Stratasys Streamline Pro Cybersecurity

July 2024

Stratasys Cybersecurity

Stratasys is leading the Additive Manufacturing industry in producing solutions that address today's critical and ever-changing cybersecurity threats. The Stratasys IT organization is ISO 27001 certified, and we continue to invest to insure the most secure solutions in the 3D printing market for the future.

Stratasys has implemented reasonable administrative, technical and physical safeguards to help protect against security incidents and privacy breaches involving a Stratasys product, provided those products are used in accordance with Stratasys instructions for use. However, as systems and threats evolve, no system can be protected against all vulnerabilities, and we consider our customers the most important partner in maintaining security and privacy safeguards. If you have any concerns, we ask that you bring them to our attention, and we will investigate. Where appropriate, we will address the issue of product changes, technical bulletins and/or responsible disclosures to customers and regulators.

Secure Software Development Lifecycle for Streamline Pro Software

Stratasys Software implements security measures across: Software development, Infrastructure setup, Identity Management, and Security Operations.

Our security practices also include an S-SDLC which utilizes a wide range of policies and tools involving secure architecture assessments, Static Application Security Testing (SAST), Dynamic Application Security Testing (DAST), Supply Chain vulnerability checks (SCA), Penetration testing and participation in the HackerOne bug bounty program.

GrabCAD Streamline Pro Control

Overview

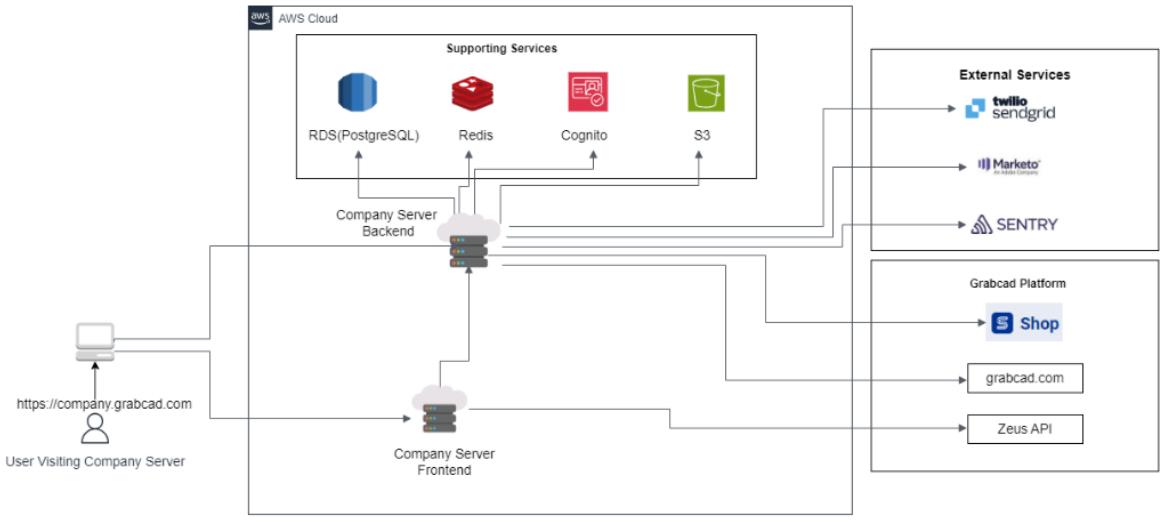
GrabCAD Control is the administrative portal for GrabCAD Streamline Pro and the GrabCAD AM Platform. It provides control over printers, gateways, users and access control through user groups, printer groups and license management.

Features

- More control over user onboarding and offboarding.
- Prevent unauthorized access to 3D printers and reduce business interruptions.
- Companies - have associated users, licenses, printers and applications and more.
- User Management.
- User Groups.
- License Management.

System Diagram

Authentication & Authorization



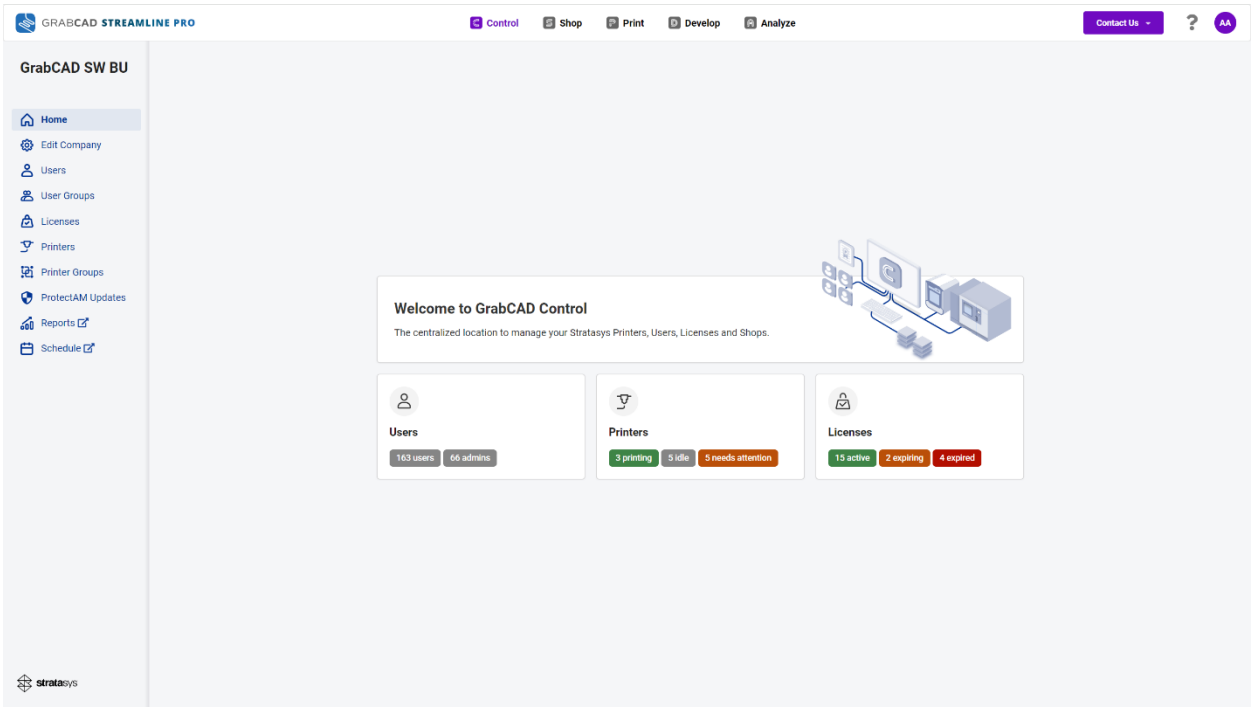
Authentication

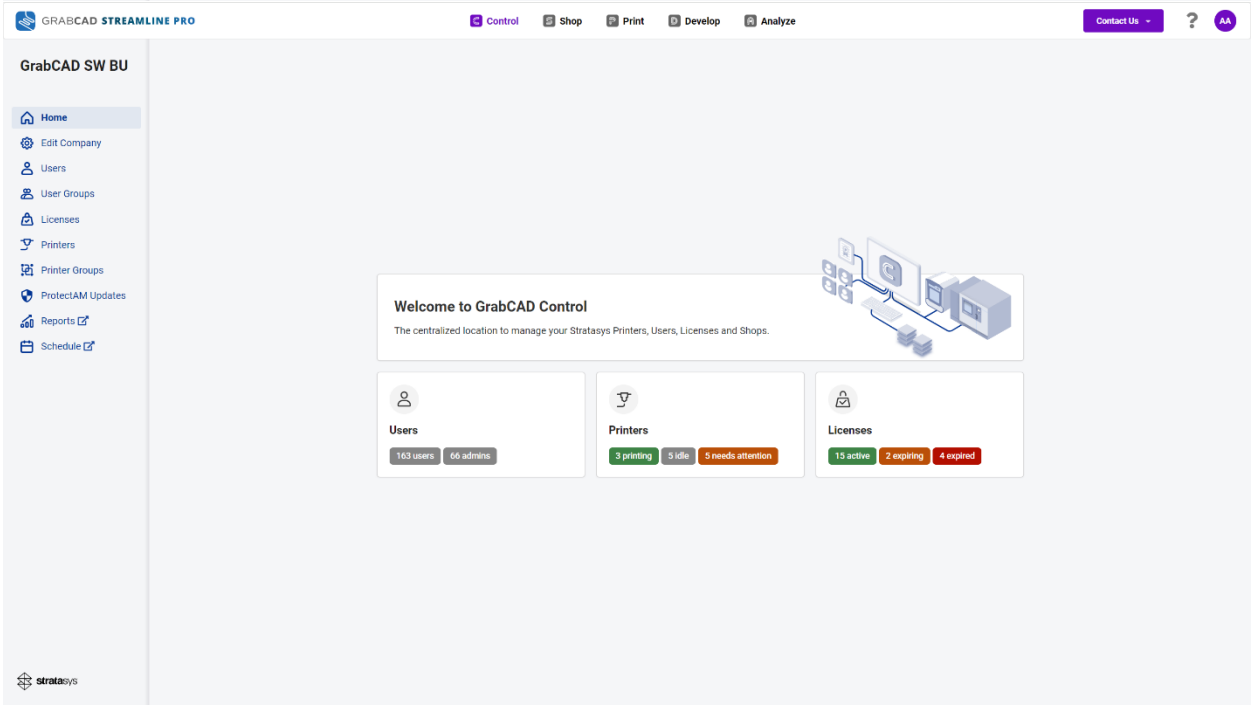
- AWS Cognito as an Identity Provider for enterprise users.
- Legacy grabcad.com as an Identity Provider for community users.
- User tokens are JWT (JSON Web Token) based on Elliptic Curve Digital Signature Algorithm with the P-256 curve and the SHA-256 hash function (ES256).
- Users are routed to AWS Cognito or legacy grabcad.com Identity Provider API's depending on their email address.
- Some of the authentication controls include: a strong password policy, reCAPTCHA, and the option to use multi-factor authentication (MFA), which is mandatory for admin-level users.

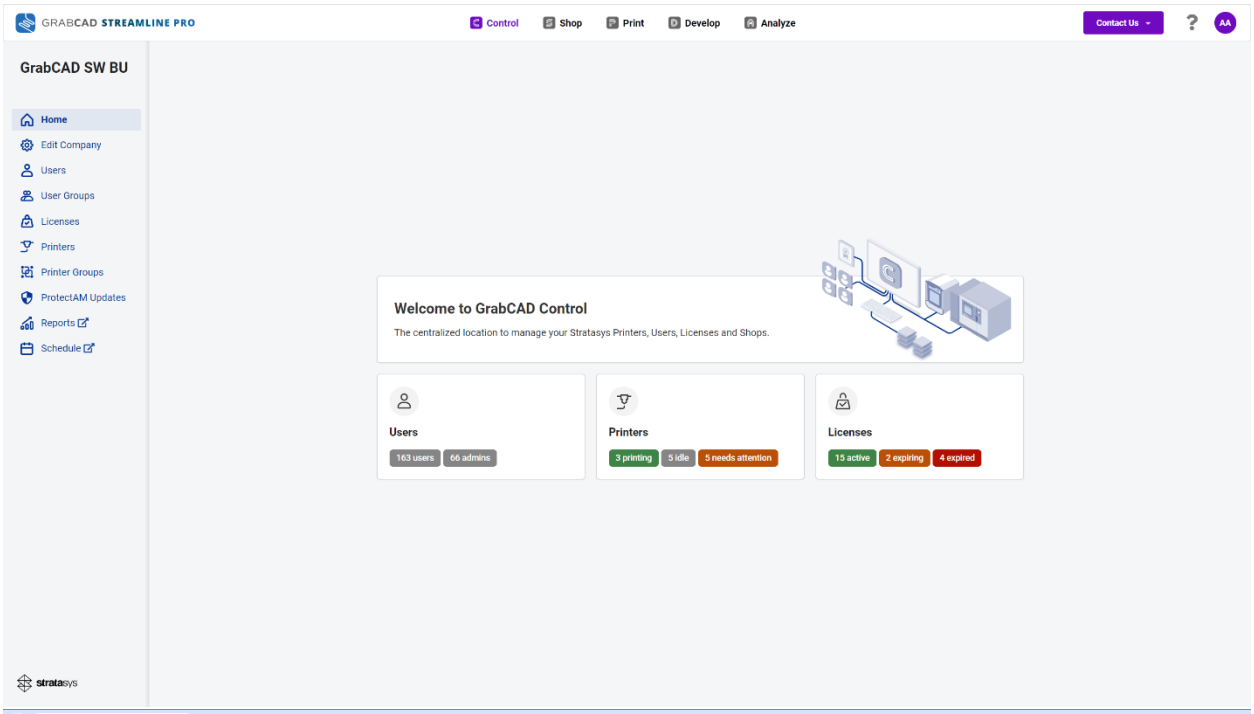
Authorization

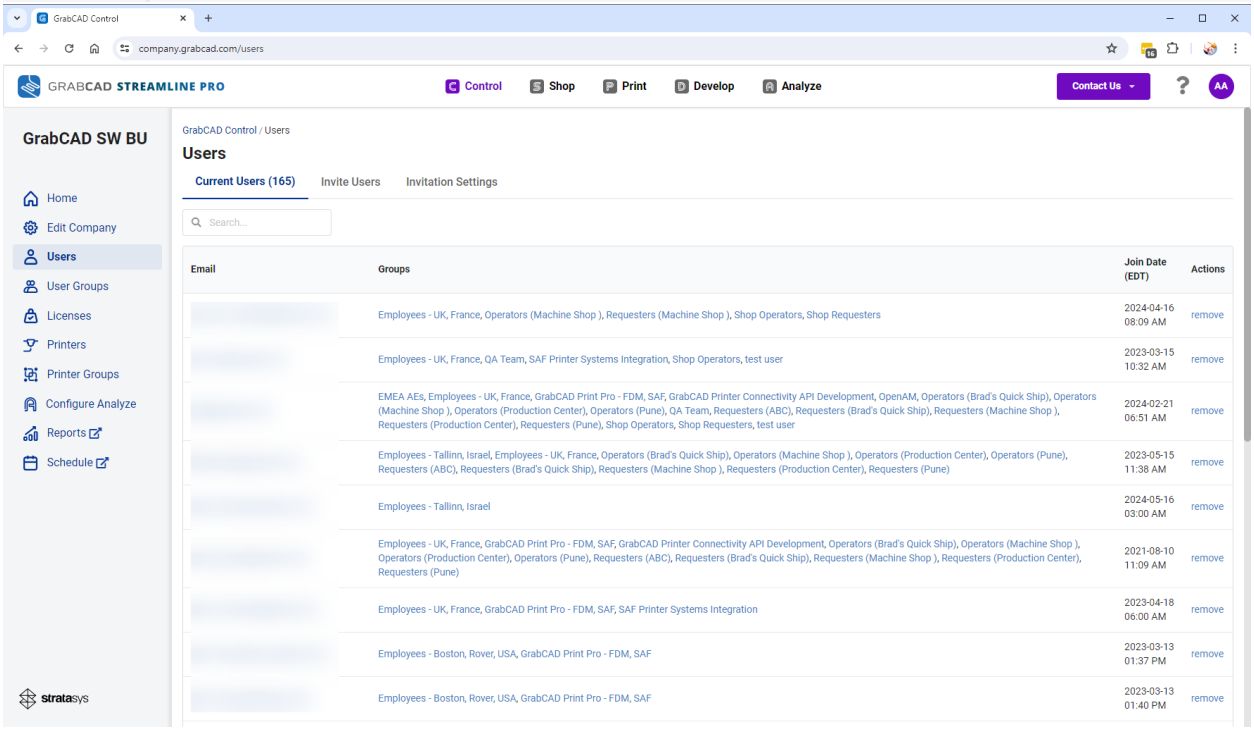
- User types:
    - Company Admins - users that have admin rights to a company. They can for example invite and delete other users, assign licenses, create shop instances and control access to printers.
    - Global Admins - Stratasys internal support users.
    - Users - users that can be associated with a Company. Some users are not associated with any companies as they may for example have been invited to a Company but not accepted this invitation. A small proportion may be associated with multiple companies, but this is unusual.
- Users are granted roles via the User Groups that they are members of. When an admin grants a role to a user group, a Group Role is constructed. This entity contains the id of the User Group, the id of the Application and the id of the Application Role being granted.
- When a user is granted a role in such a way, they also consume a seat of the license corresponding to the application in question. This is a second way of consuming a license seat as opposed to assigning the user group to the license directly.
- The user cannot access any data from a company with which he is not associated.

Screenshots






GRABCAD STREAMLINE PRO
Control
Shop
Print
Develop
Analyze
Contact Us
AA
GrabCAD SW BU
Home
Edit Company
Users
User Groups
Licenses
Printers
Printer Groups
ProtectAM Updates
Reports
Schedule
Welcome to GrabCAD Control
The centralized location to manage your Stratasys Printers, Users, Licenses and Shops.
Users
163 users
66 admins
Printers
3 printing
5 idle
5 needs attention
Licenses
15 active
2 expiring
4 expired
stratasys


GrabCAD Control
company.grabcad.com/users
GRABCAD STREAMLINE PRO
Control
Shop
Print
Develop
Analyze
Contact Us
AA
GrabCAD SW BU
Home
Edit Company
Users
User Groups
Licenses
Printers
Printer Groups
Configure Analyze
Reports
Schedule
stratasys
GrabCAD Control / Users
Users
Current Users (165)
Invite Users
Invitation Settings
Search...
Email
Groups
Join Date (EDT)
Actions
Employees - UK, France, Operators (Machine Shop), Requesters (Machine Shop), Shop Operators, Shop Requesters
2024-04-16 08:09 AM
remove
Employees - UK, France, QA Team, SAF Printer Systems Integration, Shop Operators, test user
2023-03-15 10:32 AM
remove
EMEA AEs, Employees - UK, France, GrabCAD Print Pro - FDM, SAF, GrabCAD Printer Connectivity API Development, OpenAM, Operators (Brad's Quick Ship), Operators (Machine Shop), Operators (Production Center), Operators (Pune), QA Team, Requesters (ABC), Requesters (Brad's Quick Ship), Requesters (Machine Shop), Requesters (Production Center), Requesters (Pune), Shop Operators, Shop Requesters, test user
2024-02-21 06:51 AM
remove
Employees - Tallinn, Israel, Employees - UK, France, Operators (Brad's Quick Ship), Operators (Machine Shop), Operators (Production Center), Operators (Pune), Requesters (ABC), Requesters (Brad's Quick Ship), Requesters (Machine Shop), Requesters (Production Center), Requesters (Pune)
2023-05-15 11:38 AM
remove
Employees - Tallinn, Israel
2024-05-16 03:00 AM
remove
Employees - UK, France, GrabCAD Print Pro - FDM, SAF, GrabCAD Printer Connectivity API Development, Operators (Brad's Quick Ship), Operators (Machine Shop), Operators (Production Center), Operators (Pune), Requesters (ABC), Requesters (Brad's Quick Ship), Requesters (Machine Shop), Requesters (Production Center), Requesters (Pune)
2021-08-10 11:09 AM
remove
Employees - UK, France, GrabCAD Print Pro - FDM, SAF, SAF Printer Systems Integration
2023-04-18 06:00 AM
remove
Employees - Boston, Rover, USA, GrabCAD Print Pro - FDM, SAF
2023-03-13 01:37 PM
remove
Employees - Boston, Rover, USA, GrabCAD Print Pro - FDM, SAF
2023-03-13 01:40 PM
remove

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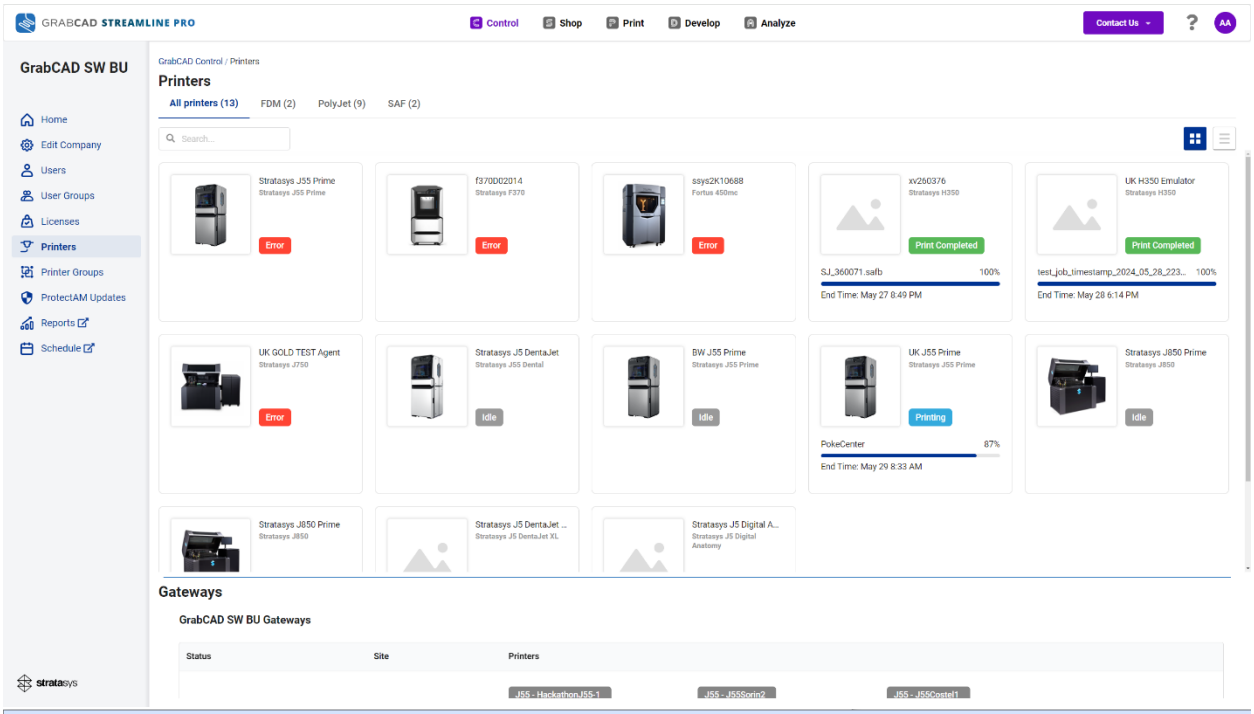
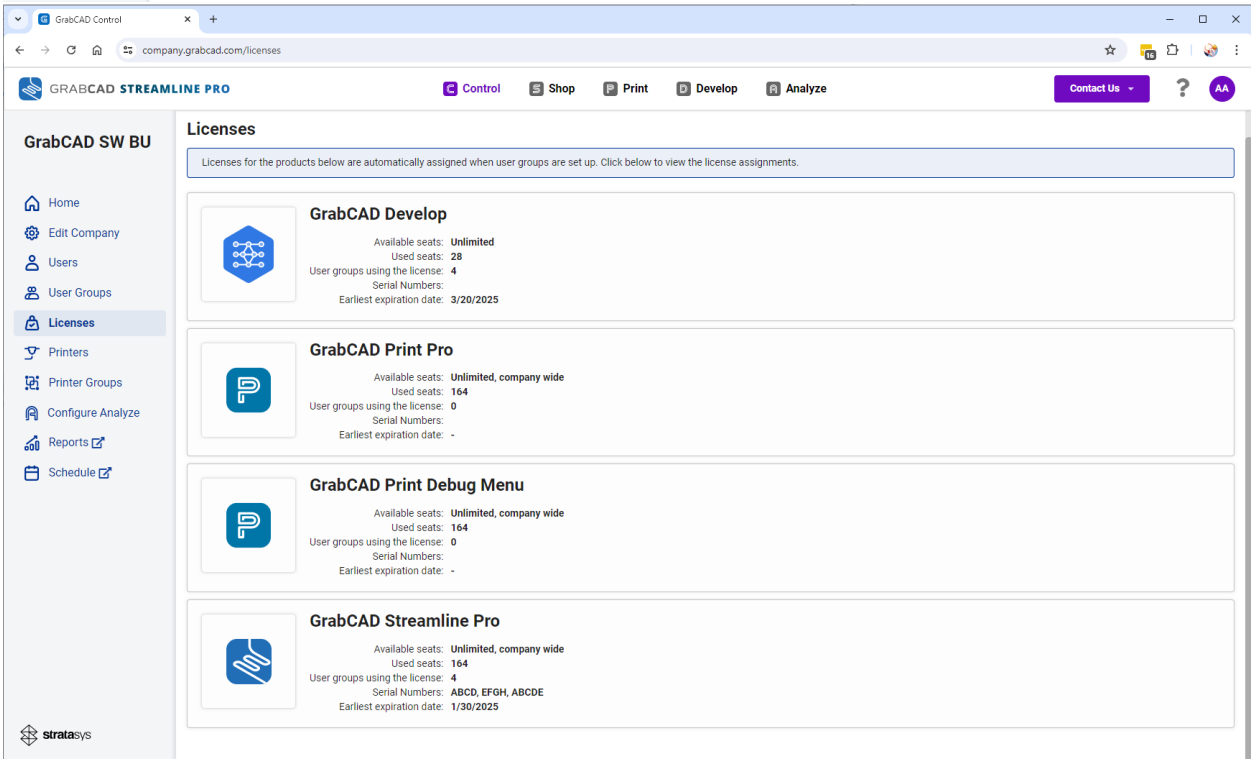

GRABCAD STREAMLINE PRO
Control
Shop
Print
Develop
Analyze
Contact Us
GrabCAD SW BU
GrabCAD Control / Printers
Printers
All printers (13)
FDM (2)
PolyJet (9)
SAF (2)
Home
Edit Company
Users
User Groups
Licenses
Printers
Printer Groups
ProtectAM Updates
Reports
Schedule
Stratasys J55 Prime
Error
f370D02014
Error
ssys2K10688
Error
xv260376
Print Completed
SJ_360071.safb
100%
End Time: May 27 8:49 PM
UK H350 Emulator
Print Completed
test_job_timestamp_2024_05_28_223...
100%
End Time: May 28 6:14 PM
UK GOLD TEST Agent
Error
Stratasys J5 DentaJet
Idle
BW J55 Prime
Idle
UK J55 Prime
Printing
PokeCenter
87%
End Time: May 29 8:33 AM
Stratasys J850 Prime
Idle
Stratasys J850 Prime
Stratasys J5 DentaJet ...
Stratasys J5 Digital A...
Gateways
GrabCAD SW BU Gateways
Status
Site
Printers


GrabCAD Control
company.grabcad.com/licenses
GRABCAD STREAMLINE PRO
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Print
Develop
Analyze
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GrabCAD SW BU
Home
Edit Company
Users
User Groups
Licenses
Printers
Printer Groups
Configure Analyze
Reports
Schedule
Licenses
Licenses for the products below are automatically assigned when user groups are set up. Click below to view the license assignments.
GrabCAD Develop
Available seats: Unlimited
Used seats: 28
User groups using the license: 4
Serial Numbers:
Earliest expiration date: 3/20/2025
GrabCAD Print Pro
Available seats: Unlimited, company wide
Used seats: 164
User groups using the license: 0
Serial Numbers:
Earliest expiration date: -
GrabCAD Print Debug Menu
Available seats: Unlimited, company wide
Used seats: 164
User groups using the license: 0
Serial Numbers:
Earliest expiration date: -
GrabCAD Streamline Pro
Available seats: Unlimited, company wide
Used seats: 164
User groups using the license: 4
Serial Numbers: ABCD, EFGH, ABCDE
Earliest expiration date: 1/30/2025

GrabCAD Streamline Pro Analyze

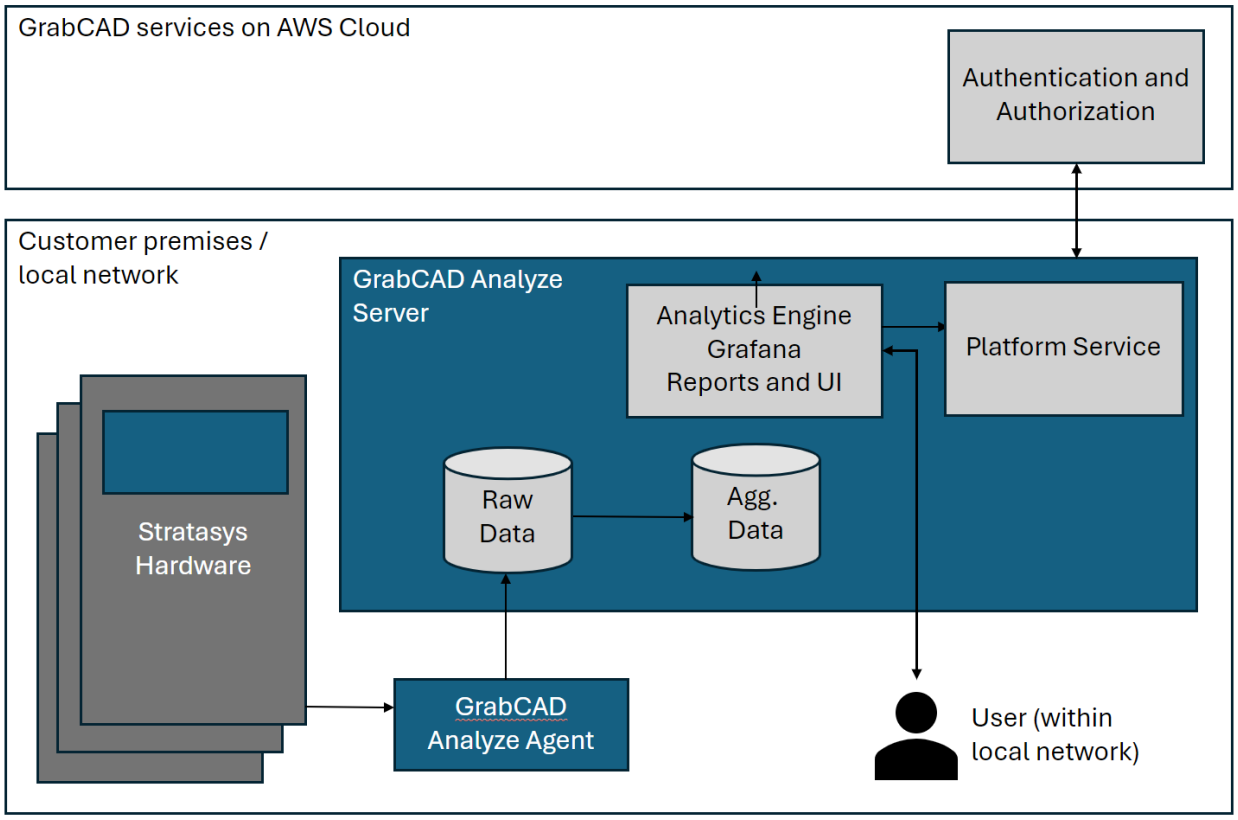
Overview

GrabCAD Analyze, an application within GrabCAD Streamline Pro, offers real-time and historical analytics on Stratasys printer and material utilization, as well as real-time printer availability and alerts. GrabCAD Analyze uses on-premises services to collect data at regular intervals from the printers and stores it in a local datastore. It then correlates, augments, and consolidates them in the form of dashboards and reports for users to consume.

Features

- Real-time printer monitoring and analytics
- Dashboards (System dashboards with customizable panels) to show machine utilization, material utilization and performance
- Alerts (system and custom) for various events and thresholds.

System Diagram



Main components:

- Analyze Agent: Windows service that collects data from the printers
- Analyze Server: Linux-based Server. The server contains the data store and the microservices required to process and present the data.

Both Analyze components are installed within the customer premises. GrabCAD Analyze services require the following network ports to be enabled:

Purpose	**Domain**	**Port**	**Protocol**
Analyze Server User Interface	Local Linux server	TCP/3000	HTTP
Analyze Admin Plugin	Local Linux server	TCP/9100	HTTP
Analyze Management Console	Local Linux server	TCP/9010	HTTP
Analyze Debug Console	Local Linux server	TCP/5601	HTTP
Analytics Agent	Local Windows server	TCP/5010	TCP
Authentication & Authorization	grabcad.com	TCP/443	HTTPS
Mail Notification	Local mail relay (optional)	TCP/25	SMTP

Authentication and Authorization

Authentication

- Same as GrabCAD Control (JSON Web Tokens issued by the GrabCAD Authentication system / AWS Cognito).
- Users can only be invited to customer's company accounts to access GrabCAD Analyze using their email address by an Administrators of the company account.
- Users log in at login.grabcad.com, obtain authentication tokens and are rerouted to their location installation of GrabCAD Analyze.
- APIs are used to retrieve user roles and validate licenses from the GrabCAD cloud (setup by administrators in GrabCAD Control).
- Connections to grabcad.com/GrabCAD cloud required at the time of launch for authentication and authorization (Port 443, see above).

User roles in GrabCAD Analyze include:

- Editor – Default non-admin role to create and edit the dashboards.
- Viewer – non-admin role to only view and interact with Analyze dashboards.
- Admin – Administrators in GrabCAD Control are administrators in Analyze. They can add printers, dashboards and modify other settings.

Data Collection

- Analyze server uses gathers printer data through the Analyze agent or through MT Connect protocols.
- Data is stored in a local database (raw data – stored for 30 days).
- Raw data is aggregated and stored in a local long-term storage.
- Analytics UI engine (Grafana) presents the data in the user interface and dashboards.

Types of Collected Data

- Personal data: Only login data (no personal information) is collected for authentication and authorization purposes.
- User submitted data: Name of the Printer, location and metadata regarding Printer are stored in the local Analyze database.
- Printer usage data: Data from Printers is collected and stored locally to provide statistics on printer availability, print job-related information, material consumption, printer tip and head life.

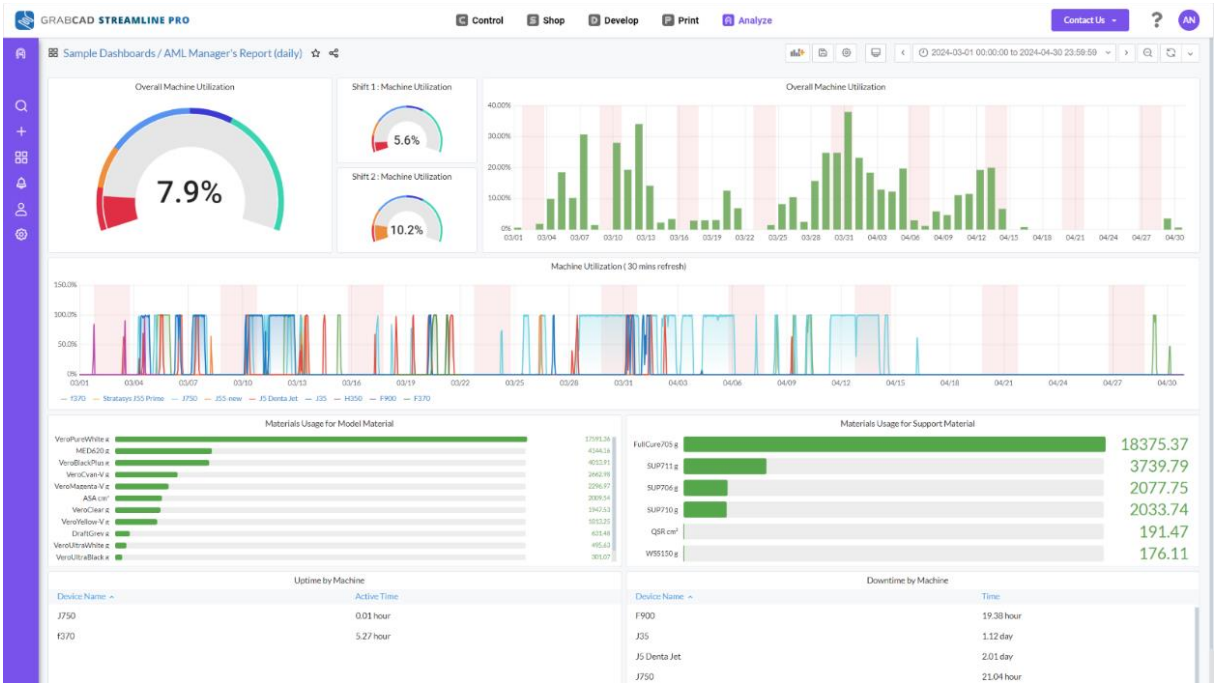
Data Storage and Data Access

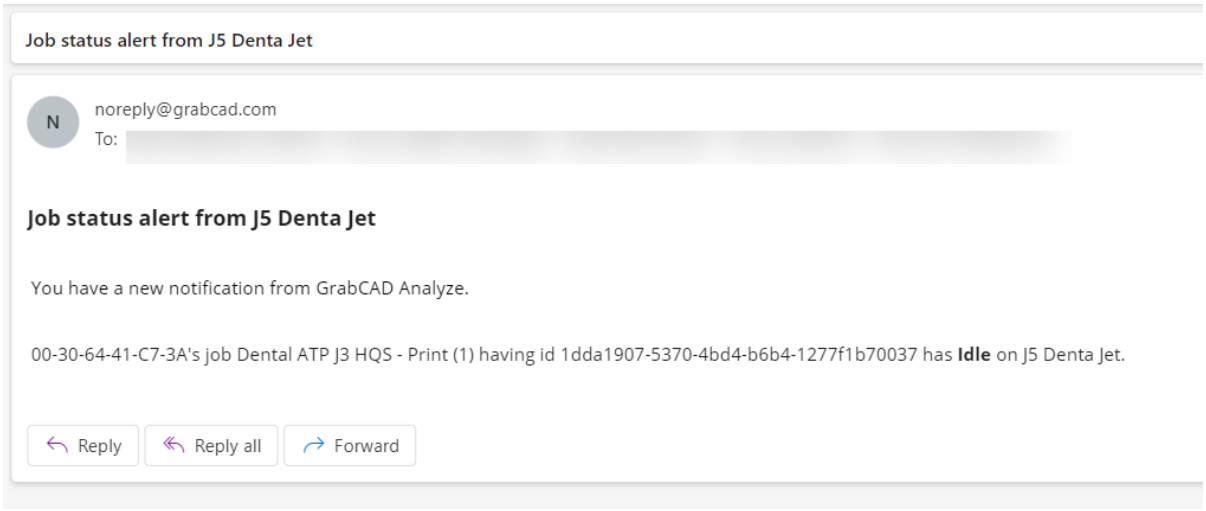
All user submitted data and printer usage data collected is stored in the local data store inside the customer network.

1. The raw data automatically purged every 30 days to optimize storage.

2. Aggregated data is stored for up to 5 years (configurable).

Screenshots





GrabCAD Streamline Pro Shop

Overview

GrabCAD Shop, a browser-based application within GrabCAD Streamline Pro, simplifies the 3D Printing order management workflow in internal model shops. Administrators can create virtual model shops with their 3D printers and invite Requesters and Operators to their Shop. Requesters (engineers, designers) can submit 3D printing requests with relevant files and metadata. Operators (printer operators, planners) can view, update, consolidate these requests, and communicate with Requesters.

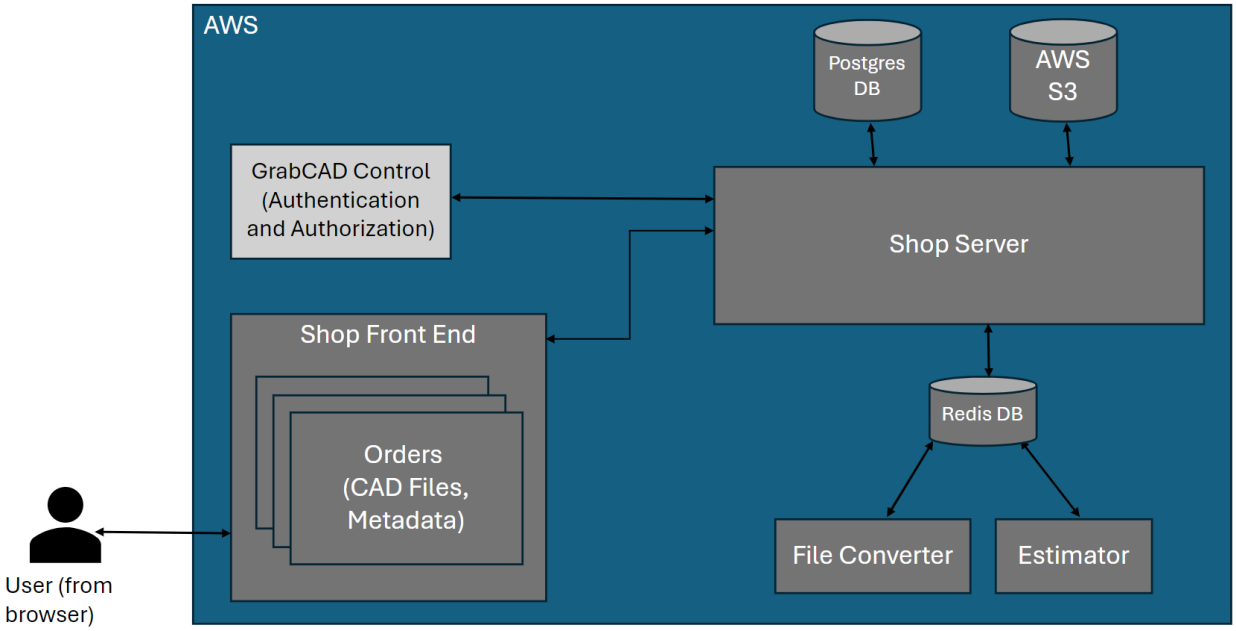
Features

- 3D printing requests (orders), with CAD files and other relevant information, in one place
- Tools to allow the operators to process, quote and fulfil orders.
- Automatic estimation and quoting of orders.
- Consolidation of orders for planning and printing purposes.

System Diagram

Main components:

- Shop Server (maintained by the Stratasys software team) facilitates adding and editing orders and is hosted in AWS.
- Orders and relevant metadata (CAD files, required printing technology, material, dates, quantities) submitted by requesters, are uploaded to AWS S3 buckets.
- File converter processes CAD Files to obtain thumbnail previews and size (bounding box) values.
- Estimator provides material and time estimates for a printer in the customer's Shop.
- A Redis database is used to manage queues to communicate with the File converter and Estimator.



Authentication & Authorization

Authentication

- Same as GrabCAD Control (JSON Web Tokens issued by the GrabCAD Authentication system / AWS Cognito).
- Users can only be invited to customer's company accounts to access GrabCAD Shop using their email address by an Administrators of the company account.
- Users log in at login.grabcad.com, obtain authentication tokens and are rerouted to GrabCAD Shop web pages.
- APIs are used to retrieve user roles and validate licenses from the GrabCAD cloud (setup by administrators in GrabCAD Control).

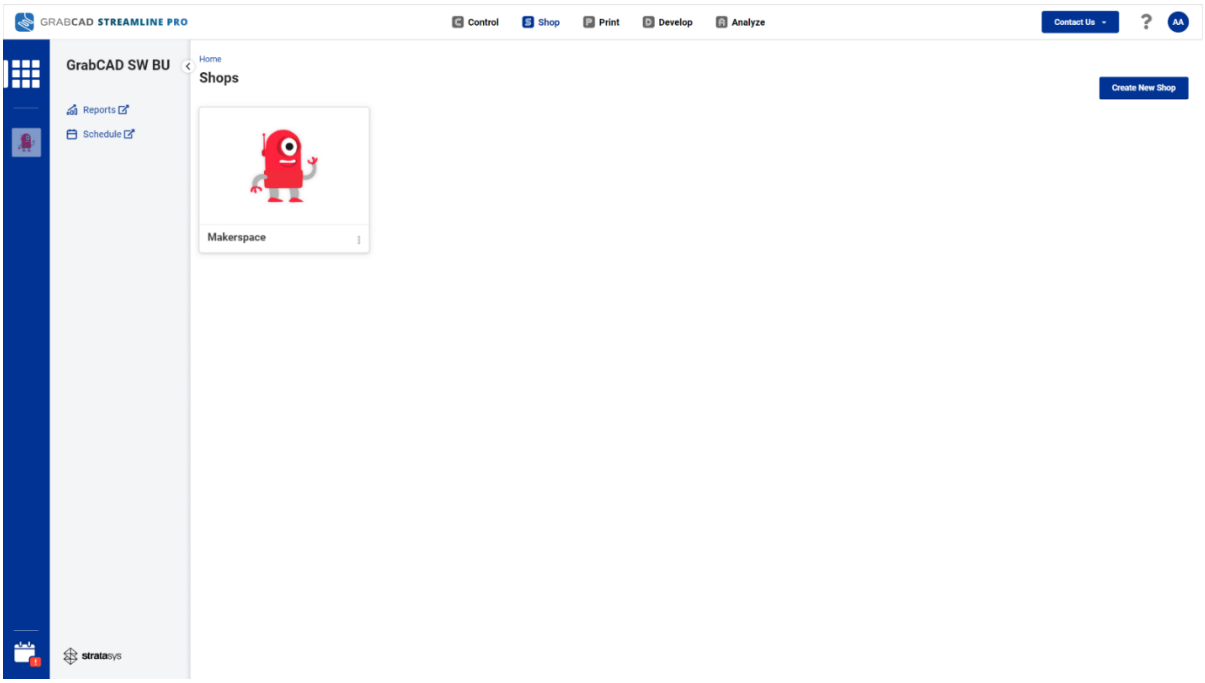
User roles and access in GrabCAD Shop:

- Administrator — Administrators in GrabCAD Control are also administrators in GrabCAD Shop. They oversee users, licenses, and creating the Shops.
- Operator - Non–admin role that can view, edit and fulfill all the orders that are submitted to the Shops they are invited to.
- Requester - non-admin role that can submit, view and edit only the orders they have submitted to their Shops.
- Only invited users and users with appropriate roles can view and access the data in their Shops. Users can be further restricted to only specific Shops in a company, and to roles within those Shops.

Data Collection

- Orders and relevant metadata are uploaded by requesters and stored in AWS S3.
- Order-related data, including file attributes and job attributes (such as previews, dates, desired printing technology, etc.), is managed in a Postgres database and protected by security middleware (GraphQL-Shield).
- Amazon Web Services (AWS) data is stored redundantly across multiple devices in distributed and environmentally controlled facilities. AWS infrastructure and controls are subject to annual
- SAS-70 Type II audits and AWS information security. AWS management processes and controls have achieved ISO 27001 certification.
- Encryption is utilized while data is in transit between the user's company network and AWS server. Data at rest is also encrypted.
- Time limited encrypted secure URLs are issued by the Shop server to allow only invited users to download the order data from a Shop.
- Administrators can revoke user access or delete Shops thereby removing access to the Shop and related data.
- On deletion of a shop, companies and Administrators can request all their data (CAD files, thumbnail previews and other data) to be deleted, by emailing shop@grabcad.com.

Screenshots



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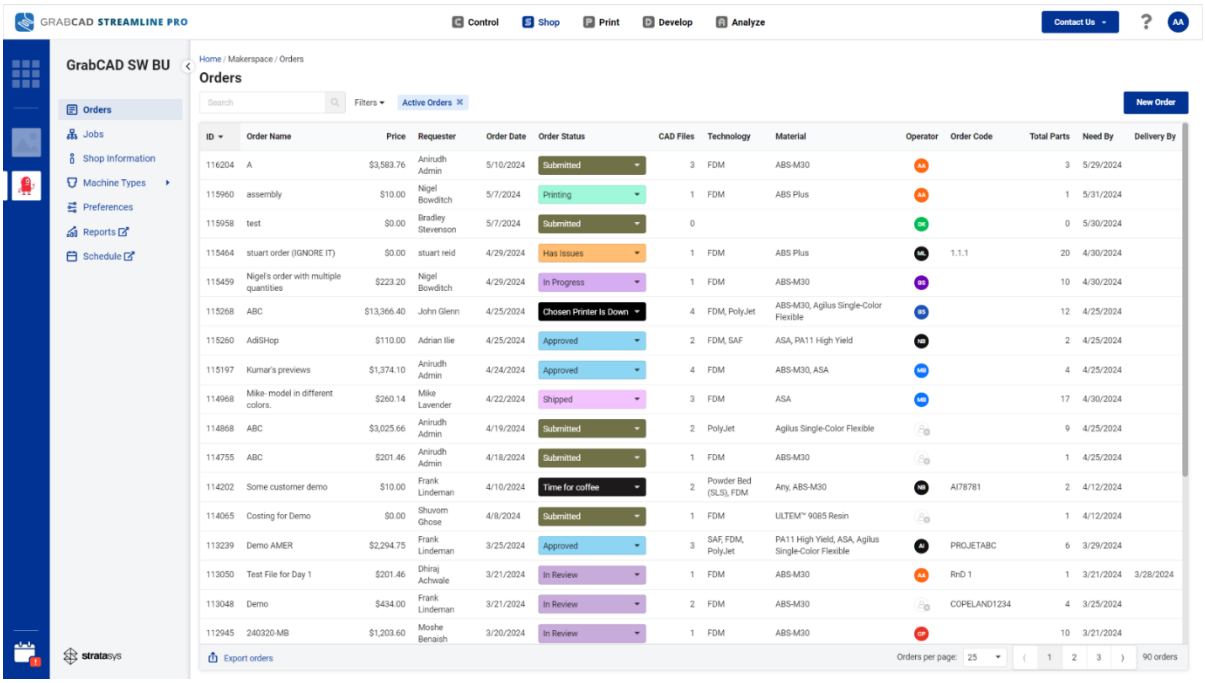
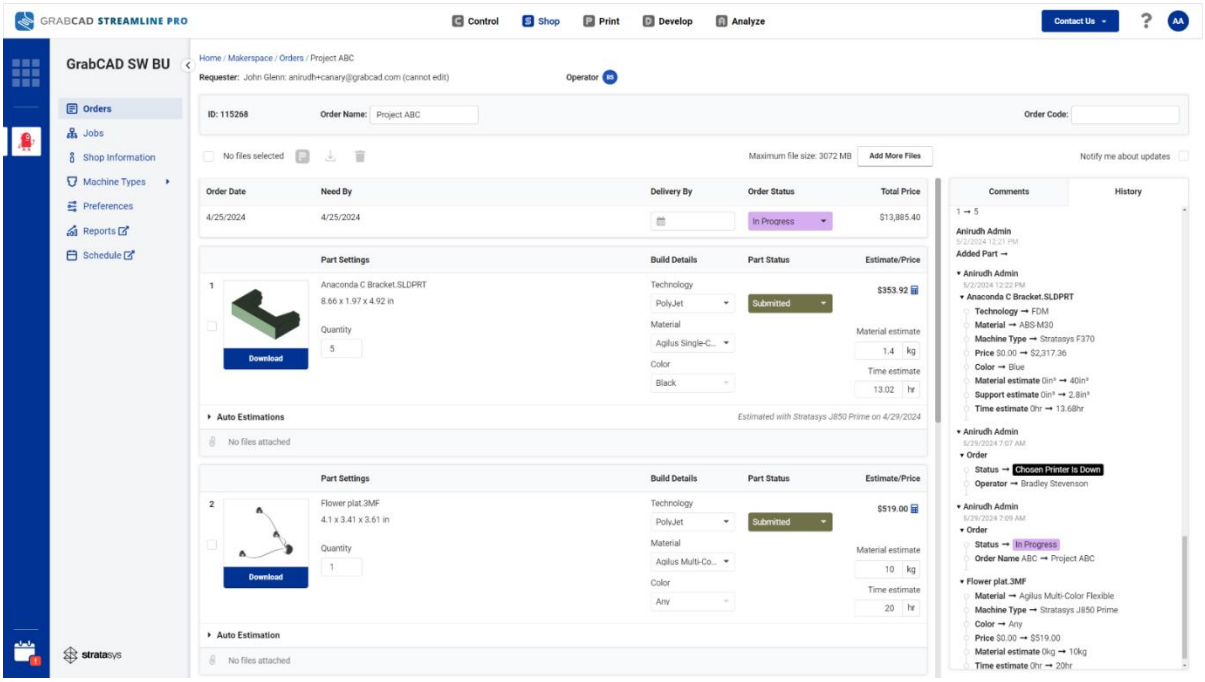

GRABCAD STREAMLINE PRO
Control
Shop
Print
Develop
Analyze
Contact Us
GrabCAD SW BU
Orders
Jobs
Shop Information
Machine Types
Preferences
Reports
Schedule
Home / Makerspace / Orders
Orders
Search
Filters
Active Orders
New Order
ID
Order Name
Price
Requester
Order Date
Order Status
CAD Files
Technology
Material
Operator
Order Code
Total Parts
Need By
Delivery By
116204 A $3,583.76 Anirudh Admin 5/10/2024 Submitted 3 FDM ABS-M30 3 5/29/2024
115960 assembly $10.00 Nigel Bowditch 5/7/2024 Printing 1 FDM ABS Plus 1 5/31/2024
115958 test $0.00 Bradley Stevenson 5/7/2024 Submitted 0 0 5/30/2024
115464 stuart order (IGNORE IT) $0.00 stuart reid 4/29/2024 Has Issues 1 FDM ABS Plus 1.1.1 20 4/30/2024
115459 Nigel's order with multiple quantities $223.20 Nigel Bowditch 4/29/2024 In Progress 1 FDM ABS-M30 10 4/30/2024
115268 ABC $13,366.40 John Glenn 4/25/2024 Chosen Printer Is Down 4 FDM, PolyJet ABS-M30, Agilus Single-Color Flexible 12 4/25/2024
115260 AdiSHop $110.00 Adrian Ilie 4/25/2024 Approved 2 FDM, SAF ASA, PA11 High Yield 2 4/25/2024
115197 Kumar's previews $1,374.10 Anirudh Admin 4/24/2024 Approved 4 FDM ABS-M30, ASA 4 4/25/2024
114968 Mike- model in different colors. $260.14 Mike Lavender 4/22/2024 Shipped 3 FDM ASA 17 4/30/2024
114868 ABC $3,025.66 Anirudh Admin 4/19/2024 Submitted 2 PolyJet Agilus Single-Color Flexible 9 4/25/2024
114755 ABC $201.46 Anirudh Admin 4/18/2024 Submitted 1 FDM ABS-M30 1 4/25/2024
114202 Some customer demo $10.00 Frank Linderman 4/10/2024 Time for coffee 2 Powder Bed (SLS), FDM Any, ABS-M30 AI78781 2 4/12/2024
114065 Costing for Demo $0.00 Shuvom Ghose 4/8/2024 Submitted 1 FDM ULTEM™ 9085 Resin 1 4/12/2024
113239 Demo AMER $2,294.75 Frank Linderman 3/25/2024 Approved 3 SAF, FDM, PolyJet PA11 High Yield, ASA, Agilus Single-Color Flexible PROJETABC 6 3/29/2024
113050 Test File for Day 1 $201.46 Dhiraj Achwale 3/21/2024 In Review 1 FDM ABS-M30 RnD 1 1 3/21/2024 3/28/2024
113048 Demo $434.00 Frank Linderman 3/21/2024 In Review 2 FDM ABS-M30 COPELAND1234 4 3/25/2024
112945 240320-MB $1,203.60 Moshe Benaish 3/20/2024 In Review 1 FDM ABS-M30 10 3/21/2024
Export orders
Orders per page: 25
1 2 3
90 orders


GRABCAD STREAMLINE PRO
Control
Shop
Print
Develop
Analyze
Contact Us
GrabCAD SW BU
Orders
Jobs
Shop Information
Machine Types
Preferences
Reports
Schedule
Home / Makerspace / Orders / Project ABC
Requester: John Glenn: anirudh+canary@grabcad.com (cannot edit)
Operator
ID: 115268
Order Name: Project ABC
Order Code:
No files selected
Maximum file size: 3072 MB
Add More Files
Notify me about updates
Order Date
Need By
Delivery By
Order Status
Total Price
4/25/2024
4/25/2024
In Progress
$13,885.40
Part Settings
Build Details
Part Status
Estimate/Price
1
Anaconda C Bracket.SLDPRT
8.66 x 1.97 x 4.92 in
Quantity
5
Download
Technology
PolyJet
Material
Agilus Single-C...
Color
Black
Submitted
$353.92
Material estimate
1.4 kg
Time estimate
13.02 hr
Auto Estimations
Estimated with Stratasys J850 Prime on 4/29/2024
No files attached
2
Flower plat.3MF
4.1 x 3.41 x 3.61 in
Quantity
1
Download
Technology
PolyJet
Material
Agilus Multi-Co...
Color
Any
Submitted
$519.00
Material estimate
10 kg
Time estimate
20 hr
Auto Estimation
No files attached
Comments
History
Anirudh Admin
Added Part
Anirudh Admin
Anaconda C Bracket.SLDPRT
Technology → FDM
Material → ABS-M30
Machine Type → Stratasys F370
Price $0.00 → $2,317.36
Color → Blue
Material estimate 0in³ → 40in³
Support estimate 0in³ → 2.8in³
Time estimate 0hr → 13.68hr
Anirudh Admin
Order
Status → Chosen Printer Is Down
Operator → Bradley Stevenson
Anirudh Admin
Order
Status → In Progress
Order Name ABC → Project ABC
Flower plat.3MF
Material → Agilus Multi-Color Flexible
Machine Type → Stratasys J850 Prime
Color → Any
Price $0.00 → $519.00
Material estimate 0kg → 10kg
Time estimate 0hr → 20hr

GrabCAD Streamline Pro Shield

Overview

Streamline Pro Shield is an industrial grade secure network gateway device that protects the connected Stratasys 3D printer by isolating and defending the 3D printer from cyber security attacks, as well as defending the network from the 3D printer.

Features

- Firewall to control communication to and from the printer.
- IDS (Intrusion Detection System) to monitor and log abnormal network traffic.
- MSI Validation - Validate installation of file packages sent to the printer (digital signature).

Firewall

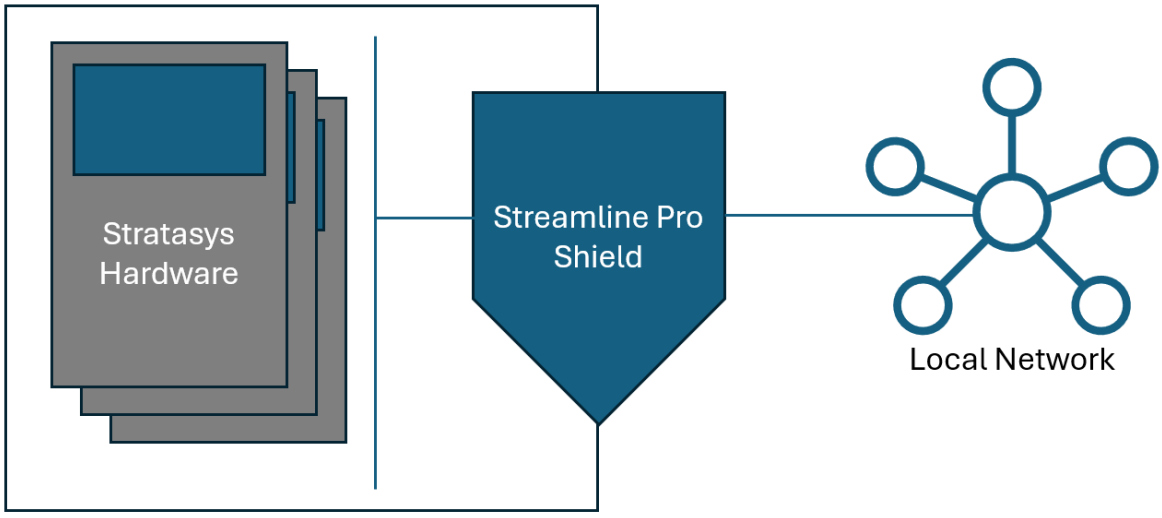
A packet filtering firewall that operates at the network layer.

Filter incoming and outgoing packets based on predefined rules (such as IP addresses, protocols, and ports).

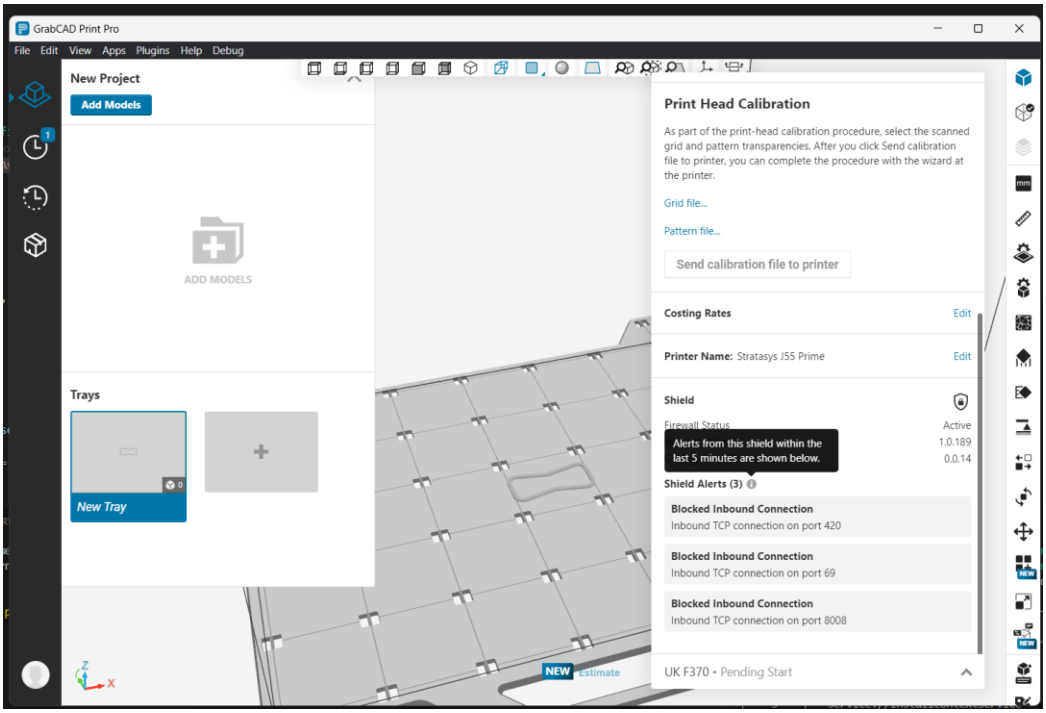
A firewall configuration file is being activated from a set of predefined configurations.

Configuration files are tamper proof via digital signature validation.

System Diagram



Screenshots



Network Communication

Purpose	**Config Set**	**Direction**	**Port**	**Protocol**
Shield Management	All	Inbound	33780	TCP
Ping	All	Inbound	1	ICMP
HTTP Beyond Trust (remote diagnosis)	PJ	Outbound	80	TCP
HTTPS Beyond Trust (remote diagnosis)	FDM PJ	Outbound	443	TCP

DNS	FDM	Inbound & Outbound	53	UDP
FDM: MTConnect	FDM	Inbound	5000	TCP
PJ: MTConnect for MQTT	PJ	Outbound	8883	TCP
PJ: GrabCAD Job sending & Job Manager updates	FDM / PJ	Inbound	57001	TCP
FDM: UPnP (optional)	FDM	Inbound & Outbound	1900	UDP
FDM: GrabCAD Job sending & Software updates	FDM	Inbound	53742	TCP
FDM: GrabCAD Printer discovery UPnP http traffic (optional)	FDM	Inbound	53743	TCP
PJ: Printer discovery	PJ	Inbound & Outbound	35891	UDP

Additional Information:

- We publish "Your Data on GrabCAD"
- We offer the "GrabCAD Platform Security Whitepaper"
- End User Agreement www.grabcad.com/terms

For further questions around Stratasys Security:

- For completion of questionnaires and forms please contact us via customerquestionnaires@stratasys.com.
- For application and product Security questions relating to Stratasys Products, Software, Cloud development and Cloud production please contact us via sw-security@stratasys.com

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