

GLASS Future Development

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May 2023

Public



Correlation Views





Correlation Views

Background to specify your alternative correlations assumptions

- Informed investment decisions requires processing vast amounts of complex data
 - The Ortec Finance Scenario set (OFS) powered by the Dynamic Scenario Generator (DSG) software serve as powerful tool in investment decision making
- Correlations are a vital component in investment decision making
 - Dictates how risk aggregates over portfolio level
- Ability to adjust correlations is highly useful for both stress testing and imposing alternate views
- Due to current DSG setup, so far only able to adjust risk and return expectations
- Developed and validated methodology to also impose correlation views on scenarios



Correlation Views

Methodology

- Start from the Ortec Finance house view scenarios
- Standardize all assets and economic variables (i.e. set mean to zero, volatility to one, and pair-wise correlations to zero)
- Next, apply desired correlations to the adjusted scenarios (using the Cholesky decomposition of target correlation matrix)
- Finally, calibrate the scenarios to the desired means (shift) and volatilities (scale)



Correlation Views

Advantages

- Able to align with alternate views
- Impact on risk and return expectations is negligible
- Scenario correlation characteristics remain intact with respect to original scenarios
 - Changes in correlation views consistently impact tail correlations as well as term structure of correlations



GLASS

ECL

The screenshot displays the 'New Economy customization layer (1)*' configuration window. The interface includes a menu bar at the top with options like 'Test', 'Variant', 'Scripting', 'Go', 'Reports', 'Windows', and 'Help'. Below the menu is a toolbar with various icons. The main window has a sidebar on the left with a tree view containing 'Economy customization layer*', 'Settings', and 'Correlation assumptions'. The main content area is divided into three sections: 'Base settings', 'Modules', and 'Specifications'.
- **Base settings:** 'Economy' is set to 'Feb23 OFS', 'Horizon' is '16y0m', and 'Number of scenarios' is '50'. 'Base currency' is set to 'EUR'.
- **Modules:** Three questions with radio buttons and help icons: 'Do you want to specify risk and return assumptions?' (No selected), 'Do you want to specify initial term structures?' (No selected), and 'Do you want to specify correlation assumptions?' (Yes selected).
- **Specifications:** A question 'Do you want to specify the risk and return assumptions or correlations of return variables in the base currency?' (No selected).
At the bottom right of the main window are 'Accept' and 'Next' buttons. A 'Messages' panel at the bottom left shows 'Errors (0)', 'Warnings (0)', and 'Information (24)'.

GLASS

Selecting variables

The screenshot displays the GLASS software interface. The main window is titled 'Economy customization layer: New Economy customization layer (1)*'. The left sidebar shows 'Economy customization layer*' with sub-items 'Settings' and 'Correlation assumptions'. The main area is divided into 'Correlation settings' and 'Correlation matrix'.

Correlation settings: A note states, 'Note that any risk and return assumptions may change the final correlation values, because risk and return assumptions are applied after applying the correlation assumptions.' The 'Horizon' is set to 10 years.

Correlation matrix: A table showing correlations between variables. The 'Selected view' is set to 'Target values'.

Variable	EQTR_WRLD_USD	GSCI_EN_USD	EQTR_EMM_LINH_USD	GDP_US	CPI_US
EQTR_WRLD_USD	1.0000				
GSCI_EN_USD	1.0000	1.0000			
EQTR_EMM_LINH_USD	0.3900	0.5000	1.0000		
GDP_US	0.1230	0.2000	0.7600	1.0000	
CPI_US	0.4800	0.0000	0.8000	0.8000	1.0000

Select Return and Level Variables dialog: This dialog box allows selecting variables from ALM variants. It has two panes: 'Available' and 'Selected'. The 'Available' pane lists variables like UNEM_US, NWGS_US, EQTR_US, etc. The 'Selected' pane lists EQTR_WRLD_USD, GSCI_EN_USD, EQTR_EMM_LINH_USD, GDP_US, and CPI_US.

At the bottom of the main window, there are buttons for 'Calculate underlying values', 'Calibrate', and 'Export to Excel'. A 'Messages' pane at the bottom left shows 'Errors (0)', 'Warnings (0)', and 'Information (23)'.

GLASS

Specifying correlation views

Correlation settings

Note that any risk and return assumptions may change the final correlation values, because risk and return assumptions are applied after applying the correlation assumptions.

Horizon: 10 year(s)

Correlation matrix

Select variables Validate matrix

Selected view: Underlying values Target values

Variable	EQTR_WRLD_USD	GSCL_EN_USD	EQTR_EMM_UNH_USD	GDP_US	CPI_US
EQTR_WRLD_USD	1.0000				
GSCL_EN_USD	1.0000	1.0000			
EQTR_EMM_UNH_USD	0.3900	0.5000	1.0000		
GDP_US	0.1230	0.2000	0.7600	1.0000	
CPI_US	0.4800	0.0000	0.8000	0.8000	1.0000

Calculate underlying values Calibrate Export to Excel

Messages: Errors (0) Warnings (0) Information (23)

GLASS

Validating correlation views

The screenshot shows the GLASS software interface with the 'Validate Correlation Matrix' dialog box open. The dialog box contains the following information:

Validate Correlation Matrix

The input correlation matrix is invalid.
The below suggested correlations present the nearest valid correlation matrix.

Selected view: Input correlations Suggested correlations Correlation differences

Variable	EQTR_WRLD_USD	GSCL_EN_USD	EQTR_EMM_UNH_USD	GDP_US	CPI_US
EQTR_WRLD_USD	1.0000				
GSCL_EN_USD	0.8805	1.0000			
EQTR_EMM_UNH_USD	0.4377	0.4506	1.0000		
GDP_US	0.1616	0.1601	0.7759	1.0000	
CPI_US	0.3821	0.1012	0.7596	0.7673	1.0000

Buttons: Use suggested correlations, Close

At the bottom of the main window, there are buttons for 'Calculate underlying values', 'Calibrate', and 'Export to Excel'. The 'Messages' pane at the bottom left shows 23 information messages.

GLASS

Validating correlation views

The screenshot displays the GLASS software interface for validating correlation views. The main window is titled "Economy customization layer: New Economy customization layer (1)*". The left sidebar shows the navigation menu with "Economy customization layer*" selected, containing "Settings" and "Correlation assumptions".

The main area is divided into sections:

- Correlation settings:** A note states, "Note that any risk and return assumptions may change the final correlation values, because risk and return assumptions are applied after applying the correlation assumptions." The horizon is set to 10 years.
- Correlation matrix:** Includes "Select variables" and "Validate matrix" buttons. The "Selected view" is set to "Target values".

Variable	EQTR_WRLD_USD	GSCI_EN_USD	EQTR_EMM_UNH_USD	GDP_US	CPI_US
EQTR_WRLD_USD	1.0000				
GSCI_EN_USD	1.0000	1.0000			
EQTR_EMM_UNH_USD	0.3900	0.5000	1.0000		
GDP_US	0.1230	0.2000	0.7600	1.0000	
CPI_US	0.4800	0.0000	0.8000	0.8000	1.0000

A "Validate Correlation Matrix" dialog box is open, displaying an error message: "The input correlation matrix is invalid. The below suggested correlations present the nearest valid correlation matrix." The dialog shows "Correlation differences" for the selected view.

Variable	EQTR_WRLD_USD	GSCI_EN_USD	EQTR_EMM_UNH_USD	GDP_US	CPI_US
EQTR_WRLD_USD	0.0000				
GSCI_EN_USD	-0.1195	0.0000			
EQTR_EMM_UNH_USD	0.0477	-0.0494	0.0000		
GDP_US	0.0386	-0.0399	0.0159	0.0000	
CPI_US	-0.0979	0.1012	-0.0404	-0.0327	0.0000

Buttons at the bottom of the dialog include "Use suggested correlations" and "Close".

The bottom of the main window features buttons for "Calculate underlying values", "Calibrate", and "Export to Excel". A "Messages" pane at the bottom left shows "Information (23)".

GLASS Workflow
automation

powered by
API



Workflow automation

Goal

- Automate repetitive GLASS-related workflows
 - Primary focus on:
 - Monthly/Quarterly processes,
 - Automated reporting layers outside of GLASS
- Improve efficiency and employee satisfaction, reduce costs and manual errors
 - No more manual updating of fields in Glass
 - Fully automated process and integrated workflow by means of API functionality





API supports an integrated workflow

Input

- Your data warehouse contains up to date input values
- Scheduled Call API will retrieve new values and send it over the internet to the Glass API which automatically updates Glass



Simulation Glass API starts and monitors simulations



Output Glass API retrieves output and sends it back, so it can be stored in your data warehouse



Conditions

Conditions

- ✓ You have the desire to automate repetitive GLASS-related work (e.g., reporting related)
- ✓ You like to automate your reporting tools with GLASS output
- ✓ You are an Ortec Finance Hosting client
- ✓ You have the internal resources to connect GLASS input and output to internal data and/or reporting platforms

First clients implemented as of early October 2020

- Lead time is around 8 weeks (will be a lot faster once cloud native)

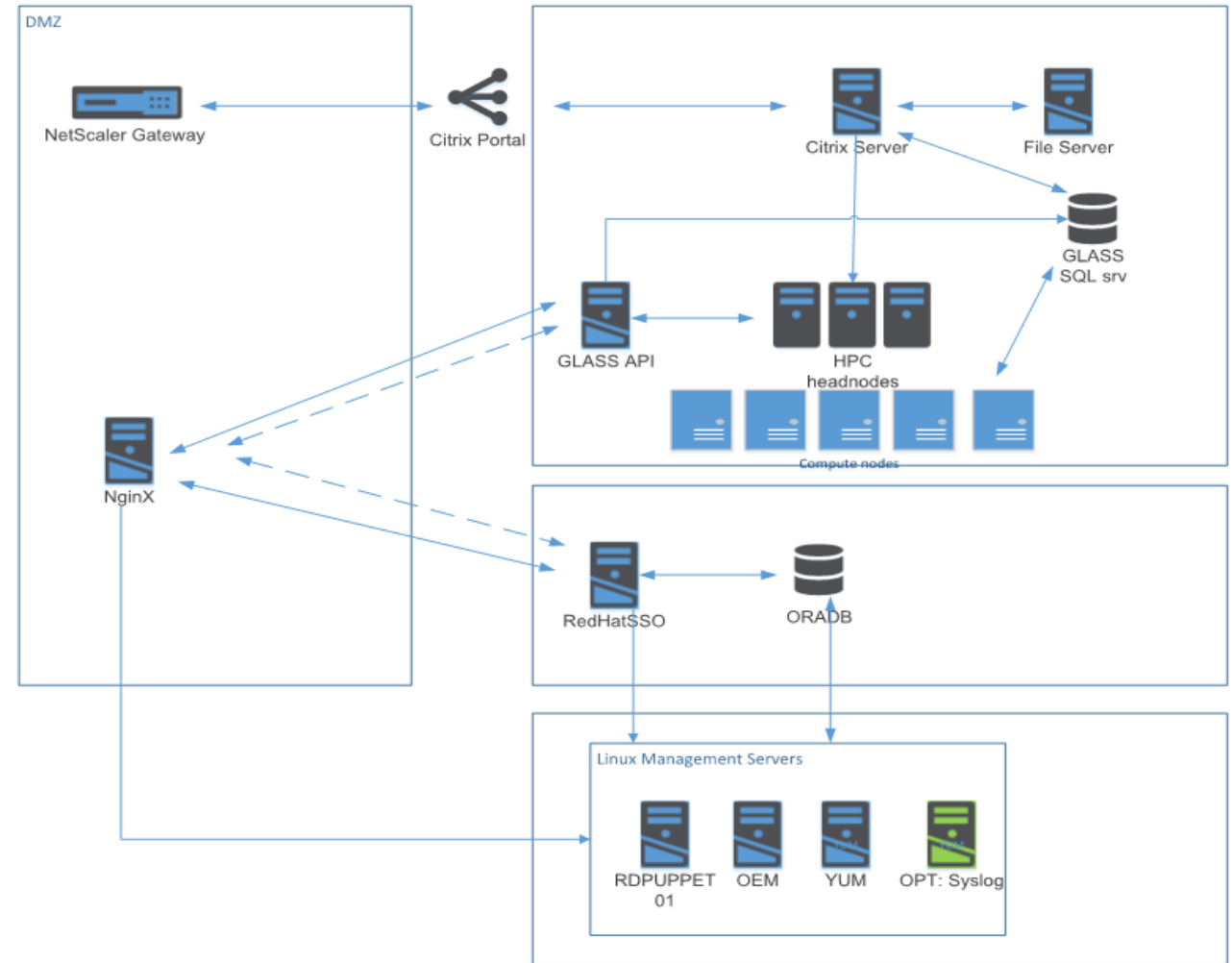
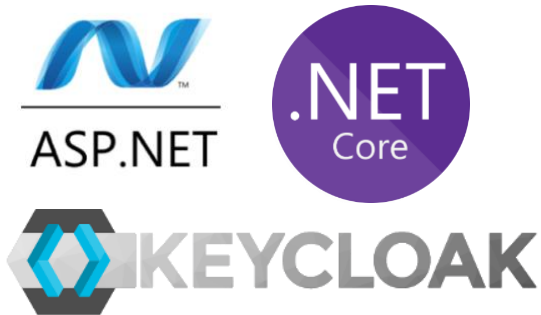
Pricing

- 15% of Glass license fee (excl. hosting)

Technical infrastructure

Schematic overview

- Communication via Web-proxy server
- API runs on dedicated IIS website
- Authorization via Token Server with RHSSO (via OAuth 2.0)

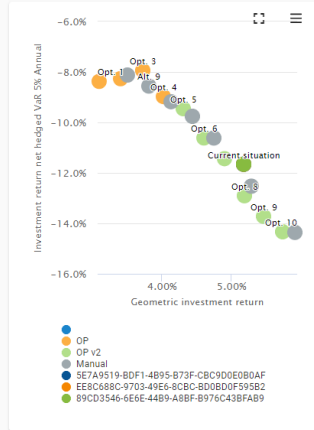
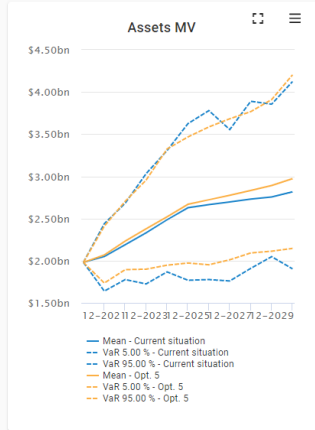


GLASS web-based modules

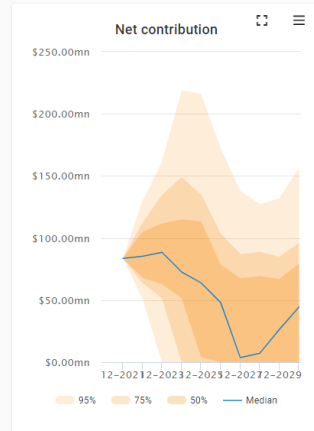


Vision I

- Projects
- SAA 2020 study
- SAA study
- Results**
- Risk decomposition
- What if
- CMA
- Climate
- Calculation status

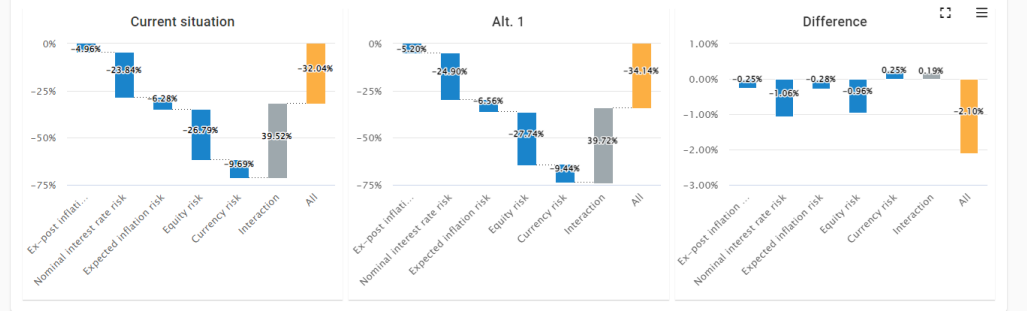


Metric	Current situation		Opt. 5		Opt. 10
	3 Years	5 Years	3 Years	5 Years	3 Years
Assets MV Mean Annual	\$2.190bn	\$2.337bn	\$2.226bn	\$2.373bn	\$2.194bn
Investment return net h...	5.2%	5.6%	4.3%	4.7%	5.6%
Service Cost Mean Ann...	\$58.236...	\$59.214...	\$80.405...	\$82.009...	\$55.368...
Funding ratio MV Going...	115.9%	122.2%	117.0%	122.5%	116.1%



- Projects
- SAA 2020 study
- Main menu
- Current situation
- Capital market assumptions

Calculation: Results | Select period*: Year 5 | Select strategies*: Current situation | Select strategies*: Alt. 1



	Current situation	Alt. 1
	Year 5	Year 5
Risk contribution		
Ex-post inflation risk	-5.0%	-5.2%
Nominal interest rate risk	-23.8%	-24.9%
Expected inflation risk	-6.3%	-6.6%
Equity risk	-26.8%	-27.7%
Currency risk	-9.7%	-9.4%

Absolute risk decomposition

The risk decomposition shows the potential losses for different risk drivers. The risk measure used is 5% CVaR of Surplus (which is defined as Assets - Liabilities). The blue bars show the gross risk contribution. Driven by correlations (or lack thereof), the total net risk is smaller than the sum of the individual gross risks. The difference is shown as the diversification effect.

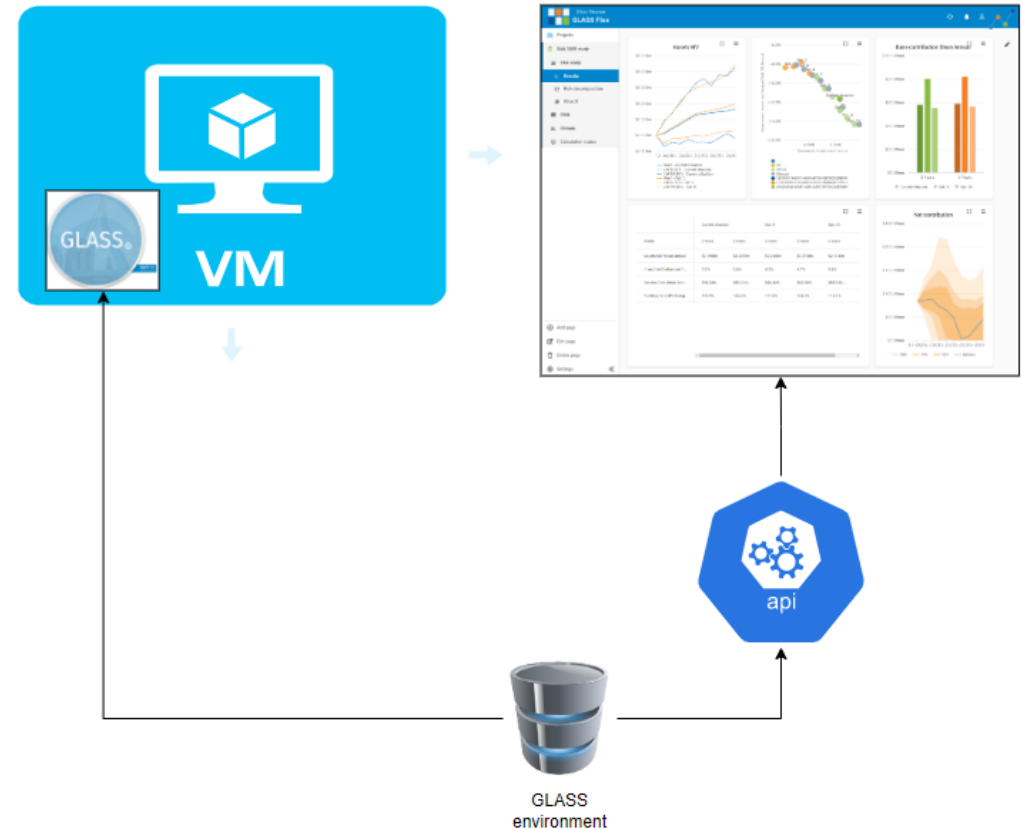
o GLASS is an advance tool with numerous parameters

o Impossible to make just web-based

Vision II

How it works (very stylized)

- Start with a calibrated model
- Only expose relevant parameters
- Advantage that also Glass Desktop can be used





Poll

Go to <https://www.menti.com>, code 6200 2296

- Do you always use GLASS in the same way?
 - I usually play around with all kinds of parameters, there is no common ground to be found
 - I basically change same parameters every time
- How much flexibility do you prefer?
 - A model with a lot of configuration options that gives much flexibility
 - A model with a far less configuration options designed for a specific use case
- How do you like to use GLASS?
 - I really like the desktop application
 - I prefer using a web-based application

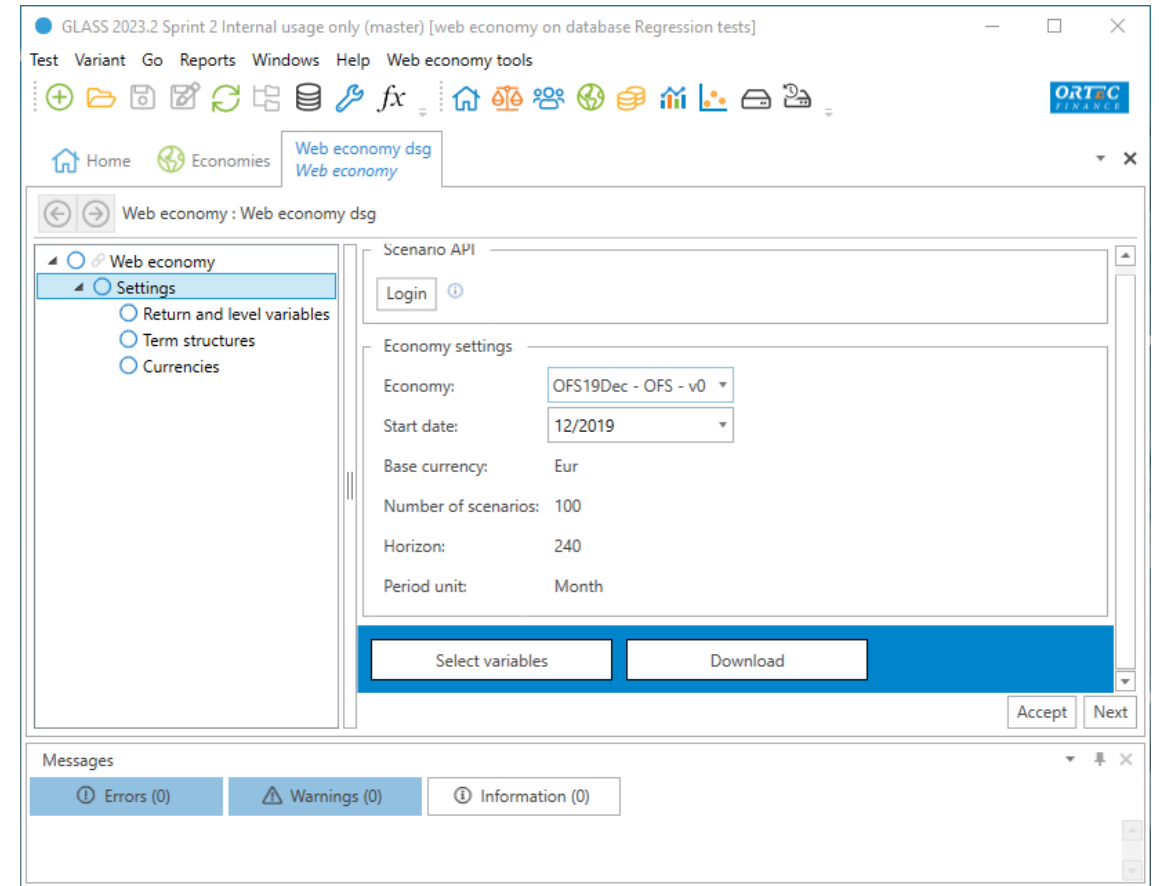
Web Economy



Vision III

Web Economy & ECL

- Economy generator DSG is considered as too complex for most clients
- Longer term vision is to replace it with
 - Web Economy (just download the OFS)
 - Economy customization layer to create your own views on top of it
- DSG is then used only internally for OFS production
- Far better suited for web-based usage





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