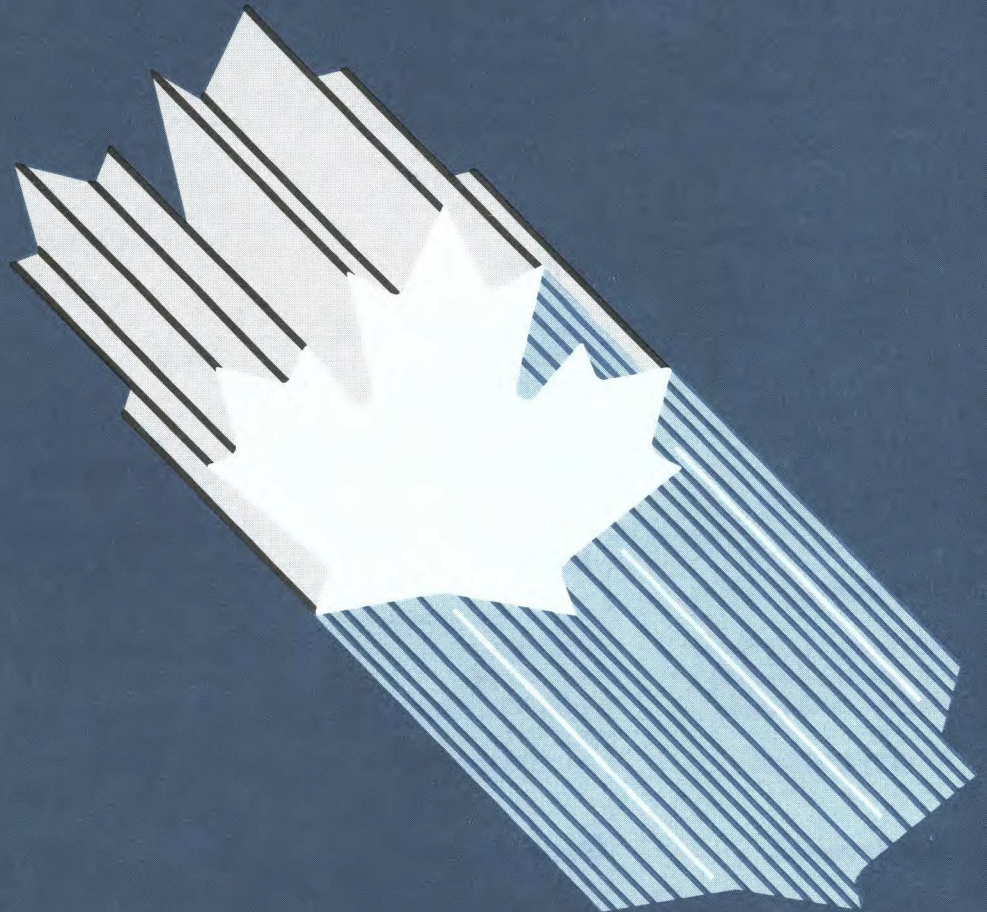


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Regional Industrial
Expansion

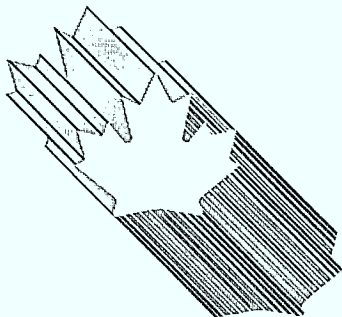
Ministry of State
Science and Technology
Canada

Expansion industrielle
régionale

Ministère d'État
Sciences et Technologie
Canada

Guided Urban Mass Transit

Canada



INDUSTRIAL DEPARTMENT OF REGIONAL P R O F I L E

OCT 04 1988

GUIDED URBAN MASS TRANSIT

1988

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FOREWORD

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In a rapidly changing global trade environment, the international competitiveness of Canadian industry is the key to survival and growth. This Industry Profile is one of a series of papers which assess, in a summary form, the current competitiveness of Canada's industrial sectors, taking into account technological and other key factors, and changes anticipated under the Canada-U.S. Free Trade Agreement. Industry participants were consulted in the preparation of the papers.

The series is being published as steps are being taken to create the new Department of Industry, Science and Technology from the consolidation of the Department of Regional Industrial Expansion and the Ministry of State for Science and Technology. It is my intention that the series will be updated on a regular basis and continue to be a product of the new department. I sincerely hope that these profiles will be informative to those interested in Canadian industrial development and serve as a basis for discussion of industrial trends, prospects and strategic directions.

Minister

Canada

1. Structure and Performance

Structure

The guided urban transit industry consists of suppliers of a wide range of products and systems serving the market for urban transit. Most of these companies serve other markets as well. Data on the sector are therefore derived from company information and should be taken only as indicators.

Guided urban transit systems have two components, infrastructure and electrical and mechanical equipment. The *infrastructure* component, which accounts for at least 50 percent of the cost, includes guideways, stations, power sub-stations, shops, yards and the like, and requires engineering and project management. The *electrical and mechanical equipment* component includes the following major segments: vehicles and spare parts, vehicle control and communications, fare collection, traction power, track systems, and passenger information and distribution systems. Since the actual construction of the infrastructure is usually supplied locally, this profile deals primarily with the electrical and mechanical equipment component.

Almost all sales of urban equipment are made to governments, government agencies, or organizations largely funded by governments. Consequently, the influence of governments on the market is strong and highly visible.

The Canadian industry is dominated by the two major vehicle manufacturers, Bombardier in Quebec and the Urban Transportation Development Corporation (UTDC) in Ontario, which is owned by Lavalin Inc. of Montreal. These companies produce a wide range of mass transit and commuter cars and can design complete systems. Both companies are diversified into other product areas.

The two dominant Canadian manufacturers are complemented by some 250 other companies in Canada which manufacture vehicle assemblies and sub-assemblies (including propulsion systems) and supply the other components of electrical and mechanical equipment. These companies range from large, diversified multinationals such as Westinghouse, General Electric and ITT which supply major subsystems to small firms producing specialty products such as digital radios (e.g., RMS Controls) and training simulators (e.g., Dynamic Sciences Ltd. [DSL]).

Bombardier and UTDC together employ an average of 3000 to 4000 workers in urban transit; their suppliers employ at least an equal number. Employment is split between Quebec and Ontario. For the other equipment manufacturers, employment related to urban transit activities cannot be segregated from their overall employment figures.

The industry is highly export-oriented. Seventy percent of orders for the period 1983-87 were for export. The United States has been the major export market, accounting for 95 percent of total exports.

Both Bombardier and UTDC have recently enhanced their international marketing organizations: Bombardier through its recent acquisition of BN of Belgium and UTDC through the international marketing organization of Lavalin.

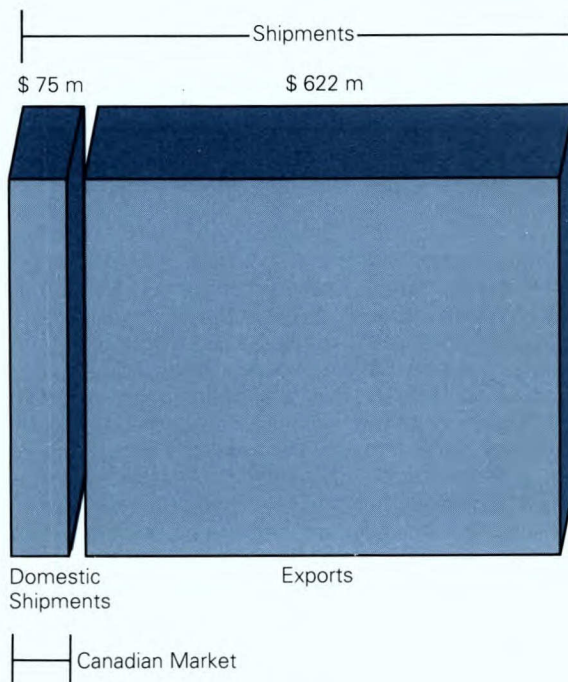
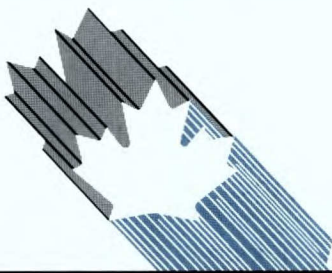


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**Exports and Domestic Shipments
1986 ***

* Shipments are estimated vehicle sales. Imports into Canada of the products of this sector are estimated to be zero.

Canada's two vehicle manufacturers face an estimated 56 competitors worldwide. Some of the major multinational competitors are Kawasaki Heavy Industries and Hitachi of Japan, Duesenberg and MAN of the Federal Republic of Germany, Alstom Atlantique of France, Metro Cammell of the United Kingdom, Breda of Italy, Hyundai of Korea, Comeng of Australia and Cobrasma of Brazil.

All international sales are large-scale. Even those to established operators, where the product is manufactured to specifications compatible with existing equipment, tend to be over \$100 million. Vehicles, the largest element in this type of purchase, sell for over \$1 million each. Many sales for new installations are made on a turnkey basis; recently, some have included a build, operate, transfer (BOT) package. The two dominant vehicle manufacturers typically take the lead to form consortia. In the case of BOT packages, often equity participation by the consortium is required. Depending on project specifications and contract conditions, the manufacturers may draw on foreign companies for components or equipment. In specific cases, Canadian companies may participate in a foreign-led consortium or form a partnership with a foreign-owned company to bid on particular projects.

Consortia allow partners to prepare an integrated proposal with compatible equipment, as well as to create the core of financial strength required to obtain the contract. In order to spread marketing costs, it is not unusual to see competitors collaborating to jointly bid on one or more turnkey projects in different markets.

Given the long service life of transit systems and the scale of these orders, there is intense competition for initial systems, since follow-on orders for extensions are often awarded to the original supplier. The ability to provide export financing with competitive terms and conditions is a major factor in securing such sales.

Performance

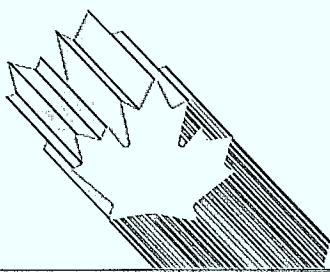
The urban transit industry has grown dramatically from the mid-1970s. As Montreal and Toronto developed their subways, the Canadian industry developed a supply capability to provide them with equipment. At the same time, the U.S. market, stimulated by generous federal funding for mass transit projects, provided a ready export market. Export sales began in the mid-1970s and have grown steadily, accounting for fully 70 percent of the \$2.6 billion in sales for the period 1983-87. Because of the nature of the industry, the flow of sales and shipments is irregular and does not lend itself readily to identifying trends. Shipments have fluctuated from a low of \$37 million in 1981 to a high of \$697 million in 1986. Despite this dramatic fluctuation, the industry has worked on average at close to full capacity for most of the period from the mid-1970s through to 1987.

2. Strengths and Weaknesses

Structural Factors

In this industry, critical factors of success include a demonstrated technological capability to develop and design products and systems, competitive pricing, a reputation for reliability and quality, competence in project management and the financial depth to participate in large-scale projects. A substantial domestic market to support the high development costs is also important.

Compared to its Japanese and European competitors, the Canadian industry suffers from having a small domestic market base. However, its proximity to the important U.S. market has partially compensated for this. When U.S. demand surged in the 1970s in response to federal funding, the American firms were too large to handle smaller projects economically. The Canadian industry penetrated the U.S. market by filling these smaller orders. Later, for a variety of reasons, all of the large American vehicle manufacturers withdrew from the urban transit industry. Canadian manufacturers were then well situated to expand further into the market and undertake larger projects. The U.S. market was not subject to procurement barriers until 1978.



The Canadian industry is competitive both in terms of product and price. In addition, Canadian manufacturers have a good reputation for quality and reliability which is essential to secure future sales.

In terms of product, Canadian firms can supply a broad range of conventional equipment; in fact, they lead the way in certain selected product areas. Bombardier's acquisition of BN, a major Belgian designer and manufacturer of urban transit equipment, broadens the company's design capability and enables it to participate in European Community (E.C.) markets. Other recent purchases (Transit America and Pullman designs) are also expected to leave the company well-positioned in the United States and other markets. The purchase of UTDC by Lavalin has strengthened its competitive position, especially for turnkey projects, by adding expertise in international project management and engineering design and construction.

The price competitiveness of Canadian companies is reflected in the fact that Canadian bids are usually close to that of the winner. Manufacturing economies of scale are of marginal importance in this industry, since quantities are small and usually involve unique specifications.

Purchasers of urban transit systems place heavy emphasis on quality and reliability. In this respect Canadian suppliers fully match the performance of their competitors. Their association with large operating entities (the Toronto Transit Commission, the Montreal Urban Community Transportation Commission and British Columbia Transit) provides them with a showcase to demonstrate their performance. In addition, Bombardier's 1983 sale to the New York City subway and UTDC's Advanced Light Rapid Transit (ALRT) project in Vancouver demonstrate that the industry is capable of handling very large projects. The completion and effective operation of the equipment has provided the industry with the credibility necessary to pursue other major projects around the world.

In relation to other competitors, the Canadian industry, however, suffers from an inability to source in Canada all of the necessary components for a systems proposal, although Canadian manufacturers can and do draw on foreign sources for components. This can hamper the industry's ability to supply systems bids.

For a variety of reasons, Canada sometimes also faces the difficulty, particularly in developing country markets, of having two Canadian companies bidding on major international projects. This is because government clients in developing countries tend to perceive bids from companies in other countries as national efforts of those countries. In most cases, therefore, only one bid is made from one country, and that bid enjoys full official support, frequently including financing and high-level government participation. Having two Canadian bids can undermine Canadian chances for success.

For some projects, especially turnkey projects, Canadian consortia lack the financial depth of other competitors. For instance, the U.S. consortium organized to bid on a US\$3 billion transit project in Taipei has combined assets greater than those of the whole Canadian industry. That consortium can therefore arrange items such as large performance bonds much more easily than could a Canadian group.

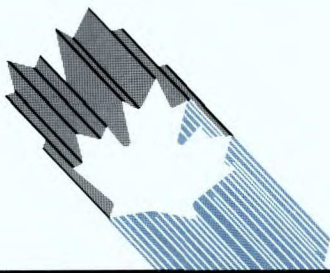
Trade-related Factors

Barriers to trade are critically important, given the industry's dependence on exports.

Tariffs are not the major obstacle. They have, however, served the purpose of providing some protection to Canadian manufacturers in the domestic market. Canada's tariffs range from 9.2 percent to 12.5 percent; those in the United States range from 2.2 percent to 6.3 percent. There are tariffs in most developed and some developing countries.

Non-tariff barriers, specifically government procurement policies, are a significant barrier to Canadian exports to developed countries. Such barriers have effectively excluded Canada from the European and Japanese markets. While Canada has been successful to date in the U.S. market, "Buy America" requirements under the U.S. federal *Surface Transportation Assistance Act* and various state requirements have become increasingly restrictive in recent years. In addition to the requirement for U.S. final assembly, the "Buy America" clauses have a minimum requirement of 50 percent U.S. content. These minimum local content levels are being increased in two stages from 50 to 60 percent over a five-year period ending in 1991. While Canadian companies which already meet "Buy America" requirements are not subject to the new local content levels until 1992, the tightening of the "Buy America" requirements will seriously compromise the future of the industry in Canada over the longer term. "Buy America" policies, for example, have already led Bombardier to establish an assembly facility in Vermont and UTDC to make arrangements for U.S. assembly on an ad hoc basis for specific projects.

In Canada, the provinces also have their own procurement requirements, although these are less restrictive than the "Buy America" clauses. Quebec requires 45 percent Quebec content in urban transit projects. Most other provinces, including Ontario, give a 10 percent preference for Canadian purchases, i.e., Canadian bids can be as much as 10 percent higher than those from competing countries. Ontario has traditionally purchased from Ontario sources. While these procurement practices have nurtured two major Canadian companies, they have also discouraged the development of a horizontally integrated Canadian industry.



Developing countries increasingly require countertrade, technology transfer, high levels of local participation, etc., as part of bidding packages.

The only provision directly affecting this industry under the Canada-U.S. Free Trade Agreement (FTA) is the removal of Canadian and U.S. tariffs on urban transit equipment, which are to be phased out over five years.

Technological Factors

The Canadian industry is competitive in terms of product technology. In some instances, Canada has a lead.

The UTDC has R&D and design capability and two major facilities in Ontario to develop its designs, with test tracks to evaluate its vehicles. The company developed its Advanced Light Rapid Transit (ALRT) for Vancouver, utilizing linear induction motors, steerable axle trucks and automatic train control. All of these were new to the industry. UTDC also designed a new streetcar for North American use — the Canadian Light Rail Vehicle (CLRV) — special freight bogies for the rail industry, the unique bi-level commuter car in use in Toronto (for which there appears to be a good market in heavy suburban corridors) and the lightweight subway car now used in Toronto.

Bombardier has acquired up-to-date product designs through licencing (Kawasaki designs for the New York subway) or purchase (Disney's Monorail and the WEDWAY people mover system). Other acquisitions such as BN of Belgium and the Transit America and Pullman designs have provided the company with a complete line of transit equipment and the technology to produce it in aluminum, core ten (a type of specialty steel) and stainless steel. Bombardier also has facilities for R&D and testing.

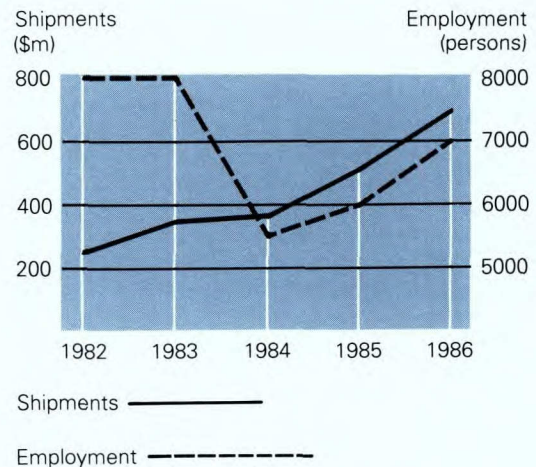
Both Canadian vehicle manufacturers have introduced computer-assisted design (CAD) and computer-assisted manufacturing (CAM). Their production technology is on a par with that of their competitors.

Other Factors

Export Development Corporation financing can play a critical role in obtaining export orders in the face of international financing competition.

3. Evolving Environment

Population trends in developing countries will create important market opportunities. The world's largest cities are in these areas, and with continuing rapid urbanization, there will be a growing demand for mass transit systems.



Total Shipments and Employment*

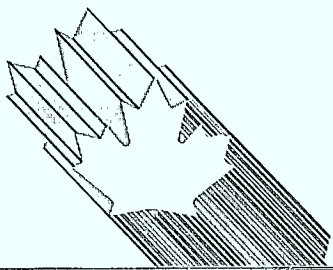
* DRIE Estimates. Shipments are estimated vehicle sales.

The world market for electrical and mechanical equipment for urban mass transit is, therefore, expected to be substantial. Outside of Japan, Europe and the Soviet Union, which have been virtually closed to Canadian suppliers, demand is estimated at \$30 to \$50 billion over the next 15 years. Canadian domestic demand will account for only one percent of this total and will occupy only 10 percent of domestic productive capacity. Exports will therefore be essential for the survival of the Canadian industry.

Competition will intensify as new competitors (Brazil, Korea and Australia) enter the market. Export financing will continue to play a central role. There will continue to be a major role for international joint ventures as consortia attempt to put together the most attractive financing and marketing packages. As noted above, Canadian companies are already beginning to participate in international consortia in specific cases.

In developing countries, all companies will have to pay more attention to requirements for technology transfer and countertrade when putting together bidding packages.

The United States will, in the medium term, continue to be Canada's best potential market. The U.S. market is estimated at \$15 billion from now to the year 2000. Reduced availability of U.S. federal funding and the high costs of subway systems are encouraging buyers to consider lighter systems such as the ALRT, monorail, and light rail vehicles (streetcars), where Canada is well-positioned to compete.



Export financing could become an increasingly important part of the bidding for U.S. projects. This is due not only to the reductions in U.S. federal government funding for transit projects, but also to a loosening of U.S. rules which require transit authorities to award contracts to the lowest responsive and responsible bidder. Municipalities and transit authorities can now accept the "best deal" which offers the most attractive features for the total package.

As "Buy America" restrictions become increasingly more stringent, they represent a big inducement to offshore firms to locate production in the United States. If a major influx of foreign producers comes about, competition in the United States will intensify. The Canadian industry is almost sure to take a closer look at the transfer of manufacturing to the United States. While both companies have diversified operations and can survive short gaps on the order books, a failure to secure orders in offshore markets could eventually result in a relocation of Canadian urban transit production south of the border. Canadian provincial procurement barriers would not appear to be sufficient to counter this shift as the domestic market is too small.

The removal of tariffs under the FTA is expected to have only a minimal impact, since non-tariff barriers are far more critical to this industry. While access to the United States would not be significantly affected, the removal of the protective Canadian tariff would make it easier in the long run for U.S.-based companies to compete in the Canadian market.

4. Competitiveness Assessment

The Canadian guided urban transit industry has demonstrated its ability to compete in world markets. Overall, the companies are competitive in terms of both price and technology. In certain product technologies, they are the world leaders. Several factors, however, have implications for the future of the industry.

In the United States, the Canadian companies face increasingly restrictive procurement barriers. In developing country markets, the companies are handicapped by their lack of financial strength. In addition, the fact that two Canadian companies are bidding against each other in developing countries hampers Canadian chances for success since the governments of these countries perceive transit bids to be national efforts and are accustomed to dealing with only one bid from one country. Success in offshore markets, therefore, will depend on overcoming these weaknesses and on matching the government-supported export financing packages of foreign competitors.

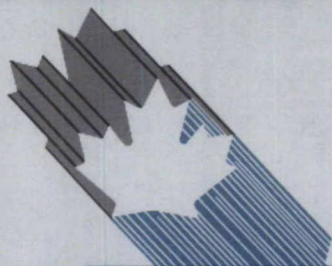
A failure to penetrate offshore markets, together with a tightening of U.S. non-tariff barriers, could compromise the continued viability of the urban transit industry in Canada.

The FTA is expected to have a minimal impact on this industry in the short to medium term. In the long term, Canadian suppliers will face increased competition in the domestic market.

For further information concerning the subject matter contained in this profile, contact:

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Department of Regional Industrial Expansion
Attention: Guided Urban Mass Transit
235 Queen Street
Ottawa, Ontario
K1A 0H5

(613) 954-3437



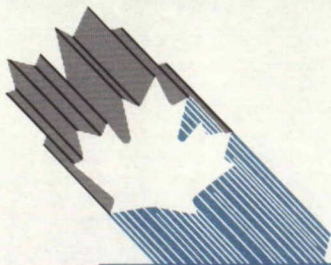
PRINCIPAL STATISTICS*

SIC(s) COVERED: various

	1973	1982	1983	1984	1985	1986
Establishments	N/A	250	250	250	250	250
Employment	N/A	—8 000—		5 500	6 000	7 000
**Shipments (\$ millions)	N/A	246	355	364	514	697

TRADE STATISTICS

	1973	1982	1983	1984	1985	1986
Exports (\$ millions)	N/A	161	115	44	203	622
Domestic shipments (\$ millions)	N/A	85	240	320	311	75
Imports (\$ millions)	N/A	0	0	0	0	0
Canadian market (\$ millions)	N/A	85	240	320	311	75
Exports as % of shipments	N/A	65	32	12	41	89
Canadian share of international market		—Less than 1%—				
Source of imports			U.S.	E.C.	ASIA	OTHERS
(% of total value)		1982 1983 1984 1985 1986		No Imports		
Destination of exports			U.S.	E.C.	ASIA	OTHERS
(% of total value)		1982 1983 1984 1985 1986	58 22 50 100 100	0 0 0 0 0	0 0 0 0 0	42 78 50 0 0



REGIONAL DISTRIBUTION — Average over the last 3 years

	Atlantic	Quebec	Ontario	Prairies	B.C.
Establishments — % of total	0	45	55	0	0
Employment — % of total	0	50	50	0	0
Shipments — % of total	0	60	40	0	0

MAJOR FIRMS

Name	Ownership	Location of Major Plants
Bombardier (Rail)	Canadian	Quebec, Vermont
UTDC (Rail)	Canadian	Ontario

* DRIE Estimates

** Estimated vehicle sales

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