & Simulink | Toolboxes |
| 0 | 7 | 0% | 0% |
| 8 | 15 | 9% | 19% |
| 16 | 31 | 19% | 38% |
| 32 | 63 | 38% | 75% |
| 64 | 127 | 75% | 100% |
| 128 | - | 100% | 100% |

The pay per use agreement with MathWorks is counting “full user equivalents” based on the Elapsed Time per application and toolbox and no longer just the concurrent max over a period. Looking back at the last 12 months one user will be counted as a fraction of a full user by the time he/she is spending in the various applications based on the thresholds in table

Visibility

- Home
- LM Portal
- Dashboard
- Analysis
- Reporting
- Administration
- Resources

License Monitor Portal

Real-time license utilization view.

License Usage

Product

Sort by Name

Current Users: 84 Collection Time: 2020-12-14 13:05

- MathWorks [licserv001] 84
- MathWorks [licserv002] 1
- MathWorks_Combined** 84

| Feature | Usage |
|----------------|------------|
| MATLAB (20000) | 19902 / 98 |

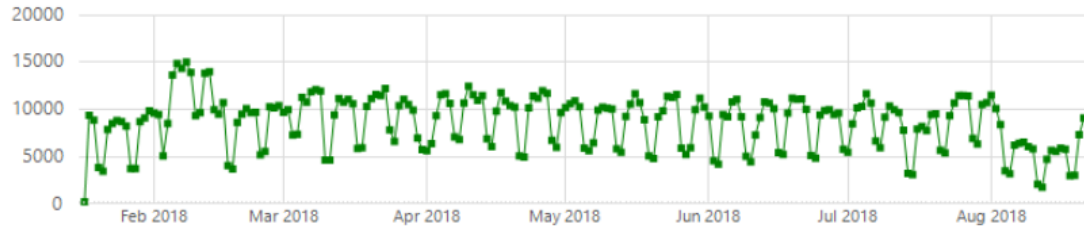
| User Name | Host | Usage Time | In Use |
|------------------|------------------|---------------------|--------|
| Aaron Gordon | oit-0009 | 2020-12-14 13:04:01 | 1 |
| Bruce Howard | oit-0943 | 2020-12-14 13:04:01 | 1 |
| Amy Wheeler | oit-0170 | 2020-12-14 12:56:01 | 1 |
| Amanda Harper | oit-0140 | 2020-12-14 12:55:01 | 1 |
| Catherine Powell | ip-10-223-13-170 | 2020-12-14 12:54:01 | 1 |
| Adam Frazier | oit-0154 | 2020-12-14 12:54:01 | 1 |
| Angela West | oit-0271 | 2020-12-14 12:54:01 | 1 |
| Andrea Lawrence | oit-0186 | 2020-12-14 12:54:01 | 1 |
| Adam Greene | oit-0156 | 2020-12-14 12:54:01 | 1 |
| Catherine Powell | ip-10-223-13-170 | 2020-12-14 12:54:01 | 1 |



MathWorks Prorated Users

Shows Utilization based on the User Equivalent the new Pay-per-use Agreement of MathWorks

Elapsed Time Trend



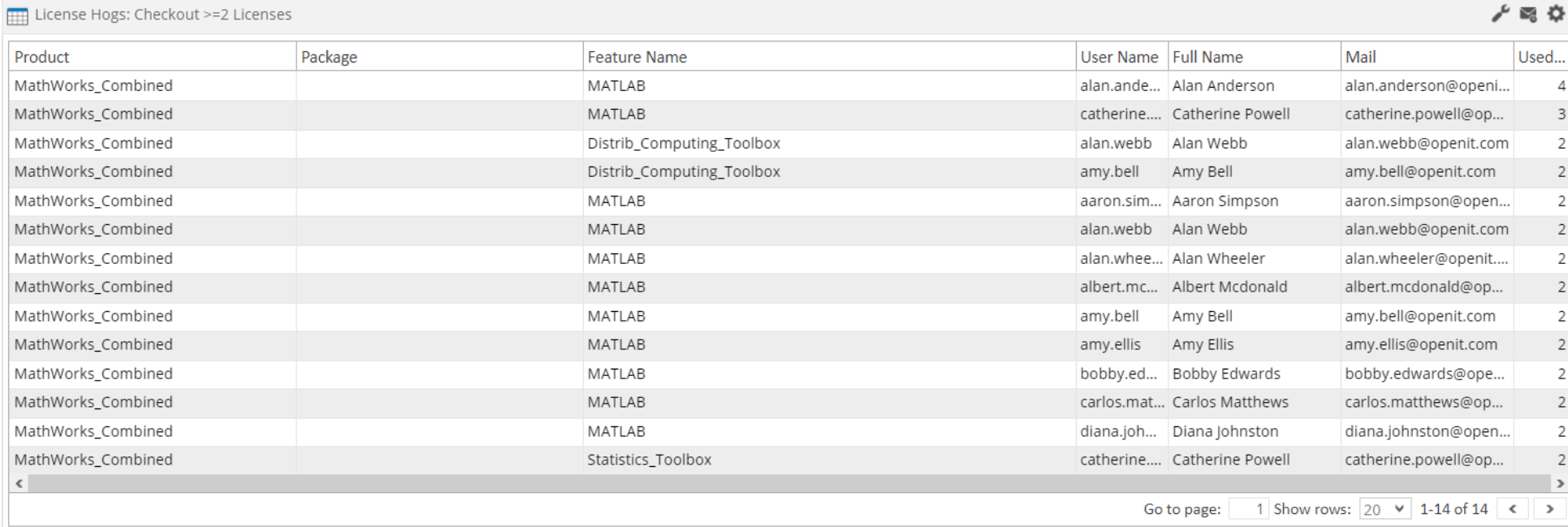
| Application | Cost Center | User | Time | Full User Count | Cost |
|---|---|-----------------|----------|-----------------|-------------|
| <input checked="" type="checkbox"/> Aerospace_Blockset | Total | | 4,712.8 | 20.00 | £ 6,720.00 |
| <input checked="" type="checkbox"/> Aerospace_Toolbox | Total | | 1,956.4 | 11.25 | £ 3,240.00 |
| <input checked="" type="checkbox"/> Antenna_Toolbox | Total | | 89.4 | 1.38 | £ 683.10 |
| <input checked="" type="checkbox"/> Audio_System_Toolbox | Total | | 92.0 | 1.19 | £ 436.05 |
| <input checked="" type="checkbox"/> Automated_Driving_Toolbox | Total | | 118.7 | 1.56 | £ 1,350.00 |
| <input checked="" type="checkbox"/> Bioinformatics_Toolbox | Total | | 24.8 | 0.38 | £ 108.00 |
| <input checked="" type="checkbox"/> Cert_Kit_JEC | Total | | 179.8 | 2.50 | £ 2,160.00 |
| <input checked="" type="checkbox"/> Communication_Toolbox | Total | | 1,997.2 | 14.69 | £ 5,393.25 |
| <input checked="" type="checkbox"/> Compiler | Total | | 3,017.2 | 13.38 | |
| <input checked="" type="checkbox"/> Control_Toolbox | Total | | 14,491.9 | 61.44 | £ 17,694.00 |
| | <input checked="" type="checkbox"/> CostCenterA | All | 3,553.1 | 18.25 | £ 5,256.00 |
| | <input checked="" type="checkbox"/> CostCenterB | All | 10,403.7 | 38.69 | £ 11,142.00 |
| | <input checked="" type="checkbox"/> CostCenterC | All | 535.2 | 4.50 | £ 1,296.00 |
| | | debra.henderson | 189.3 | 1.00 | £ 288.00 |
| | | debra.young | 36.9 | 0.75 | £ 216.00 |
| | | denise.hanson | 91.8 | 1.00 | £ 288.00 |
| | | diana.stanley | 158.6 | 1.00 | £ 288.00 |
| | | diane.elliott | 58.5 | 0.75 | £ 216.00 |
| <input checked="" type="checkbox"/> Curve_Fitting_Toolbox | Total | | 2,031.3 | 17.31 | £ 4,986.00 |
| <input checked="" type="checkbox"/> Data_Acq_Toolbox | Total | | 359.0 | 2.56 | £ 738.00 |
| <input checked="" type="checkbox"/> Database_Toolbox | Total | | 277.8 | 3.50 | £ 1,008.00 |

Visibility: Another source of truth

- Visibility of up-to-date consumed cost
- Audit the reports from the vendor



Optimization: Avoid Multiple Sessions



License Hogs: Checkout >=2 Licenses

| Product | Package | Feature Name | User Name | Full Name | Mail | Used... |
|--------------------|---------|---------------------------|---------------|------------------|------------------------|---------|
| MathWorks_Combined | | MATLAB | alan.ande... | Alan Anderson | alan.anderson@openi... | 4 |
| MathWorks_Combined | | MATLAB | catherine.... | Catherine Powell | catherine.powell@op... | 3 |
| MathWorks_Combined | | Distrib_Computing_Toolbox | alan.webb | Alan Webb | alan.webb@openit.com | 2 |
| MathWorks_Combined | | Distrib_Computing_Toolbox | amy.bell | Amy Bell | amy.bell@openit.com | 2 |
| MathWorks_Combined | | MATLAB | aaron.sim... | Aaron Simpson | aaron.simpson@open... | 2 |
| MathWorks_Combined | | MATLAB | alan.webb | Alan Webb | alan.webb@openit.com | 2 |
| MathWorks_Combined | | MATLAB | alan.whee... | Alan Wheeler | alan.wheeler@openit... | 2 |
| MathWorks_Combined | | MATLAB | albert.mc... | Albert Mcdonald | albert.mcdonald@op... | 2 |
| MathWorks_Combined | | MATLAB | amy.bell | Amy Bell | amy.bell@openit.com | 2 |
| MathWorks_Combined | | MATLAB | amy.ellis | Amy Ellis | amy.ellis@openit.com | 2 |
| MathWorks_Combined | | MATLAB | bobby.ed... | Bobby Edwards | bobby.edwards@ope... | 2 |
| MathWorks_Combined | | MATLAB | carlos.mat... | Carlos Matthews | carlos.matthews@op... | 2 |
| MathWorks_Combined | | MATLAB | diana.joh... | Diana Johnston | diana.johnston@open... | 2 |
| MathWorks_Combined | | Statistics_Toolbox | catherine.... | Catherine Powell | catherine.powell@op... | 2 |

Go to page: 1 Show rows: 20 1-14 of 14

Making sure users don't check out multiple licenses at the same time will reduce costs, since every checkout session counts against the total elapsed time

Optimization: Avoid unnecessary long sessions

Long Checkout: Duration >= 48 Hours

Drag a column and drop it here to group by that column

| Product | Package | Feature Name | Checkout Time | User Name | Host Name | Full Name | Mail |
|--------------------|---------|---------------------------|------------------------|--------------|-----------|------------------|-------------------------|
| MathWorks_Combined | | MATLAB | 2020-12-12 12:49:01 PM | amy.bell | oit-0150 | Amy Bell | amy.bell@openit.com |
| MathWorks_Combined | | MATLAB | 2020-12-12 12:47:01 PM | amy.bell | oit-0652 | Amy Bell | amy.bell@openit.com |
| MathWorks_Combined | | MATLAB | 2020-12-12 08:51:01 AM | andrew.p... | oit-0813 | Andrew Patterson | andrew.patterson@o... |
| MathWorks_Combined | | MATLAB | 2020-12-12 08:45:01 AM | adam.mills | oit-0033 | Adam Mills | adam.mills@openit.c... |
| MathWorks_Combined | | MATLAB | 2020-12-11 09:10:01 PM | adam.mor... | oit-0034 | Adam Morales | adam.morales@openi... |
| MathWorks_Combined | | MATLAB | 2020-12-11 06:31:01 PM | amy.carroll | oit-0153 | Amy Carroll | amy.carroll@openit.c... |
| MathWorks_Combined | | MATLAB | 2020-12-11 02:03:01 PM | cheryl.perez | oit-0883 | Cheryl Perez | cheryl.perez@openit.... |
| MathWorks_Combined | | Distrib_Computing_Toolbox | 2020-12-11 01:02:01 PM | david.kelly | oit-0839 | | |
| MathWorks_Combined | | MATLAB | 2020-12-11 12:54:01 PM | david.kelly | oit-0839 | | |
| MathWorks_Combined | | Distrib_Computing_Toolbox | 2020-12-11 11:18:01 AM | aaron.sim... | oit-1018 | Aaron Simpson | aaron.simpson@open... |

Go to page: 1 Show rows: 10 1-10 of 52

To warn users when they forget to shut down an application, alerting is configured in dashboards. This can be set up to email the user whenever the license is checked out for more than e.g., 8 hour

Optimization: Avoid unnecessary sessions

Product: MathWorks_Combined
Feature: MATLAB

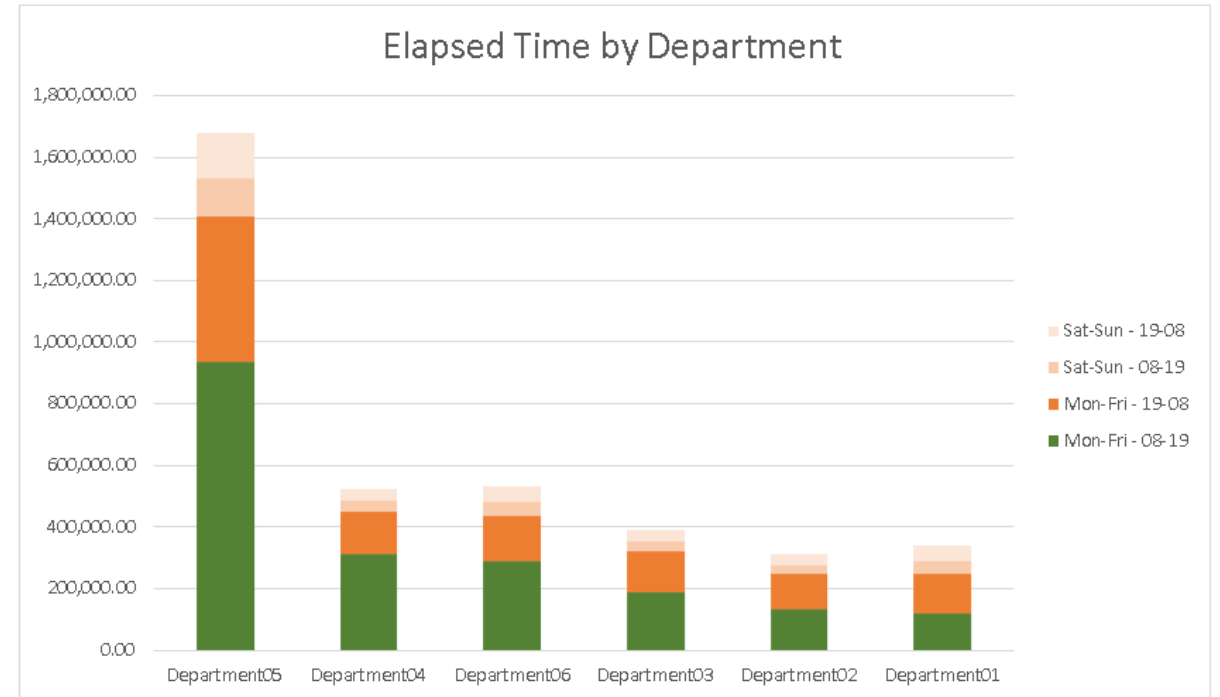
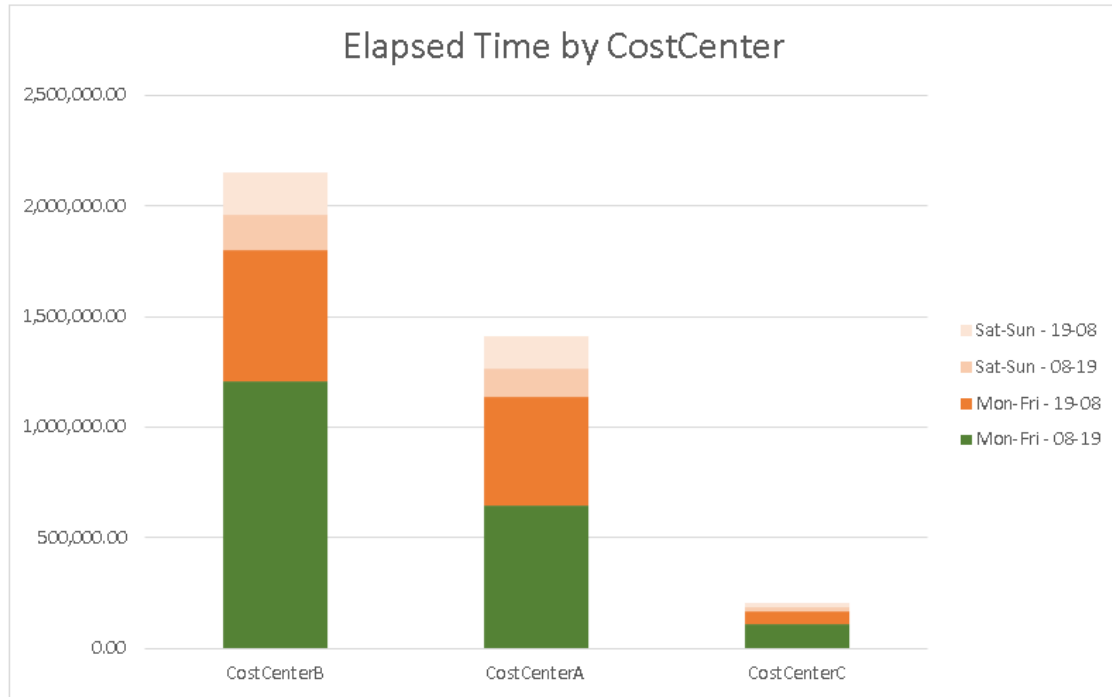
Year: 2018
Month: May

Max available: 20000
Max in use: 172

Within 99% use*: 159
Within 95% use*: 149

| Max in use | | | | | | | | | | | | | | | | | | | | | | | | | |
|------------|----|----|----|----|----|----|----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|----|----|----|
| Day/Hour | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | |
| 1 | 84 | 88 | 84 | 80 | 79 | 79 | 78 | 85 | 109 | 132 | 141 | 149 | 139 | 132 | 143 | 143 | 144 | 142 | 131 | 105 | 86 | 84 | 83 | 81 | |
| 2 | 83 | 84 | 84 | 84 | 81 | 81 | 81 | 89 | 114 | 136 | 144 | 151 | 152 | 148 | 159 | 162 | 152 | 143 | 141 | 106 | 97 | 92 | 91 | 90 | |
| 3 | 93 | 92 | 88 | 87 | 86 | 86 | 86 | 95 | 117 | 141 | 143 | 146 | 146 | 144 | 143 | 148 | 145 | 139 | 130 | 101 | 89 | 86 | 86 | 85 | |
| 4 | 85 | 83 | 82 | 82 | 82 | 80 | 79 | 86 | 103 | 131 | 143 | 142 | 137 | 137 | 135 | 141 | 138 | 127 | 109 | 83 | 74 | 69 | 70 | 70 | |
| 5 | 70 | 69 | 68 | 66 | 69 | 69 | 69 | 69 | 69 | 69 | 68 | 68 | 68 | 68 | 68 | 67 | 67 | 67 | 66 | 66 | 66 | 69 | 69 | 66 | |
| 6 | 66 | 69 | 69 | 65 | 64 | 64 | 64 | 64 | 64 | 64 | 65 | 64 | 64 | 64 | 64 | 64 | 64 | 64 | 64 | 64 | 65 | 67 | 66 | 65 | |
| 7 | 64 | 4 | 68 | 65 | 65 | 65 | 65 | 71 | 77 | 87 | 98 | 99 | 97 | 94 | 94 | 93 | 91 | 92 | 87 | 79 | 78 | 80 | 79 | 77 | |
| 8 | 76 | 79 | 79 | 76 | 76 | 76 | 76 | 83 | 101 | 129 | 136 | 144 | 137 | 140 | 140 | 140 | 135 | 129 | 126 | 93 | 84 | 81 | 78 | 78 | |
| 9 | 75 | 79 | 79 | 77 | 73 | 74 | 74 | 80 | 104 | 125 | 144 | 148 | 155 | 148 | 149 | 149 | 149 | 146 | 134 | 109 | 90 | 87 | 88 | 88 | |
| 10 | 85 | 88 | 88 | 85 | 83 | 84 | 83 | 92 | 117 | 133 | 140 | 142 | 144 | 144 | 157 | 154 | 140 | 141 | 128 | 108 | 91 | 84 | 83 | 82 | |
| 11 | 79 | 83 | 83 | 82 | 81 | 80 | 81 | 86 | 108 | 138 | 152 | 161 | 163 | 154 | 161 | 161 | 158 | 153 | 136 | 109 | 96 | 88 | 85 | 84 | |
| 12 | 81 | 82 | 82 | 80 | 77 | 77 | 77 | 77 | 77 | 78 | 78 | 79 | 83 | 83 | 84 | 83 | 83 | 81 | 77 | 79 | 80 | 76 | 76 | 73 | |
| 13 | 74 | 76 | 76 | 74 | 72 | 72 | 72 | 72 | 73 | 73 | 74 | 75 | 73 | 70 | 70 | 69 | 67 | 68 | 68 | 71 | 72 | 72 | 71 | 70 | |
| 14 | 69 | 72 | 72 | 71 | 69 | 70 | 69 | 74 | 102 | 126 | 134 | 145 | 143 | 137 | 150 | 149 | 147 | 147 | 135 | 113 | 96 | 100 | 98 | 96 | |
| 15 | 93 | 95 | 95 | 93 | 92 | 92 | 92 | 102 | 119 | 142 | 149 | 162 | 169 | 157 | 170 | 172 | 165 | 152 | 139 | 121 | 109 | 103 | 96 | 96 | |
| 16 | 98 | 99 | 99 | 97 | 96 | 97 | 99 | 111 | 126 | 144 | 149 | 155 | 156 | 155 | 162 | 164 | 166 | 161 | 140 | 117 | 100 | 89 | 83 | 82 | |
| 17 | 80 | 83 | 83 | 81 | 79 | 79 | 80 | 82 | 105 | 125 | 126 | 133 | 137 | 129 | 136 | 140 | 137 | 132 | 125 | 87 | 79 | 77 | 77 | 76 | |
| 18 | 73 | 73 | 73 | 72 | 71 | 71 | 71 | 84 | 107 | 126 | 125 | 122 | 121 | 122 | 128 | 128 | 125 | 115 | 103 | 80 | 62 | 61 | 59 | 57 | |
| 19 | 55 | 55 | 53 | 53 | 56 | 55 | 53 | 53 | 54 | 54 | 53 | 54 | 54 | 55 | 55 | 56 | 54 | 53 | 54 | 56 | 55 | 55 | 54 | 54 | |
| 20 | 54 | 57 | 56 | 54 | 52 | 52 | 52 | 52 | 52 | 52 | 52 | 52 | 52 | 52 | 52 | 52 | 53 | 55 | 56 | 55 | 54 | 55 | 57 | 58 | 56 |
| 21 | 54 | 55 | 54 | 55 | 55 | 55 | 54 | 68 | 90 | 120 | 122 | 142 | 140 | 136 | 139 | 146 | 144 | 144 | 133 | 109 | 87 | 83 | 83 | 79 | |
| 22 | 77 | 80 | 80 | 82 | 81 | 79 | 76 | 87 | 109 | 124 | 128 | 132 | 133 | 126 | 135 | 136 | 131 | 126 | 117 | 94 | 88 | 87 | 83 | 80 | |
| 23 | 79 | 80 | 80 | 76 | 77 | 77 | 78 | 90 | 116 | 139 | 150 | 155 | 159 | 149 | 153 | 155 | 157 | 145 | 129 | 106 | 99 | 98 | 93 | 89 | |
| 24 | 91 | 89 | 88 | 90 | 86 | 85 | 85 | 93 | 114 | 141 | 154 | 156 | 160 | 153 | 155 | 152 | 152 | 150 | 142 | 120 | 105 | 99 | 99 | 98 | |
| 25 | 93 | 96 | 96 | 93 | 91 | 91 | 92 | 100 | 125 | 149 | 149 | 157 | 162 | 160 | 157 | 159 | 150 | 146 | 127 | 92 | 81 | 78 | 77 | 77 | |
| 26 | 76 | 77 | 76 | 74 | 72 | 72 | 72 | 71 | 72 | 73 | 79 | 85 | 84 | 89 | 85 | 83 | 82 | 75 | 75 | 74 | 73 | 70 | 70 | 70 | |
| 27 | 71 | 73 | 73 | 71 | 70 | 70 | 69 | 70 | 70 | 71 | 70 | 70 | 71 | 72 | 71 | 72 | 69 | 64 | 63 | 63 | 58 | 58 | 58 | 58 | |
| 28 | 58 | 60 | 60 | 59 | 58 | 57 | 58 | 61 | 71 | 88 | 94 | 96 | 96 | 95 | 98 | 99 | 95 | 90 | 86 | 74 | 72 | 72 | 72 | 72 | |
| 29 | 72 | 76 | 76 | 74 | 71 | 70 | 70 | 76 | 103 | 124 | 130 | 136 | 135 | 136 | 144 | 145 | 143 | 131 | 124 | 109 | 93 | 89 | 90 | 86 | |
| 30 | 84 | 87 | 86 | 85 | 84 | 83 | 83 | 84 | 108 | 140 | 140 | 140 | 143 | 150 | 149 | 150 | 142 | 142 | 125 | 113 | 87 | 84 | 82 | 80 | |
| 31 | 79 | 82 | 81 | 81 | 78 | 77 | 78 | 87 | 99 | 116 | 122 | 127 | 129 | 137 | 145 | 143 | 138 | 133 | 125 | 93 | 76 | 72 | 71 | 72 | |

Optimization: Usage outside working hours by Business Units



Usage falling outside of working hours (2018-01:2018-08)

Optimization: Effect of Long Sessions to Cost



MathWorks Prorated Users

Shows Utilization based on the User Equivalent the new Pay-per-use Agreement of MathWorks

Elapsed Time Trend



| Application | Company | User | Time | Full User Count | Cost |
|----------------------------|---------|------|-----------------|-----------------|--------------------|
| Control_Toolbox | Total | | 231.8 | 2.13 | £ 612.00 |
| Database_Toolbox | Total | | 20.3 | 0.38 | £ 108.00 |
| Dial_and_Gauge_Blocks | Total | | 31.7 | 0.38 | |
| Identification_Toolbox | Total | | 304.3 | 2.75 | £ 792.00 |
| Image_Toolbox | Total | | 207.2 | 1.00 | £ 288.00 |
| MATLAB | Total | | 14,966.3 | 29.75 | £ 17,136.00 |
| Optimization_Toolbox | Total | | 700.3 | 2.19 | £ 735.00 |
| Power_System_Blocks | Total | | 12.2 | 0.19 | £ 156.15 |
| Signal_Toolbox | Total | | 1,986.3 | 2.13 | £ 612.00 |
| SIMULINK | Total | | 2,675.0 | 10.06 | £ 8,694.00 |
| Simulink_Control_Design | Total | | 133.2 | 1.19 | £ 399.00 |
| Simulink_Design_Optim | Total | | 12.0 | 0.19 | £ 63.00 |
| SL_Verification_Validation | Total | | 27.3 | 0.38 | £ 216.00 |
| Stateflow | Total | | 190.7 | 1.94 | £ 1,613.55 |
| Statistics_Toolbox | Total | | 406.2 | 2.19 | £ 630.00 |
| Symbolic_Toolbox | Total | | 19.3 | 0.38 | £ 108.00 |
| Grand Total | | | 21,640.3 | 54.31 | £ 31,442.70 |



MathWorks Prorated Users

Shows Utilization based on the User Equivalent the new Pay-per-use Agreement of MathWorks

Elapsed Time Trend



| Application | Company | User | Time | Full User Count | Cost |
|----------------------------|---------|------|----------------|-----------------|--------------------|
| Control_Toolbox | Total | | 145.8 | 1.56 | £ 450.00 |
| Database_Toolbox | Total | | 12.2 | 0.19 | £ 54.00 |
| Dial_and_Gauge_Blocks | Total | | 8.0 | 0.19 | |
| Identification_Toolbox | Total | | 90.2 | 1.50 | £ 432.00 |
| Image_Toolbox | Total | | 176.0 | 1.00 | £ 288.00 |
| MATLAB | Total | | 6,403.8 | 21.59 | £ 12,438.00 |
| Optimization_Toolbox | Total | | 483.7 | 1.38 | £ 462.00 |
| Signal_Toolbox | Total | | 727.2 | 1.75 | £ 504.00 |
| SIMULINK | Total | | 1,172.3 | 6.75 | £ 5,832.00 |
| Simulink_Control_Design | Total | | 101.2 | 1.19 | £ 399.00 |
| Simulink_Design_Optim | Total | | 12.0 | 0.19 | £ 63.00 |
| SL_Verification_Validation | Total | | 23.3 | 0.38 | £ 216.00 |
| Stateflow | Total | | 71.5 | 0.94 | £ 780.75 |
| Statistics_Toolbox | Total | | 191.3 | 1.94 | £ 558.00 |
| Symbolic_Toolbox | Total | | 17.7 | 0.38 | £ 108.00 |
| Grand Total | | | 9,636.2 | 40.91 | £ 22,584.75 |

28%

COST SAVINGS
if usage outside
primetime is
excluded



No double counting of Users

| Full Users | | Product | | | |
|---------------------------|----------------------|------------------------|------------------------|--------------------|------|
| Application Name | User Full Name | MathWorks [licserv001] | MathWorks [licserv002] | MathWorks_Combined | |
| Control_Toolbox | Betty Stone | 1.00 | | 1.00 | |
| | Beverly Weaver | 0.75 | | 0.75 | |
| | Clarence Carr | 0.75 | 0.38 | 1.00 | |
| | Arthur Fox | 0.19 | | 0.19 | |
| | Bruce Howard | 1.00 | | 1.00 | |
| | Debra Henderson | 1.00 | 0.19 | 1.00 | |
| Distrib_Computing_Toolbox | Betty Crawford | 0.19 | | 0.19 | |
| | Betty Stone | 1.00 | | 1.00 | |
| | Clarence Carr | 0.38 | 0.38 | 0.75 | |
| | Amy Carroll | 1.00 | 0.19 | 1.00 | |
| | Bruce Howard | 1.00 | 0.19 | 1.00 | |
| | Debra Henderson | 1.00 | | 1.00 | |
| MATLAB | Betty Crawford | 1.00 | 0.09 | 1.00 | |
| | Betty Stone | 1.00 | 1.00 | 1.00 | |
| | Beverly Weaver | 1.00 | 0.09 | 1.00 | |
| | Clarence Carr | 1.00 | 0.19 | 1.00 | |
| | Amy Carroll | 1.00 | 0.09 | 1.00 | |
| | Angela Chavez | 1.00 | 0.09 | 1.00 | |
| | Arthur Fox | 1.00 | 0.09 | 1.00 | |
| | Bruce Howard | 1.00 | 0.09 | 1.00 | |
| | Carlos Robertson | 1.00 | 0.38 | 1.00 | |
| | Catherine Powell | 1.00 | 1.00 | 1.00 | |
| | Cheryl Mills | 1.00 | 0.09 | 1.00 | |
| | Debra Henderson | 1.00 | 0.19 | 1.00 | |
| | Optimization_Toolbox | Betty Stone | 0.75 | | 0.75 |
| | | Clarence Carr | 0.38 | | 0.38 |
| Arthur Fox | | 1.00 | | 1.00 | |
| Bruce Howard | | 0.38 | | 0.38 | |
| Debra Henderson | | 1.00 | 0.19 | 1.00 | |
| Signal_Blocks | Betty Crawford | 1.00 | | 1.00 | |
| | Betty Stone | 1.00 | 1.00 | 1.00 | |
| | Beverly Weaver | 0.38 | | 0.38 | |
| | Bruce Howard | 1.00 | | 1.00 | |
| Signal_Toolbox | Betty Crawford | 1.00 | | 1.00 | |
| | Betty Stone | 1.00 | 1.00 | 1.00 | |

Combining License managers (product-mapping) ensure that users are only counted once

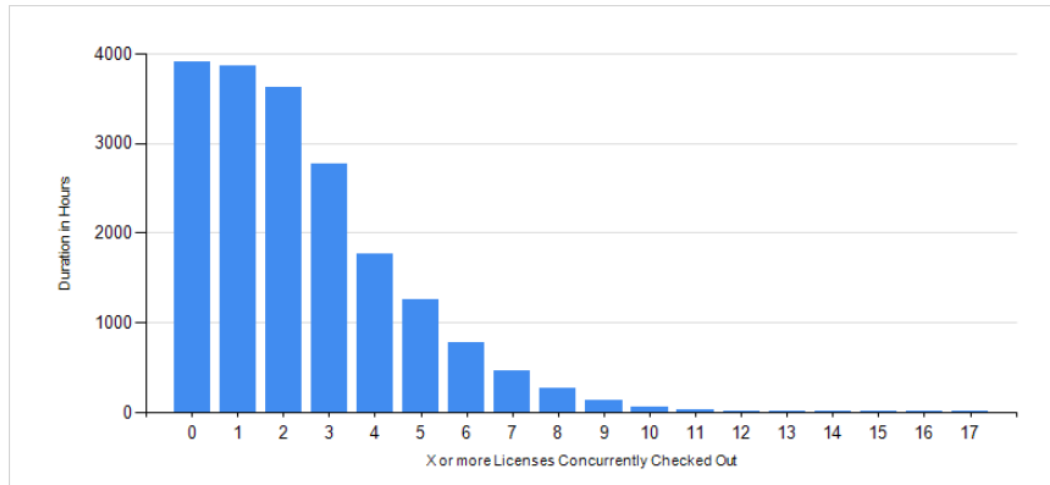


Optimization: User Capping

Query Period: from 2011-02-28 00:00 to 2011-05-24 00:00

License Efficiency Chart: Matlab_Combined

| Application Name | Max Available | Max In Use | Within 99% use ¹ | Within 95% use ¹ |
|------------------|---------------|------------|-----------------------------|-----------------------------|
| MATLAB | 33 | 17 | 10 | 8 |

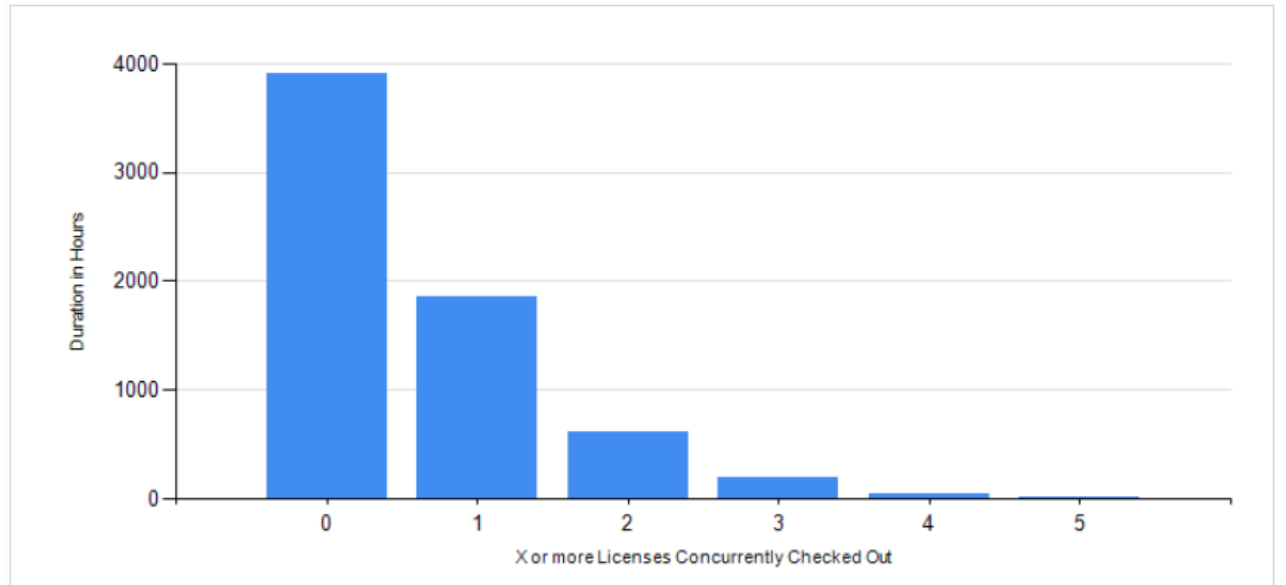


| | Minimum # of Licenses ² | Duration in Hours | Duration in % of Total |
|----|------------------------------------|-------------------|------------------------|
| | MATLAB | 17 | 0.33 |
| 16 | | 1.67 | 0.04 % |
| 15 | | 2.33 | 0.06 % |
| 14 | | 5.67 | 0.14 % |
| 13 | | 9.67 | 0.25 % |
| 12 | | 14.50 | 0.37 % |
| 11 | | 27.83 | 0.71 % |
| 10 | | 62.33 | 1.59 % |
| 9 | | 127.83 | 3.27 % |
| 8 | | 266.17 | 6.81 % |
| 7 | | 458.83 | 11.73 % |
| 6 | 780.50 | 19.96 % | |

Query Period: from 2011-02-28 00:00 to 2011-05-24 00:00

License Efficiency Chart: Matlab_Combined

| Application Name | Max Available | Max In Use | Within 99% use ¹ | Within 95% use ¹ |
|------------------|---------------|------------|-----------------------------|-----------------------------|
| SIMULINK | 18 | 5 | 4 | 2 |



| | Minimum # of Licenses ² | Duration in Hours | Duration in % of Total |
|---|------------------------------------|-------------------|------------------------|
| | SIMULINK | 5 | 13.67 |
| 4 | | 47.33 | 1.21 % |
| 3 | | 188.17 | 4.81 % |
| 2 | | 609.33 | 15.59 % |



TWO-PART WEBINAR

PART 1

MathWorks Toolboxes: How to Optimize in any Licensing Model

Questions?

Next Steps

Don't miss our final session in this series!

Part 1

**MathWorks Toolboxes:
How to Optimize in any
Licensing Model**

Part 2

**Implement a Cost
Reduction Strategy for
your MathWorks
Toolboxes**

<https://bit.ly/MathWorks-Part2>

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