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SYSTEMS PLANNING AND DEVELOPMENT  
IN FINNISH NEWSPAPERS

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## PREFACE

This paper is an example of collaboration within the scope of INNOVNET, a network of research institutions interested in innovation management.

One of the sectors singled out for closer analysis at IIASA was telecommunications, which represents a high growth sector with significant societal impact. The paper by Prof. Karttunen is interesting for this research in several ways. It attempts to identify the role of newspapers in communications in general and elaborates on the industry's interaction with and use of telecommunications and information technology.

This technology, a dominant source of change in newspaper production and distribution, is presenting a real challenge to the management of enterprises. Prof. Karttunen describes the state-of-the-art of systems planning and development in Scandinavia in general and in Finland in particular. His data illustrate the depth to which new systems penetrate all activities related to newspaper industry management.

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Management and Technology  
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## CONTENTS

1. ABSTRACT	1
2. INTRODUCTION	1
3. TRANSFER OF NEW TECHNOLOGY	2
4. REASONS FOR CHANGE	4
5. PRODUCTIVE GROUPS IN FIRMS	7
6. SECTOR INTERACTIONS WITH SOFTWARE ENGINEERING	8
7. NEW DIRECTIONS FOR NEWSPAPER FIRMS	8
8. REFERENCES	11



## SYSTEMS PLANNING AND DEVELOPMENT IN FINNISH NEWSPAPERS

Simo Karttunen

### ABSTRACT

Newspapers are becoming a significant user of systems. This has changed the strategy, investment and personnel structure of Finnish newspaper production plants already during the 1970's. National joint efforts and firm policies are reviewed. The reasons for this development are analysed. At the same time as systems are implemented improvements have been obtained in work flow, productivity and economy. There are also problems as many newspapers cannot follow the accelerating technology transfer. In the most successful cases the firms change from passive buyers to active systems development and planning units which both create and transfer new technology. Newspaper systems are highly individual and require an essential software tailoring. On the other hand graphic mass communication – such as newspaper – gets new alternative and competing forms. Newspapers as many other institutions are interested in developing advertising and electronic media such as cable-TV, pay-TV, videotex and video recordings.

### INTRODUCTION

The history of Finnish newspapers is short and intensive and covers about 21 decades of which four first were spent in the Kingdom of Sweden, 11 next ones in the Czardom of Russia and 6 last ones in the Republic of Finland. This paper only touches the last decade and a pair of the coming ones – all as interesting as the older ones. More about the history of the Finnish press can be learned from the group of professor Tommila at the University of Turku which has published thousands of pages on the history of press.

Today newspapers are recognised as a part of mass communication, in fact, its biggest product in most countries. In Finland its business volume was 30 % of the total mass communication in 1978 (2). The consumption of newspapers is high and Finland ranks as fifth in the per capita statistics of Unesco (15), the four higher ranks belonging to Iceland, Japan, Sweden and GDR. In average a Finnish household subscribes about 1.7

newspapers – most of them morning papers evening papers being only about 4 % of the total circulation (7).

As defined loosely (3) newspaper is a local sometimes national communication product published more frequently, typically 3–7 times per week, than other graphic media such as magazines, journals or books. Its economy is essentially based on advertising (7, 15) which covers more than 70 % of the income of Finnish newspapers. This is both a strength and a weakness. In media competition newspapers are leaders in advertising and have almost a monopoly in local business. On the other hand advertising is the most sensitive income component as regards the macroeconomic cycles (7).

Newspapers are well organised in Finland. Most of them belong to the Newspaper Association, which again supports the NTS, Scandinavian Newspaper Publishers Association. Both Newspaper Association and NATS (Scandinavian Newspaper Technical Cooperation Council, the technology promoting part of NTS) play important roles in the technology transfer processes for Nordic newspapers by taking care of many joint efforts such as initiating and financing research and development, information service and seminars. This paper aims at a brief analysis on the changes taking place in the Finnish newspaper firms. At the same time as new technology is accepted – there are also reasons and economic conditions to be considered – it means changes in management, leadership, work flow and organisation deliberately or not. There are only some short general descriptions (15) and sector forecasts (7, 8) and only very few words of analysis (16) on the effects of the rapid technology change in newspapers. My colleagues Tuukkanen and Sivonen (16) have made an early attempt trying to show the primary effects on productivity, manning, work flow and cost structure and lately an economist and journalist Ukkola (11) published a very thorough analysis of the productivity and other effects of editorial text systems in four provincial newspapers during and after system installations 1977–1980. By writing this paper in the INNOVNET group of IIASA (1) I also follow some of the guidelines accepted in IIASA's innovation management studies. On the other hand a series of reports and articles written in Finland on this topic (2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 15, 16, 29) becomes reviewed and summarised for those who cannot know about them.

This study is strictly concentrating in the fairly unique economic and organisational conditions of Finnish newspapers. On the other hand there are general features of communication business and medium or small scale firm problematics which make it interesting also to any readers, who should also forgive the author his fair enthusiasm as an active partner in this successful sector case.

## TRANSFER OF NEW TECHNOLOGY

As pointed out in many reports (6, 7, 8, 27, 29) the trend in the newspaper technology is from manual separate processes such as manuscripts, photocomposing, page make-up, cameras and plate processes to systems, and really to many different systems for various functions. This can be illustrated by listing text, picture and more integrated systems as in Fig. 1. The basic text systems such as composition and editorial systems are just now completed by advertisement systems, page planning and make-up or scanner systems for colour pictures and assembly. The invasion of systems can be easily followed since NATS and ANPA (in Scandinavia and USA respectively) register production installations of the newspaper plants (18, 19).

Development work goes on also in Finland (see the next chapter) because system companies supported by the graphic arts firms including newspapers see that some key products can and should be domestic, particularly software, since tailoring and custom specific options cannot be guaranteed within standard system deliveries.

## GRAPHIC COMMUNICATION PROCESSES

## OTHER COMMUNICATION PROCESSES

e.g.

### 1. TEXT SYSTEMS

- *Photocomposing systems*
- *Editorial systems*
- *Display advertisement systems*
- *Newspaper library systems*

### 2. PICTURE SYSTEMS

- *Colour scanner systems*
- *Colour display and proofing*
- *Electronic cameras*
- *Digital screening*

### 3. INTEGRATED SYSTEMS

- *Pagination systems*
- *Colour graphics plotters*
- *Film plotter systems*
- *Computer-to-plate systems*

*data  
typing  
phoning  
speaking  
conference  
meeting  
video  
drama  
film  
concert  
show*

### DISTRIBUTION ALTERNATIVES

#### GRAPHIC MEDIA

- *Newspapers*
- *Local newspapers*
- *Magazines*
- *Periodicals*
- *Books*
- *Commercial printing*

#### ELECTRONIC MEDIA

- *Radio*
- *TV*
- *Cable-TV*
- *Satellite-TV*
- *Videotex*
- *Teletext*
- *Home video*

Figure 1. Graphic communication processes listed as types of text, picture, and integrated systems.

As a rough estimate we have forecast (20) that systems investments in the graphic arts industry (being about twice as much as those of newspapers alone) will rise from about 100 MFIM 1980 to about 300 MFIM 1990 in Finland. At that time the system investments will be the major part of all newspaper business investments. Relatively, the system investment may rise from the today's level 1-2 % of turnover to about 3-6 % annually. In less than ten years such investments – if they can be done – will be real strategy functions for the firm management. The newspaper companies who don't see this or cannot for any other reasons follow the development will be in a difficult situation in the beginning of 1990's.

The system investments are a very challenging task for the user firms. Systems engineering companies tend to offer standard systems which are promised to fit any user's needs. Newspaper management should start from their own requirements such personnel, product back-up and capacity aspects and then force the system manufacturers to seek the proper solutions even if this means additional software. Being actively with some newspaper firms in such planning projects (30) the definition and adequate documentation of user needs is a difficult and ever changing task. In such a situation the firms in fact decide whether they are actively transferring technology or just blindly purchasing already developed and often obsolete solutions. A system delivery is always more than a bought machine since the user must be taken care with new versions of software, training service and the additional new developments as joint efforts. Fortunately there are fairly many firms already having experience of systems implementation. They are lucky since doing is the only way of learning this – how difficult or expensive it may prove to be.

It is not only the prepress area i.e. text and picture systems but also the mass production area i.e. printing, mailing and distribution which are changing rapidly. Systems for controlling those processes have been reviewed as well (6, 7, 14, 27, 29) and their market is rapidly growing. In the prepress area the computer systems form the production line whereas in mass production the material process (e.g. printing) is auxiliarly helped by control systems. Additionally many firms are using production control, job cost, subscriber and custom register systems on mini or microcomputer hardware.

## REASONS FOR CHANGE

There are many real and some more abstract reasons for the development. These may be only listed and some of them seem to be selfevidencies. As newspaper production has been very labour intensive the substitution of manual work was one of the first reasons already in the end of 1960's when the first photocomposition installations were started. Composition department really is the place where now less manual labor is needed. Fig. 2 shows however the two other important prepress areas:

- The editorial department where the text processing starts but which also is responsible of the page design editorial picture material and news gathering
- The advertisement department or ad processing which is responsible to the advertisers of the quality and design of printed ads.

These two departments are as labor intensive – or even more so – as the composition used to be. Additionally any straight forward automation is far more difficult in such complicated operations. Systems with higher degree of intelligence, interactive features and local distribution seem to be needed. Now, instead of substitution, the liberation of highly skilled and motivated personnel from secondary and tedious routines becomes the planning objective (16, 30). Systems will certainly lead to better throughput and the increasing production and more complex products can be processed with even smaller manning in the long run.

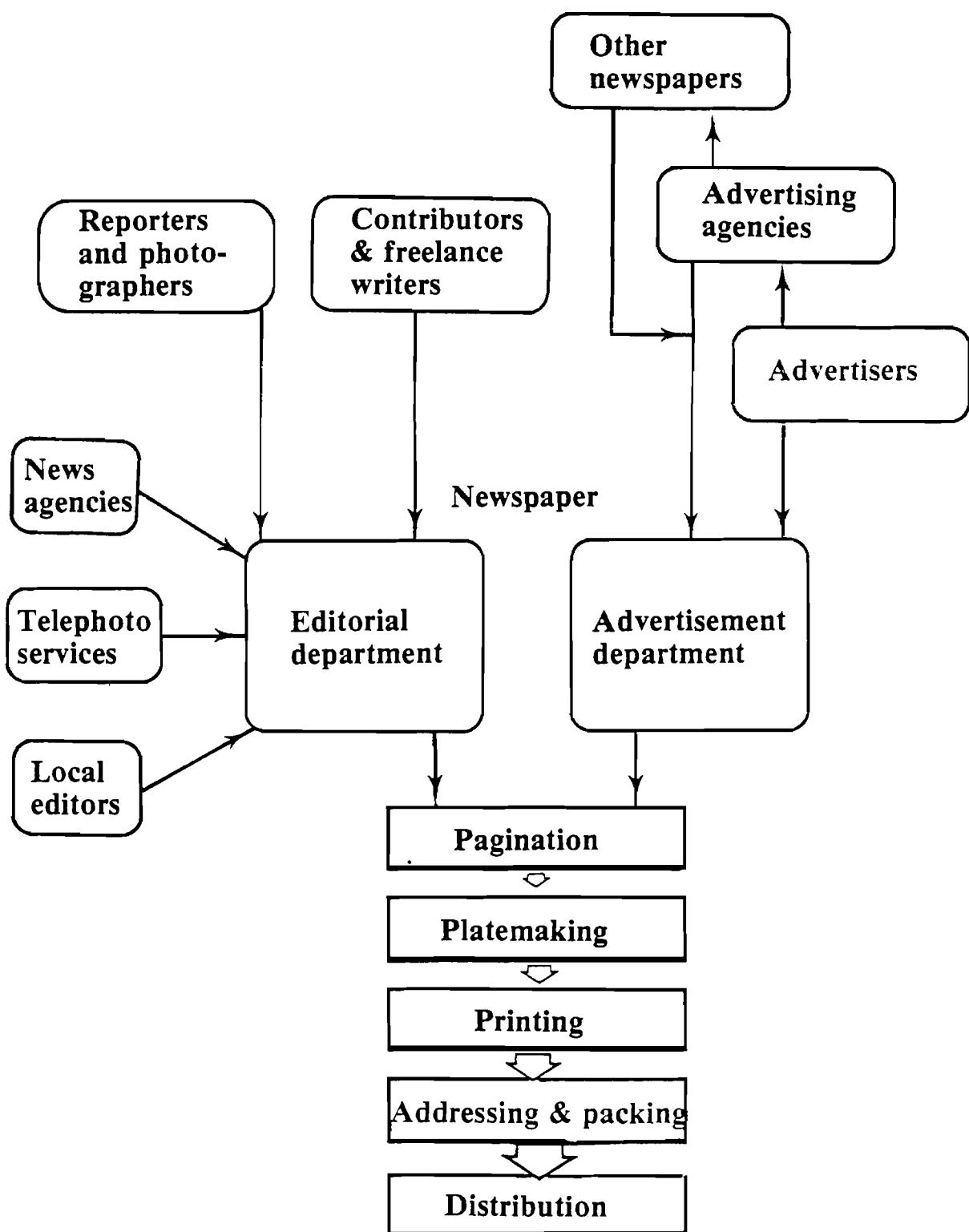


Figure 2. Newspaper production stages.

Let us list some most obvious reasons for technology change:

- Increasing cost of labour makes labour saving or enhancing investments profitable
- Some processes such as distribution become more expensive due to several reasons (9, 14) i.e. cost of labour, heavy night work and transportation
- Raw materials – not only paper and inks but also films, plates and chemicals – are more expensive and price fluctuations (7) cannot be transferred in prices. Thus less material oriented processes, material economy and upgrading such as colour printing (which means more inks but no more paper) are relevant approaches.
- Energy dependence of newspaper is mainly (50–60 %) due to paper (9, 13) but also printing and transportation have their shares. In total the energy costs still remain on a very moderate level of about 6–8 % of the total costs.
- Advertising business has been increasing in Finland and newspapers have come up to about 60 % of all ad revenues (7, 15) being market leaders, far above magazines, TV, direct advertisement and free sheets. Ad production profits and service level depend on the systems used in production.
- Free sheets can use the same technology as the newspapers in ad production. They compete in local markets with low prices and have reached a turnover of about 95 MFIM 1980 which is about 3 % of the total ad revenues (13). Due to small firm size the free sheets have to wait for cheaper systems and newspapers can try to beat them by faster production and higher quality. Both parties will be using systems.
- Magazines are competing with newspapers in the national ad market (5). They use colour printing on high quality coated papers. They are using the new digital picture processing and assembly systems in ad production.

Many of the listed reasons are competition dependent rather than simple savings or rationalisation measures. A management must be capable to handle such complex matter and collect relevant information for decision making.

Newspapers are however doing many things jointly and that is possible due to less mutual competition than in other media say magazines, books, direct ads or business forms. Most newspapers are local products and national newspapers have their special profiles. In Finland this has lead to concentration of certain joints efforts to the national Newspaper Association, and via it, to NTS and NATS at the Scandinavian level. Additionally newspapers play certain roles in the Central Association for Graphic Arts and the respective Employer's Association jointly with book, magazine and commercial printers, some of them profit centers of newspaper firms.

NATS has been a forum of following the systems supply and feasibility (16). Many valuable reports and handbooks have been prepared and distributed to Scandinavian newspapers. Its annual conferences and exhibitions have been very popular and more specific than bigger international exhibitions. Most of the companies are small firms with turnovers typically around 20–60 MFIM, and a personnel of about 100–200. They could send both managers and plant supervisors to learn about latest things in NATS conferences. Seminars are held on special topics such as text systems, material economy or new reproduction systems. NATS has also initiated and financed newspaper research and development mainly in the national research laboratories (31).

During 1981 Newspaper Association made its own research and development program for technology. This program will guide (not execute) the work done in the Association and research institutes. Through many permanent working groups, such as Technologist's Committee, where about 10 production managers from different firms meet the program of Association is discussed. All projects supported by such groups and started are then further followed and used by them as well. These joint projects cannot solve the individual problems of the firms but they are necessary for planning and development personnel.

Development work is also performed in separate systems engineering firms and in the biggest newspaper companies. Also the electronics industry, which reached the value of production of about 3000 MFIM (12) will perform product development projects and later market systems or software to newspapers and other graphic media.

All necessary components now activated, within about 10–15 past years, this sector should be able to control the dynamics of changes. In this work the firms are in central roles. Jointly, the Association helps by monitoring the technology statistics (17), where the main productivity and economy figures are gathered. It has also performed review and forecasting studies with and without the research experts (7, 8, 29, 32).

## PRODUCTIVE GROUPS IN FIRMS

It is very evident from the few pieces of analysis (7, 11, 32) that many systems and later networks and particularly their software and human ware, from management to leadership, supervisors and craftsmen are the key elements. If we take a separate case of success, such as newspaper *Keskisuomalainen*\* analysed by Ukkola (11) we see that systems are used for creating, what is here called, *productive groups*. This term is author's attempt to express shortly this core of production system planning. We can think today's newspaper processes being run by more or less productive groups using some few systems if any.

The change becomes a series of projects in firms – maybe assisted by experts – in which systems of increasing integrity towards various networks and system architectures are *continuously* planned using the expertise and know-how simultaneously but slowly accumulating in the firm's management and personnel.

It is important to accept that there will be no single integrated system and no patent solutions but many very different systems which may or may not (if not necessary) be interfaced to the local or in-plant networks. For example the reproduction systems are used to process pictures – later masses of them – which need quite another approach as regards to software, processors, busses, memories and displays which are to be used. On the other hand, these systems are in the main production line and not just auxiliary control systems which means the productivity requirement, and clear money losses in the case of less successful system solution.

Theoretically there are also some problems left. It is unfortunately just now when we still define measuring methods and units for the various production amounts (characters, text blocks, pictures, colour, pages, plates, assemblies, sheets, folds, covers, backs, addresses, packages).

The department or system line productivity can be monitored automatically if we just understand the measurement of production and the respective time, labour and capital factors. It is just this department productivity which is the most difficult planning objective. Others such as ergonomics of the working stations, system architecture, capacity and back-up are easier.

In setting the productivity definitions and goals the planning group also has to consider the personnel policy issues and union aspects. In Finland the Employer's Association, Printer's Union and Journalist's Union have agreed upon a frame contract. Additionally the firms in the case of system investments concerning the members of both unions have to make an agreement in the beginning of that particular project. Both parties have in principle agreed on the need of new technology. They also understand

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\* A medium size newspaper with a circulation of about 71 000 (1981) located in Middle-Finland. One of the earliest users of editorial text systems.

how difficult these cases may individually be and what are the planning aspects which help over the difficulties. The frame contract and its principles are needed and thus appreciated. This understanding is a result of many decade's labour market maker's work. In many other countries such as UK, particularly the Fleet Street papers, and Denmark new technology has been a reason for hard strikes and other disturbances.

## 5. SECTOR INTERACTIONS WITH SOFTWARE ENGINEERING

Software engineering business and systems marketing have been interested in the graphic arts industry for years. Several big companies such as Harris, DEC, IBM, SDC, Siemens, Esselte/Dymo, ITEK, Kodak, Agfa-Gaewaert, Ferranti, Norsk Data, Nokia Electronics and many others have made more or less successful approaches both by developing or by acquiring systems engineering groups. In Scandinavia Nokia and Liber lately announced (25) a systems engineering project which aims at an integrated text and picture processing system TIPS for newspapers including colour image processors which the Swedish party Liber gets from a smaller University based company from Lindköping and text system know-how by Typlan.

Kodak bought Atex – a very successful text processing system company – for getting some connections to the professional graphic arts markets where films and chemicals can be seen as a product group with limited marketing time scale and particularly threatened with electronic imaging technology. Similarly Agfa-Gaewaert moved towards text and picture systems market by acquiring the majority of shares of the Compugraphic – worlds biggest photocomposer firm.

IBM has spent lots of attention and some money to enter the graphic arts text systems market without any great success whereas DEC makes both their own text systems (for US market) and sells very well through several DEM customers its minicomputer systems as the main hardware for the software engineering, done by about a dozen system houses.

In this era of sudden birth, blossoming and merging of system companies the bigger concerns are relatively happy to find new ideas developed towards ready products and the smaller companies normally turn out to be overdynamic and poorly financed particularly as regards the need for infinite technological development. In Finland the case of Typlan – now a subsidiary of Nokia concern – is typical. After several system products and about 80 installations with which Typlan holds the majority of the Finnish text systems market the company was successfully sold to Nokia in 1981 but still a minority of shares belongs to several persons and companies of the printing industry.

## 6. NEW DIRECTIONS FOR NEWSPAPER FIRMS

As the newspaper business and many other graphic communication products are no more any rapidly growing products the firms must focus their attention to other directions. Internationally there are big differences in costs and productivity of graphic arts firms (24). On a local area – i.e. a medium scale city with its surroundings – newspaper is normally one of the leading companies within the information sector. There are already today several Finnish examples of joint efforts where newspapers have taken other companies, computer services firms or local software engineering groups (20, 25, 26) as partners in development projects. The objectives of such projects vary from subscriber register systems, production control, job cost systems and similar conventional small systems to very special electronic communication systems such as local videotex (several Finnish companies) or catalogue information system LIS (26) which was developed for updating the local

telephone book data bases and which also includes a search system useful as an electronic directory for the videotex customers.

Cable-TV and pay-TV have been a permanent topic for many discussions in Finland. Helsinki TV is the first local and private cable-TV company in Finland and Helsingin Sanomat the biggest newspaper runs this activity which already covers almost 100 000 households in the Helsinki city area. Many companies are interested in video cassettes and discs (23). There are also some signs of the increasing integration into the advertising business which at least on local scale appears as a very natural approach. Newspapers have the main responsibility for producing the daily mass of local display ads of the warehouses and supermarkets and could well offer services in the design of such advertisements.

Finally it seems inevitable that the newspapers have to be ready to respond to the challenge of the office automation sector (27, 28) which pushes intelligent copiers, text and word processors, teletex, local networks, computer output microfilm (COM) and business graphics into practically all customer companies. This causes increasing efforts towards interfacing all these systems into what the telecommunication experts call the integrated data and communication network.



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