



Topic: Demand Driven MRP Update



The State of Demand Driven MRP

A report by the Demand Driven Institute

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www.demanddriveninstitute.com

The Demand Driven Institute (DDI) was founded by Carol Ptak and Chad Smith, co-authors of Orlicky's Material Requirements Planning, Third Revised Edition in order to proliferate and further develop demand driven strategy and tactics in industry to enable a company to transform from "push and promote" to "position and pull."

For more information about our mission and how you might get involved, please contact us at:

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The State of Demand Driven Materials Requirements Planning

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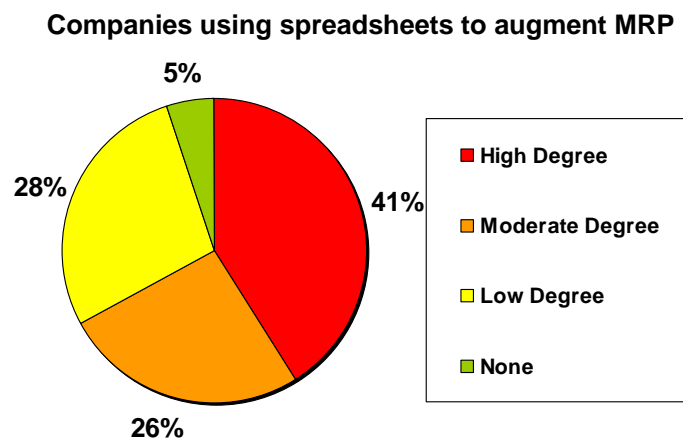
Section 1: The Breakdown of Conventional Planning

Over the past few months the [Demand Driven Institute](#) has been doing a series of webinars on the concept of DDMRP hosted by [Demand Driven Technologies](#). During these webinars the audience answered a few key questions about the problems associated with conventional planning in today's environments.

The results of those surveys strongly suggest that in today's global manufacturing landscape, conventional formal planning for many environments appears to be fundamentally inadequate. This inadequacy is so significant that most planning and purchasing personnel have to develop work arounds outside of their formal integrated planning system in some way, shape and form. Below are the results of our first question during the webinar:

POLL Question #1: To what degree are you using spreadsheets to address limitations in your ERP/MRP software?

High degree – 41%
Moderate degree – 26%
Low degree – 28%
Not at all – 5%



95% of companies reported that they use spreadsheets to some degree to address limitations in the MRP product – 67% to a high or moderate degree. This is consistent with DDI surveys done in 2008 and Aberdeen Group research in 2009. This identified issue leads to questions.

Why do planning and purchasing personnel so distrust what they see in their formal planning system? Why work outside of the system even though it makes the daily routine more difficult?

The number one answer is simple: SURVIVAL.

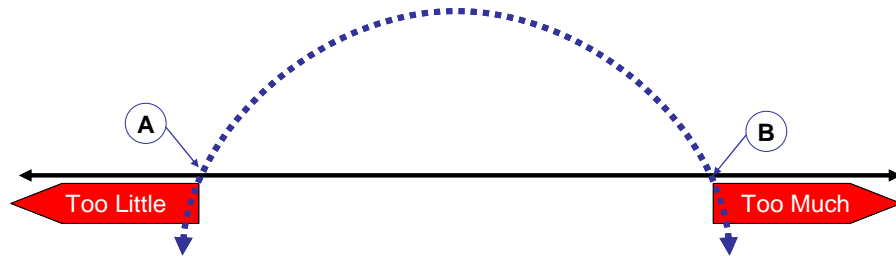
Experienced planning and purchasing personnel know that if they simply follow what MRP recommends they will be in big trouble. Shortages will increase, excess inventory will increase



and expedites will increase. Intuitively planners understand that materials and inventory management, under conventional practices, places them in a no win situation.

How does conventional MRP put manufacturers between a rock and a hard place?

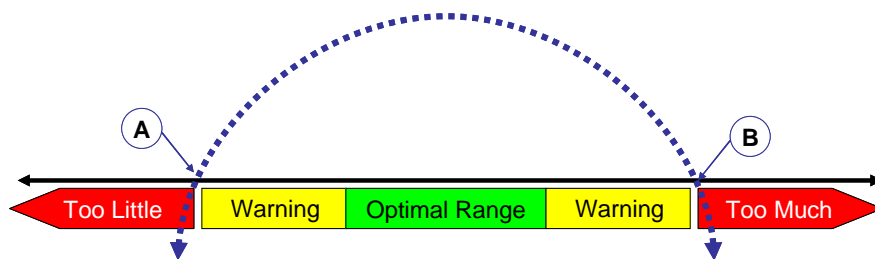
In order to understand the severity of the situation, consider the following simple graphical depiction. Below you see a line running in both directions. This line represents the quantity of inventory. As you move from left to right the quantity of inventory increases; right to left the quantity decreases.



Whether it is at the single SKU/Part # or at the aggregate inventory level, there are two very important points on this curve:

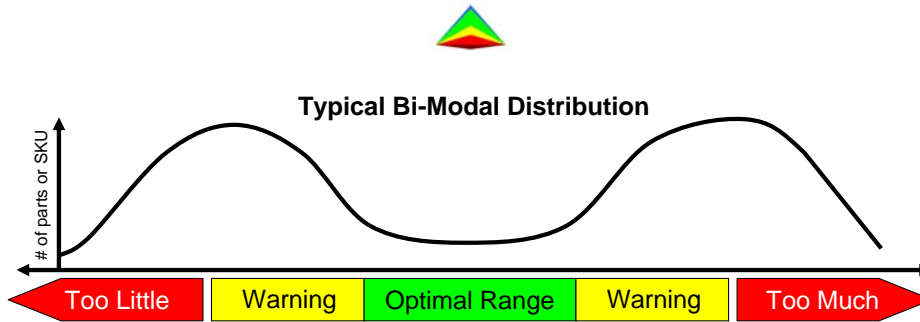
- A point where we have too much inventory and there is excess cash, capacity and space is tied up in working capital. This is represented by point B.
- A point where we have too little inventory and the company experiences shortages, expedites and missed sales. This is represented by point A.

If we know that these two points exist then we can also conclude that for each SKU/Part # as well as the aggregate inventory level there is an optimal zone somewhere between those two points. This optimal zone between the two points is depicted below.



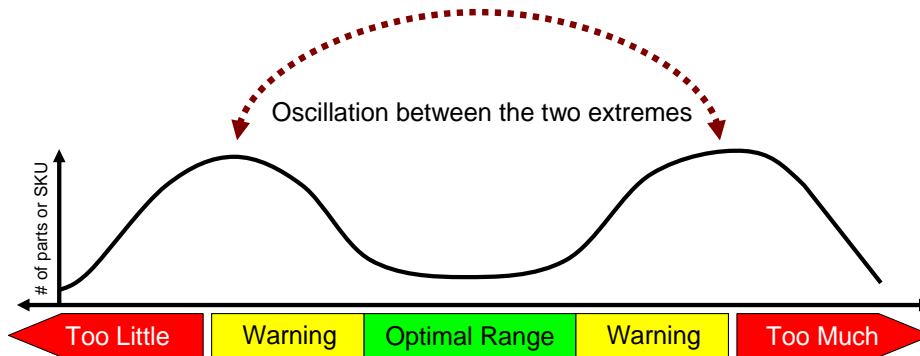
As inventory quantity expands out of the optimal zone and moves towards point B the return on the working capital captured in the inventory becomes less and less. The converse is also true as inventory shrinks out of the optimal zone and approaches zero or less than zero (the typical quantity when we start to have too little). Placing point A at the quantity of zero means that inventory becomes too little when we are stocked out. Placing Point A at less than zero means that inventory becomes too little when we are “stocked out with demand” – the traditional definition of a true shortage.

When the aggregate inventory position is considered against these zones we frequently notice a bi-modal distribution in which a large number of SKU/part #s have too little while still another large number have too much. The smallest population tends to be in the optimal zone.



Not only is the smallest population in the optimal zone, the time any individual SKU spends in the optimal zone tends to be short lived. In fact, most SKU tend to oscillate between the two extremes. That oscillation can occur in an extremely short time frame, especially when planning using traditional dependent demand. This quick oscillation is also called the bull-whip effect.

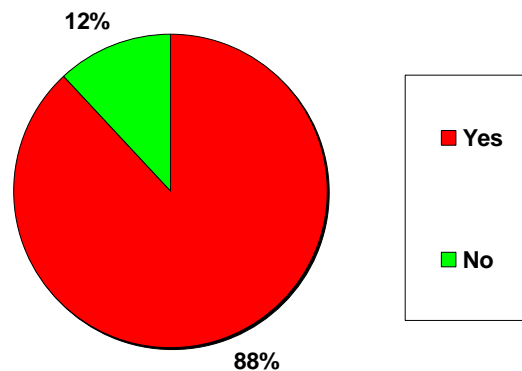
bullwhip effect — An extreme change in the supply position upstream in a supply chain generated by a small change in demand downstream in the supply chain. Inventory can quickly move from being backordered to being excess.¹



Another very simple way to explain this bi-modal distribution and the oscillation is that conventional MRP is a binary system. You are either “OK” or “Not OK.” It is extremely difficult to judge relatively how “Not OK” or “OK” you are. Experienced planners and buyers also know that the time that it takes to go from “OK” to “Not OK” can be in the blink of an eye.

Is this bi-modal distribution real? The results of our survey are quite compelling.

POLL Question #2:
Are you experiencing bi-modal inventory distribution?

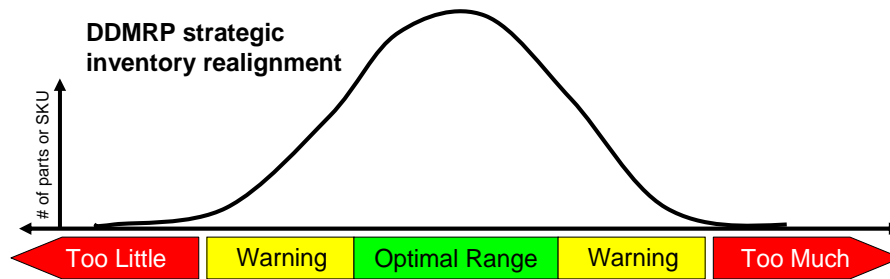


¹ APICS Dictionary 12th Edition, page 40

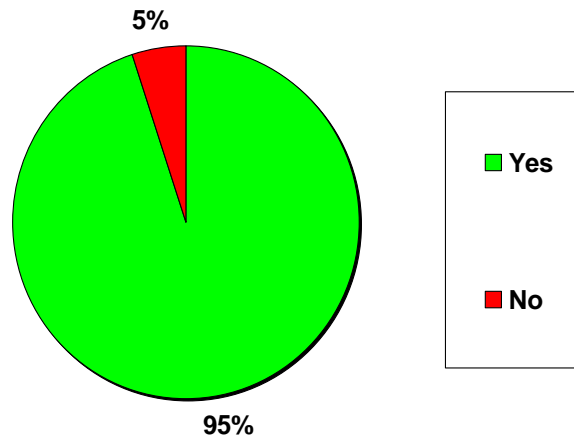


Can Demand Driven Material Requirements Planning Help?

Ultimately DDMRP is designed to attack the bi-modal distribution for the SKU/parts that really matter. The first step of the DDMRP method is to determine which SKU/parts are truly strategic; which parts when stocked decouple lead times, dampen variability and minimize total working capital.



POLL Question #3: Do you believe implementing DDMRP tactics will improve your materials management performance?



What made DDMRP so compelling for these people? Find out for yourself. Sign up for a free DDMRP webinar here: <http://www.demanddriventech.com/webinars.php>

You may also want to visit the comments section on Amazon's Orlicky's Material Requirements Planning (3/E) page. [You will find it here.](#)

Section 2: DDMRP Impact Report – Tube Forgings of America

Tube Forgings of America, Inc. (TFA) has been manufacturing welding fittings since 1955. TFA's customer base varies from oil refining to chemical and petro-chemical processing, from gas transmission to power generation, including nuclear, and from shipbuilding to a broad assortment of commercial



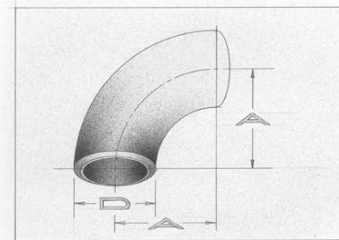


construction applications. Tube Forgings of America is a mid-range closely held manufacturing enterprise.

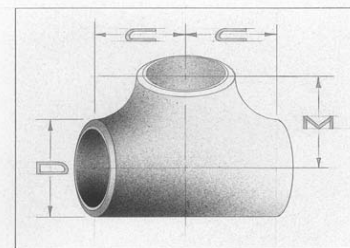
An update from Wally Browning, Materials Manager, Tube Forgings of America

“We currently use DDMRP methods. Our material supply is all directly purchased from steel mills around the world. Our supplier lead times run upwards of 4-6 months. We are a manufacturer that makes 60% of our items to stock. Our customers expect shipment of product in 1-3 days with any backorders that might remain to be shipped within 2-3 weeks.

DDMRP is much more effective than trying to use forecast ‘guesses’ on what we think our customers might buy in the future. By continuously and automatically adjusting for changing actual market trends, DDMRP is constantly adjusting our stocking level signals to ensure we are stocking what our customers expect us to have, and ordering what we are going to need in raw materials in the future.



Using this method, we have REDUCED inventory and decreased WIP, while increasing serviceability to customers. Inventory planning adjusts quickly and smoothly, with very visible and easy to understand signals. As a result, we have been VERY successful during the recent economic crisis.



Our customers have learned to rely on our delivery promises, therefore allowing THEM to change their buying habits, switching to order less more often. This change in their purchasing approach passes on the increased inventory turn benefits to them and gives us a very large marketable advantage. It also allows us to get away from the ‘snake swallowing a rabbit’ syndrome that traditionally impacts a manufacturing facility when dealing with historically large monthly purchases placed by master distributors.”

Section 3: Frequently Asked Questions about DDMRP

Q: Are DDMRP strategic replenishment buffers different from Safety Stock?

The short answer is YES. The two are dramatically different in some very critical ways. Safety stock is supplemental static inventory meant to compensate for differences between planned orders and actual demand. Replenishment buffers are primary points of dynamically managed inventory designed to fully decouple one event or process from another. Through this decoupling, lead time is compressed and ALL supply order signals will correspond to actual demands. We wrote an entire technical white paper on the differences, it is referenced below.

References:

[DDMRP versus Safety Stock](#)

Q: Is MRP failing because it is flawed or poorly implemented?



Yes and Yes. MRP is failing because many the rules embedded in it no longer fit the circumstances of today. Customer tolerance times are shorter than ever before. Combine this with more complex and extended supply chains combined with more complex product structures and variety. Manufacturing companies have never faced this level of complexity and volatility. MRP also fails because it is often poorly implemented so that its full potential cannot be realized. However, its full potential is often not good enough anymore. Companies that look to re-implement MRP will be disappointed with the lack of results. MRP needs an overhaul. There are so many good things about MRP's core purpose but the foundation is simply antiquated, cumbersome and more risky to use in today's environment.

References:

Chapters 2 and 3; Orlicky's Material Requirements Planning (3/E)

[New Rules for the 21st Century Supply Chain](#)

Q: What is the smallest (in terms of annual revenue) manufacturing company where you would recommend DDMRP?

It really depends on how much of their problems relates to material or product availability. Typically, problems manifest themselves in three ways. First, poor inventory performance (too much of the wrong and too little of the right - we often refer to this as the "bi-modal" distribution). Second, poor service level performance. Third, high expedite related expenses - all the extra money and efforts to make up for availability problems. The smaller enterprises (let's say under \$20M) tend to have this more under control because their materials issues are easier to see and compensate for through manual work-arounds. They may simply have a manageable number of end items requiring fewer types of purchased and raw items. However, we have seen smaller companies that greatly benefit from DDMRP especially when they are in high growth mode and need a scalable materials and inventory method for the future.

Q: Is DDMRP simply a consumption based dynamic order point system?

No. DDMRP CAN be a consumption based dynamic order point system but it goes well beyond that. A calculated rate of usage is a factor in determining the buffer levels but supply orders are generated based on what zone of the buffer the "available stock" equation places the SKU/part in. The available stock equation is new to DDMRP and incorporates open supply, on-hand and sales order demand that is past due, due today and qualified as a spike in the future. If usage consumption occurs without sales orders then the available stock equation becomes more driven by actual usage through adjustments to the on-hand element.

References:

Chapters 24-26; Orlicky's Material Requirements Planning (3/E)

Q: What is the difference between planning and execution in DDMRP?

DDMRP carefully separates the process of planning versus the process of execution.

Planning = the process of generating supply order requirements.

Planning is about generating supply order requirements. Remember that DDMRP is a formal planning solution (in the traditional MRP sense). That is why we call the process of supply order generation "Planning".

Execution = the process of managing open supply order requirements.



Execution is about managing open supply requirements. Things always change from the time a supply order is generated until it is received and closed. DDMRP execution is about relating open supply orders against the established buffer levels and short range sales order demand.

References:

Chapters 27 and 28; Orlicky's Material Requirements Planning (3/E)

Q: How are the buffers calculated?

The buffers are calculated using a variety of factors. SKU/Parts chosen for strategic buffering are grouped into families that are managed globally. These groups are based on common attributes including lead time, variability and whether there are significant minimum order quantities. The buffer sizing is composed of three distinct zones (Green, Yellow and Red). Each buffer family has different zonal settings depending on the above attributes. Then the individual traits for each SKU/part are applied to the global settings to create a unique level and zonal distribution for each part.

References:

Chapter 24; Orlicky's Material Requirements Planning (3/E)

[DDMRP versus Safety Stock](#)

Q: What's really new about DDMRP?

DDMRP builds on a solid foundation of known, accepted and still relevant attributes of MRP and DRP. Through innovation, the visibility and pull-based emphasis of Lean and the Theory of Constraints are incorporated into a multi-echelon integrated planning and execution solution.

According to Dr. Eli Berniker, one of the world's foremost experts on Socio-Technical Systems (STS) the DDMRP method has "cracked the problem by, in effect, turning independent demand into what mimics dependent demand via strategic buffers. In place of unreliable statistical forecasts, you have specific requirements calculated within ops for the replenishment of internal buffers."

Here is how one very bright student, Rafael Zveibil, at the British Columbia Institute of Technology described DDMRP: "If you do not know what DDMRP is, I will give this advice: do not let the MRP in the title fool you. DDMRP is not MRP, and it is not Lean or TOC. It is all of them and none of them at the same time. It combines important aspects of all, but creates a completely new whole that causes a shift from the traditional "Push and Promote" mode of operation to "Position and Pull". Position here refers to the strategic decision of where to hold inventory and Pull to production being driven by demand, not forecasts."

References:

Chapters 22-29 and Appendix C; Orlicky's Material Requirements Planning (3/E)

[Standing on the Shoulders of a Giant to See the Future of Formal Planning](#)

[New Rules for the 21st Century Supply Chain](#)

[Lean Finds a Friend in DDMRP](#)

[Orlicky Book Reviews](#)

Q: How do you pick the Strategic items in DDMRP?

A strategic item is also known as a decoupling point.



Decoupling point – *The locations in the product structure or distribution network where inventory is placed to create independence between processes or entities. Selection of decoupling points is a strategic decision that determines customer lead times and inventory investment.*"²

Traditional MRP is all about making everything dependent. It was specifically designed NOT to decouple. In today's more volatile environment making everything dependent is a recipe for disaster. At the same time you cannot afford to make everything independent (like the Lean approach seeks to do). Making everything independent complicates inventory management and forces more inventory into the environment. Enter DDMRP - a blend of dependence between independent points.

References:

[Lean Finds a Friend in DDMRP](#)

Chapter 23; Orlicky's Material Requirements Planning (3/E)

Q: Isn't running to forecast being "Demand Driven"?

There is massive confusion about what demand driven is. The history of the phrase is simple. The phrase "Demand Driven Manufacturing." was coined by PeopleSoft in 2002. The idea was to align manufacturing assets closer to ACTUAL CONSUMPTION. The PeopleSoft VP and thought leader behind this concept? Carol Ptak. PeopleSoft's demand driven manufacturing technology suite was largely lost after the takeover by Oracle. As part of their marketing strategy, PeopleSoft briefed the analysts including AMR and Gartner on the DDM idea. Since then Analyst firms have continued to refer to it and have even attempted to build on it (Demand Driven Value Networks). Unfortunately, the analysts have allowed the idea that forecasts are demand driven to enter into the equation. The Third edition of Orlicky's MRP defines what Demand Driven really means.

MRP is essentially a big calculator. It needs inputs to start its calculation. One of those inputs is "demand." It is up to you to determine what that really means. Does it mean forecasted orders? It can but there are other forms of demand. From the APICS dictionary):

demand — *A need for a particular product or component. The demand could come from any number of sources (e.g., a customer order or forecast, an interplant requirement, a branch warehouse request for a service part or the manufacturing of another product).*³

What if the market does not want to buy what you forecasted? Is "demand" what you want to sell or what the market wants to buy? One answer is a recipe for frustration and potential disaster in the hyper-fickle markets we see today. It all comes down to what you want to call "demand." In DDMRP, forecasted demand is disregarded because the costs of guessing wrong are higher than ever, the guesses are getting more inaccurate AND the efforts associated with short term changes and reactions are increasing. In place of forecasted or planned orders DDMRP uses sales orders as part of what is called an "available stock equation."

² APICS dictionary (12th edition)

³ APICS dictionary (12th edition, page 40)



References: The available stock equation is really quite simple. See http://demanddrivenmrp.com/replenish_safety.php. It is also described in depth in Chapter 26 of Orlicky's MRP 3rd edition book. Available stock is not synonymous with usage.

Q: Under DDMRP, won't someone in the supply chain have to hold stock?

Of course someone in the supply chain will have to hold stock! Unless the customer is willing to wait for the entire supply chain to execute to their demand someone has to hold inventory. No effective solution will prevent that with today's short customer tolerance times and extended supply chains. Holding stock in some form in some place is a reality today. **Holding stock is NOT wasteful. Holding stock everywhere IS wasteful and holding stock nowhere IS also wasteful.** The key and the first component of DDMRP is to find out where the right places to hold stock are.

Q: Under DDMRP will stock levels go up?

In most environments by holding stock in the right places not only do lead times go down but aggregate stock levels go down as well. If the inventory is positioned properly for the environment, lead times are decoupled. This means that many stock positions' reliable replenishment times drop (on manufactured items). Additionally, materials and capacity are directed toward what is actually needed rather than towards a guess of what is needed. The result is that there is less unnecessary inventory. Some inventory positions will rise but many will fall. At the aggregate level inventory tends to drop dramatically.

References:

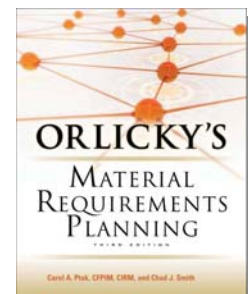
Chapters 4 and 23; Orlicky's Material Requirements Planning (3/E)

Odds and Ends

Carol Ptak and Chad Smith introduce DDMRP to a packed house at the APICS International Conference and Exposition in October 2011. APICS is sponsoring several DDMRP events in 2012. [See 2012 DDMRP events here.](#)



Six months after its release Orlicky's Material Requirements Planning (3/E) went to its second printing.





DDMRP is producing amazing results for early adopters. Early adopters include:



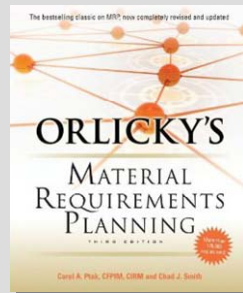
The third edition of [Orlicky's Material Requirements Planning](#) tells the story of MRP; its past, its present and the blueprint for its future. The future, something called Demand Driven MRP (DDMRP), is a true multi-echelon supply chain solution that represents a fusion of the still relevant aspects of MRP and DRP combined with the pull-based methods of Lean and the Theory of Constraints and incorporates revolutionary innovations. The future is now.



Praise for the new Orlicky's Material Requirements Planning (Ptak and Smith, McGraw-Hill, 2011)

"It is in short the best book in this subject area that I have ever seen."

John G. Schleier Jr.



"This is a very useful and brilliant book. Ptak and Smith have resolved the core problems of MRP systems."

Eli Berniker PhD

"This comprehensive text will, in my opinion, become THE new standard for anyone who wants to get ahead in manufacturing."

William M Hewitt

"Carol and Chad: as one of the original MRPs, I applaud you and thank you for your work, and for advancing, with this book, our science more than any other has done in many years."

Bob Reary

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