Supply Chain Optimization for CA Distributors

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SUPPLY CHAIN OPTIMIZATION FOR CA DISTRIBUTORS

Trabajo de Obtención del Grado que para obtener el grado de

ESPECIALISTA EN GESTIÓN DE LA CADENA DE SUMINISTRO

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INSTITUTO TECNOLÓGICO Y DE ESTUDIOS SUPERIORES DE OCCIDENTE

Reconocimiento de validez oficial de estudios de nivel superior según acuerdo secretarial 15018, publicado en el Diario Oficial de la Federación el 29 de noviembre de 1976.

Departamento de Economía, Administración y Mercadología

ESPECIALIDAD EN GESTIÓN DE LA CADENA DE SUMINISTRO
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Abstract

CA DISTRIBUTORS COMPANY is a global distribution Company for wire and cable products. In 2017 CA DISTRIBUTORS COMPANY for the first time started operations with an Asian Company named CHINA TELECOM. The program objective is to store power cable sourced from an Asian vendor (Shenzhen Products) in local warehouses located Latin America (Guadalajara, Mexico & Colon, Panama).

The product is shipped from Shenzhen China via ocean freight with an average transit time from six to seven weeks to both warehouses. CA DISTRIBUTORS COMPANY and CHINA TELECOM agreed to store eight weeks forecast worth material in each of their warehouses in order to meet CHINA TELECOM’s demand.

Every week CHINA TELECOM sends an updated forecast which will show up to twelve weeks expected usage, based on a simple addition of the first eight weeks CA DISTRIBUTORS COMPANY will place an order to the Chinese vendor.

The purpose of this document is to explain the reasons why choosing a 3PL at Manzanillo Port, is the most suitable options for better inventory management, rather than using a consignment program, or increasing inventory quantity in local warehouses. In addition to that, CA DISTRIBUTORS COMPANY will implement new service cost to CHINA TELECOM in order to satisfy customer demand and keep business profitability in all additional services offered.
1.1 DESCRIPTION OF THE INTERVENTION PROBLEM

CA DISTRIBUTORS Company is a leading global distributor of network, security, electrical, electronic and solutions. CA DISTRIBUTORS has presence in over 50 countries, 300 cities and has over 65,000 products in stock.

Image 1: CA DISTRIBUTORS Company Supply Chain Solutions Diagram – Own Source

Company Shenzhen products is a Chinese cable manufacturer located in Jiangsu province. Company Shenzhen products has developed high-tech cable products and has presence in countries such as Singapore, Germany, USA, Italy, Japan and Hong Kong.

CHINA TELECOM is a leading Chinese information and communication company provider. CHINA TELECOM has presence in more than 170 countries and regions, and currently serves more than three billion people around the world. With operations increasing in Latin America, CHINA TELECOM decided to open two distributions centers, one located in Guadalajara Mexico, that will be sourcing material to North America and one located in Colon, Panama in order to source materials in South America (Reuters, 2018)

Before operating the business with CA DISTRIBUTORS, CHINA TELECOM used to source the products directly through Chinese vendor named Shenzhen products.
Shenzhen Products always had available stock for any urgent demand; however, transportation lead-time from China can go from six to eight weeks.

CHINA TELECOM had to order the exact amount of material that was going to use for the upcoming six to eight weeks, if there was any demand ramp up material had to be shipped by air which can approximately cost $5,000 USD per shipment to CHINA TELECOM. Total air shipments per year could go from five to ten, which represent an annual cost from $25,000 USD to $50,000 USD.

Image 2. Initial CHINA TELECOM business scheme – Own Source

First interaction between CA DISTRIBUTORS and CHINA TELECOM was during an Electronic and Electric tradeshows in Hong Kong back in 2016. Since 1966 the Hong Kong Development Council (HKTDC) has promoted and developed Hong Kong Trade around the world. Every year the HKTDC organizes a yearly electronic and electric exhibition in Hong Kong. (The Hong Kong Trade Development Council (HKTDC), 2019).

CA DISTRIBUTORS started business operations with CHINA TELECOM in 2017, under the terminology of Supply Chain Solutions for cable distribution in Latin America.
The new business scheme was presented to CHINA TELECOM and despite the fee charged by CA DISTRIBUTORS for inventory management; CHINA TELECOM agreed using a new business scheme that will immediately reduce additional logistics charges.

Image 3. New business scheme development – Own Source

During these two years, CA DISTRIBUTORS Company has realized that customer CHINA TELECOM forecast is extremely inaccurate. When the business started all parties agreed in storing and managed eight weeks forecast worth of material, however this amount has not been enough at times which is causing line down incidents, this directly affecting CA DISTRIBUTORS Company by incurring in poor score card results and high risk of losing the business.

The score card is an annual evaluation done by customer CHINA TELECOM that is focused on the following areas:

1. Technique

   R&D capability for advanced technology

   Ability for mass production

   Maturity of new products

   Technical communication performance
Technical support capability

2. Quality
   Customer complaint
   Quality problem
   Prompt quality problem solving
   Effectiveness of problem solving

3. Responding time
   Responsibility ability for supply requirements, such as supplying flexibility/ early response/ timely notice
   The responsibility about exceptional and urgent issues
   Documentation of the critical commitments: provision of relevant information and status

4. Delivery
   Demand meet rate
   Performance of preparing safety stock or raw material according to customer requirement
   No serious shortage issue

5. Cost
   Price competitiveness
   Cost reduction

6. Environment
   Environment and social responsibility performance
The results of the 2017 yearly supplier/score card evaluation from CHINA TELECOM to CA DISTRIBUTORS were very poor totaling 73.56 points out of 100. Future and continuing failure on the results can represent a possible cancelation of the contract.

In 2018, CA DISTRIBUTORS delivery performance improved, from 73.56 to final 90.0 out of a 100.

Image 4. CA DISTRIBUTORS 2017 vs 2018 score cards results – Own Source

After several forecast analysis done by CA DISTRIBUTORS, top management has determined that is nearly impossible to satisfy customer demand with the initial eight weeks commitment. Based on this tendency, CA DISTRIBUTORS has decided to increase inventory up to ten weeks demand, however every once in a while there are shortages that is costing around $5,000 per event in order to fly in the material from China to Mexico.
The intervention will consist in CA DISTRIBUTORS Company supporting Chinese vendor (Shenzhen products) in setting up a 3PL provider for five weeks safety stock to be stored at Manzanillo, Mexico.

The 3PL will be storing additional five weeks inventory for which Shenzhen Products will be liable. This means CA DISTRIBUTORS will store initial eight weeks and Shenzhen Products five weeks safety stock, totaling thirteen weeks. This strategy will help reduce inventory cost and risk for CA DISTRIBUTORS Company and avoid any penalization fees from China TELECOM as well as scorecard results improvement.

Image 5: CA DISTRIBUTORS representation of Shenzhen products Warehouse location and CA DISTRIBUTORS Company Warehouse – Own Source.
1.2 OVERALL OBJECTIVE

The overall objective is to reduce CA DISTRIBUTION inventory cost and financial liability, as well as penalization fees and score card results improvement that will lead to growth opportunities, while assuring material availability at all times including considering demand ramp up.

1.2 PARTICULAR OBJECTIVES

The particular objectives for CA DISTRIBUTORS to implement a new cost & fee strategy for all “additional services” provided to CHINA TELECOM that were not considered in the initial contract and that represent additional cost that is draining the operation profitability.

Implementing this “additional services fee” will improve business profitability and decrease quality incidents that might occur due procedures failure and that directly impact CA DISTRIBUTORS yearly score card results.
CA DISTRIBUTORS will support Shenzhen products with the negotiation and contact of 3PL located in Manzanillo, Mexico free trade Zone in order to store five weeks worth inventory.

CA DISTRIBUTORS has researched and contacted certified 3PLs located in the area and has prepared the following comparison table for Shenzhen products to choose the most suitable option.

<table>
<thead>
<tr>
<th>3PL Vendor</th>
<th>Location</th>
<th>Inventory Control</th>
<th>Cost*</th>
<th>Industry Experience</th>
<th>Website</th>
</tr>
</thead>
<tbody>
<tr>
<td>Grupo Cargoquin</td>
<td>Boulevard Miguel de la Madrid No, 308 Local 3 Col.</td>
<td>Yes</td>
<td>$12</td>
<td>Automotive Electronic</td>
<td><a href="https://www.cargoquin.com">https://www.cargoquin.com</a></td>
</tr>
</tbody>
</table>
Based on the previous information available, Shenzhen products has determined that the most suitable option is Grupo Cargoquin. The main reason is the previous working experience and service satisfaction CA DISTRIBUTORS has from working with Grupo Cargoquin for the past ten years.

In regards the new service fees politics to be implemented, CA DISTRIBUTORS is considering the following services:

<table>
<thead>
<tr>
<th>Grupo Sercomex</th>
<th>Less than 5km away from the port</th>
<th>Yes</th>
<th>$12</th>
<th>All type of products</th>
<th><a href="https://www.sercomex.com.mx">https://www.sercomex.com.mx</a></th>
</tr>
</thead>
</table>

* Cost per pallet position in USD – Own Source

Image 7: CA DISTRIBUTORS Cost representation – Own Source
<table>
<thead>
<tr>
<th>Cost Name</th>
<th>Description</th>
<th>USD Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Freight</td>
<td>Any additional freight besides local deliveries incurred due CHINA TELECOM requirement need and confirmation. This could be Air or Sea</td>
<td>Vary according volume. Range goes from $5000 USD to $50,000 USD. Upon confirmation from Sales Representative</td>
</tr>
</tbody>
</table>
| Cost Pass Through         | Any additional fees incurred due lack of information originated from CHINA TELECOM | Vary according the incident  
- Demurrages at port - $250 USD per day  
- Overtime at any point of cargo arrival to destination port to final destination - $150 USD per person per day. |
| Cost to Serve Small Orders| MOQ per order is $250 USD                                                    | Any order below $250 USD will have a $250USD cost to serve fee            |
| Restocking                | An amount of money charged by a company or store for accepting returned goods and giving the customer their money back | 25% of invoice value                                                     |
1.3 CONTEXT AND ECONOMIC AND STRATEGIC JUSTIFICATION – Own Source

As previously mentioned CHINA TELECOM is a leading telecommunications company that was just founded in 1987 and that is currently employing 180,000 people around the world (Reuters, 2018). Main CHINA TELECOM competitors are Cysco systems and Motorola (Reuters, 2018).

CHINA TELECOM became the world’s seventh largest tech firm with presence in more than 170 countries. (The Washington Post)

1.3.1 TELECOMMUNICATION EVOLUTION IN MEXICO

Mexico’s evolution in the telecommunication sector comes from thirty years history of partially privatizing services (Prieto, 2011).

Current key plays in the sector are focused in five main services, such as mobile, fixed telephone, internet, broadcast and per-pay TV. This key players are America Movil, Televisa, Grupo Salinas. (Prieto, 2011)
Internet penetration in Latin America had been rapidly increasing and is one of the most dynamic sectors in Mexico (Prieto, 2011).

<table>
<thead>
<tr>
<th>Country</th>
<th>Internet users per 100 inhabitants</th>
<th>Percentage of households with a computer</th>
<th>Percentage of households with Internet access</th>
</tr>
</thead>
<tbody>
<tr>
<td>Argentina</td>
<td>28.1</td>
<td>36.4</td>
<td>27.5</td>
</tr>
<tr>
<td>Brazil</td>
<td>34.8</td>
<td>20.8</td>
<td>15.4</td>
</tr>
<tr>
<td>Canada</td>
<td>72.4</td>
<td>79.1</td>
<td>72.1</td>
</tr>
<tr>
<td>Chile</td>
<td>32.5</td>
<td>36.4</td>
<td>22.1</td>
</tr>
<tr>
<td>Colombia</td>
<td>17.6</td>
<td>27.4</td>
<td>8</td>
</tr>
<tr>
<td>United States</td>
<td>71.2</td>
<td>70.2</td>
<td>61.7</td>
</tr>
<tr>
<td>Mexico</td>
<td>21.6</td>
<td>22.1</td>
<td>12</td>
</tr>
<tr>
<td>Uruguay</td>
<td>40</td>
<td>27</td>
<td>13.5</td>
</tr>
<tr>
<td>Venezuela</td>
<td>25</td>
<td>11.9</td>
<td>3</td>
</tr>
</tbody>
</table>

Source: International Telecommunication Union, Statistical Profiles 2009 Americas
(*) For the year 2008

1.3.2 EVOLUTION OF 3PL INDUSTRY

A 3PL stands for a third party logistics, which is an external supplier that manages supply chain services such as transportation, consolidation, warehouse management, custom brokerage, consulting services and order processing. (Incae Business Review, 2009).
Back in 2009 the 3PL industry was considered relatively a young industry in Central America, while 2006 in the USA had yearly sales of $85 million USD (Incae Business Review, 2009)

According to Grand View Research the size of the third party logistics market is expected to reach $1.2 USD trillion by 2025, which gives plenty of options and growth opportunities in the current globalized market (Grand View Research, 2019)

Due to new technologies trend is to transform 3PL services due digitalization, automation and data collection capabilities (Grand View Research, 2019)

Based on the expected revenue from 2014 to 2025, the following end-users are expected:

- Manufacturing
- Retail
- Healthcare
- Automotive

1.4 SCOPE AND LIMITATIONS

CA DISTRIBUTORS COMPANY limitation will be warehousing capabilities specifically in Guadalajara, due the lack of racking available for storage. CA DISTRIBUTORS can only store a thousand pallet positions in each of their warehouses.

On the other hand CHINA TELECOM does not share accurate and relevant project data that could help CA DISTRIBUTORS for decision making, for that reason using historical usage data will be key for decision making.
CHAPTER 2. THEORETICAL FRAMEWORK

The Department of Supply Chain and Information Management from Hang Seng Management College, has researched and analyzed the behavior of spare parts and the complexity of logistics networks. The analysis is extended from the traditional on-site stocking management in order to improve profitability. (IEEE International Conference on Industrial Engineering and Engineering Management, 2017).

The objective of the analysis is to reduce the inventory excess for spare with non-stationary demand parts by using a reverse logistics network which will allow selecting optimal location and manufacturing facilities. (IEEE International Conference on Industrial Engineering and Engineering Management, 2017).

This supply chain is specifically characterized by handling high spare parts cost and low demand with high uncertainty. Since handling this type of Supply Chain represent high maintenance and high management cost, the trend is to outsource the process to service providers located in multiple locations that will be able to supply during emergencies and still assure short lead times. (IEEE International Conference on Industrial Engineering and Engineering Management, 2017).

The research conclusion proposed an inventory pooling or sharing strategies with logistic partners for cost optimization (holding, expedited shipments, stock out). In case customer has a ramp up situation, there demand could be satisfied by local stocking facility. (IEEE International Conference on Industrial Engineering and Engineering Management, 2017).

Even do the above theory has specifically applied for spare parts logistics in different sectors, such as healthcare, military and aerospace, this theory is suitable for the power cable analysis that is being currently done for CA DISTRIBUTORS and CHINA TELECOM program,
since the essence of the program is related to handling high cost, low demand products through different logistic partners which will be able to decrease the risk of having overstock.

In addition to that it is important to describe the following key concepts that will allow a better understanding of the theoretical framework.

a) Supply Chain Management: is a conglomerate of activities that help maximize resources and give the customer an competitive advantage. These activities go from product development, sourcing, production, logistics as well as information systems. (North Carolina University, 2017)

b) Physical flow: refers to the movement and storage of goods and materials and Information flows (North Carolina University, 2017)

c) Information flow: is referring to the information that allow the activity coordination of all supply chain partners. (North Carolina University, 2017)

d) Forecasting: according to the definition provided, forecasting is determining what is going to happen in the future by analyzing historical and current available data. (Market Business News)

CHAPTER 3 - METHODOLOGICAL FRAMEWORK

Based on the methodology applied by the Department of Supply Chain and Information Management from the Hang Seng Management College, the inventory and excess analysis consist in directing distribution flows from a centralized distribution center to country depots, and finally city depots. (IEEE International Conference on Industrial Engineering and Engineering Management, 2017). The use of a 3PL methodology for inventory management of CA DISTRIBUTION is supported by the methodological framework mentioned above.
The analysis will start with the data collection such as the past usage, part cost, on hand, on order and target inventory levels (IEEE International Conference on Industrial Engineering and Engineering Management, 2017).

The information is provided through a weekly forecast sent by CHINA TELECOM where we will be able to analyze the data for the incoming demand. This will allow determining the excess inventory quantity based on the following calculation

\[ \text{Excess Inventory} = \text{On Hand} + \text{On Order} - \text{Months of forecast usage} \]


The following table is a representation the weekly forecast sent to CA DISTRIBUTORS by CHINA TELECOM. This particular forecast is showing how inventory liability will be shared with the vendor Shenzhen products.

<table>
<thead>
<tr>
<th>Location</th>
<th>CA DISTRIBUTORS LIABILITY</th>
<th>SHENZHEN PRODUCTS LIABILITY</th>
</tr>
</thead>
<tbody>
<tr>
<td>1st Qtr April</td>
<td>10-Mar-14</td>
<td>5,000</td>
</tr>
<tr>
<td>2nd Qtr May</td>
<td>15-Mar-14</td>
<td>6,000</td>
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<tr>
<td></td>
<td>20-Mar-14</td>
<td>6,000</td>
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<td></td>
<td>25-Mar-14</td>
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<td></td>
<td>30-Mar-14</td>
<td>6,000</td>
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<tr>
<td></td>
<td>5-Apr-14</td>
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<td>30-May-14</td>
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<td>5-Jun-14</td>
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<td>10-Aug-14</td>
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<td>5-Sep-14</td>
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<td>25-Sep-14</td>
<td>6,000</td>
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<tr>
<td></td>
<td>30-Sep-14</td>
<td>6,000</td>
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</tbody>
</table>

Based on the initial statement of this document, the problem is the frequency of flying urgent material from China to Mexico or Panama.
According to the initial business model, in which CA DISTRIBUTORS is not involved in the Supply Chain Management, CHINA TELECOM would have to pay a ranging cost from $25,000 USD to $50,000 USD for urgent air shipments. However if CA DISTRIBUTORS does not have enough inventory in their HUB, it will cost them the same amount of money to fly in urgent material. This is the main reason why it is so important to get Shenzhen products involved in the process in order to assure the supplying demand from the customer is covered.

Image 10. CHINA TELECOM air freight cost representation – Own Source

The second measurement will be the amount of “additional fees” billed to customer CHINA TELECOM as part of the new pricing strategy.

CHAPTER 5. ANALYSIS OF THE PROBLEM

The main problematic is the forecast uncertainty that is forcing CA DISTRIBUTORS COMPANY to have a larger stock on hand in order to avoid shortages for material; however the financial risk for CA DISTRIBUTORS COMPANY is considerably increasing.
The lack of information provided by the customer and long lead-times represents a problematic to the accuracy of inventory calculation.

CHAPTER 6. PROPOSALS FOR IMPROVEMENT AND IMPLEMENTATION

CA DISTRIBUTORS has to keep building a strong trust relationship between CHINA TELECOM and Shenzhen Products in order to be able to obtain more reliable information that would be able to help decide to go back to the previous operation model, the program will become inefficient and expensive to handle.

Analysis has shown the following areas of optimization and improvement achieved ever since CA DISTRIBUTORS has been involved in the operation.

BEFORE CA DISTRIBUTORS
- Variable costs
- Non productive labor
- Completion variables
- Safety
- Storage / theft
- Excess material
- Risk

AFTER CA DISTRIBUTORS
- Fixed costs
- Labor optimization
- Less completion variables
- Improved Safety
- Less storage / theft
- Less excess material
- Mitigate risk

Image 6: CA DISTRIBUTORS optimization areas representation – Own source

Bellow is the detail of saving concepts for implementing the 3PL str and charging fees for additional services.
• Total freight savings:
  o Air freight cost: $5,000 USD per shipment
  o Total air shipments per year: 10**
  o Total air shipment cost: **$50,000USD** per year
    ** Estimated annual air shipments
• Cost Past Through
  o Demurrages: $250USD per shipment
    Total shipments per year: 30 shipments**
    Total demurrage expense: **$7,500 USD**
    **Estimated annual shipments
  o Overtime: $150USD per person per day
    Total average overtime days per shipment: 2 days
    Total Shipments per year: 30 shipments
    Total overtime charges: **$9,000 USD**
    **Estimated annual shipments
• Cost to serve small orders: $250 USD fee charge for orders worth less than $250 USD
  Total orders worth less than $250USD: 50 orders**
  Total MOQ fees per year: **$12,500 USD**
  **Estimated annual order quantity
• Restocking fee: 25% of invoice value
  Average invoice value: $250,000 USD**
  Average returns per year: 2**
  Total restocking fee per invoice: $62,500 USD
Total restocking fee per year: **$125,000 USD**

** Estimation values based on historical data

- Total operational savings/earnings: **$204,000 USD per year!**
- Annual Sales 2018 - $ 10 USD million per year
- Total operational savings represent: 2.04% of annual sales

CHAPTER 7. CONTROL

The project control will be through a quarterly both internal and external performance review with all departments involved within CA DISTRIBUTORS and a final sales meeting with customer (CHINA TELECOM)

The areas involved during this internal performance review will be as follows:

1. Sales – Efficiency and effectiveness while communicating the message from the customer to other areas.
   - Was the sales order entered in the system on time?
   - How many sales orders were entered per day?
   - Was the cost and price of the goods correctly communicated to the purchasing team?
   - Was the forecast analyzed and discussed with the Procurement and Operations area for space capabilities?

2. Operations - During the evaluation, all operational areas as well as the sales will be providing evidence of how individual’s performance affected the final outcome and perception from the customer.
   - Were the sales orders processed right after credit release?
   - Was the material inspected and clearly labeled?
• Was all documentation, such as packing list & checklist prepared and sent to the sales team for final review?
• Did the truck operator check the date accuracy on the proof of delivery received after delivering the cargo?
• How many sales order did the Operations team processed per day?
• Was the proof of delivery sent to the sales team within twenty four hours after cargo delivery?

3. Customer service – Measure daily customer service complaints received from CHINA TELECOM
• How many emails did the customer service team response in less than twenty two hours from customer notification?
• How many complaint emails did the customer service team received in a daily basis?
• How many quality complaints did CA DISTRIBUTORS received from CHINA TELECOM?
• What’s the average response time for quality related issues?
CONCLUSIONS & RECOMMENDATIONS

a) After current situation analysis and before any intervention, it’s important to realize that CA DISTRIBUTORS did not consider any kind of additional fees for activities that were not initially requested by the customer. In addition to that the lack of experience that CA DISTRIBUTORS had handling volatile demand in the telecommunication sector created massive problems in terms of over stock.

b) CA DISTRIBUTORS will have to keep close communication with both Shenzhen products & CHINA TELECOM in order to keep identifying areas of opportunity and most of all get all partners involved in the process. CA DISTRIBUTORS need to enforce Shenzhen products in order to share the inventory liability, especially since Shenzhen products has more valuable experience handling the customer.

c) CA DISTRIBUTORS has to raise awareness through the sales team about the importance of identifying all activities in which the company gets involved in order to assure the material arrives on time to CA DISTRIBUTORS warehouse and finally to the customer warehouse, since those activities represent a value added to the customer that is not being charged and that is costing the company money in order to be performed.

d) CA DISTRIBUTORS will have to keep a close eye on international trade trends and regulations in order to avoid any penalization due to unfair trade practices that are usually performed by Chinese companies in order to increase their market share internationally.


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