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RPG core systems: the nine main limitations and solutions



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Despite their proven value, RPG applications struggle to meet modern requirements. The systems can be a real drag for organizations seeking to rapidly launch a web shop or application. So what are their main limitations and how can the systems be modernized?

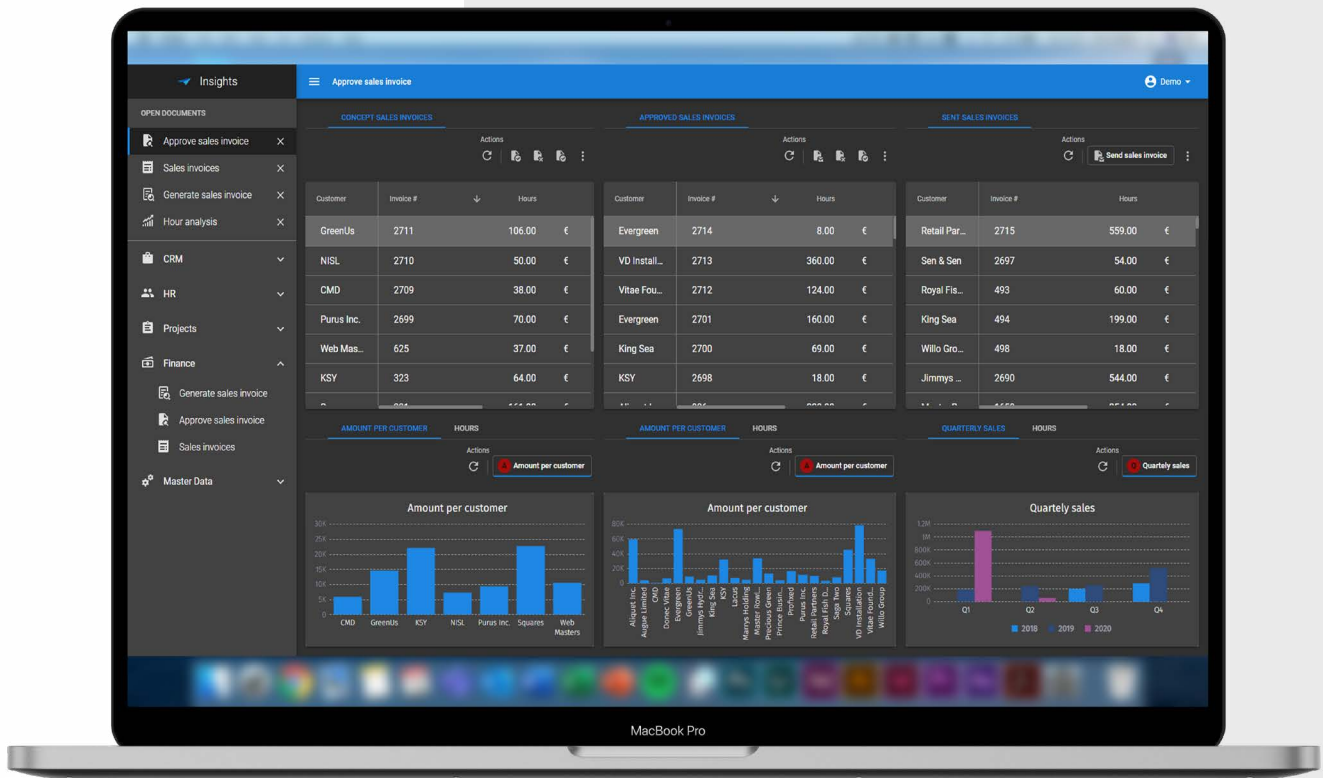


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The limitless possibilities of modern technology are the driving force of progress. You need the capacity to quickly launch a webshop, instantly exchange location and order information with supply chain partners and customers, and always be ready to seize new opportunities. You also want to offer your employees the latest mobile apps in order to make their work more pleasant and efficient. In short, you want to apply all sorts of new technologies to improve your business. However, many businesses find themselves stuck in a technological prison. We will help you come up with an escape plan.

RPG: the inhibiting lead

Numerous large companies run core systems based on Report Program Generator (RPG), the software on the IBM AS/400 and iSeries mid-range computer systems. RPG has now become a heavily outdated programming language and comes with its share of drawbacks. RPG systems used to be the go-to choice, and they continue to provide value to this day.



The power of RPG

- **Specific process support through customization**

Organizations are successful because they serve their customers in a specific way. This calls for a specific form of process support. The system was tailored years ago in order to optimally support operating processes.

- **Consistent high performance**

Continuity is crucial. AS/400 or RPG were – and still are – legendary systems known for their power and stability. The system remains stable and reliable even when processing huge data volumes.

- **Low costs**

AS/400 and RPG have relatively low licensing costs. In some cases, these costs may even be non-existent, since the original supplier has gone out of business

The disadvantages of RPG systems

We are no longer living in the 80s or 90s, when AS/400 and RPG were still the industry standard. Since the emergence of the Internet, we now live in an on-demand, 24/7, interconnected society in which the technological landscape and market needs are evolving evermore rapidly. With systems largely or entirely incapable of adapting effectively, businesses find themselves at a technical and strategic disadvantage.

1. Developer scarcity

Business processes are constantly changing, and programming code has to be adjusted accordingly. The RPG programming language is now so outdated that it has become extremely difficult to find capable programmers. This does not pose a problem when it comes to minor adjustments: modifying a field is not that much of a challenge. However, the modification of entire processes requires real specialist knowledge. If you do manage to find a programmer, they may be aware of just how valuable their skills are. What's more, you will find yourself dependent on a single person.

2. As a result, changes are difficult to implement.

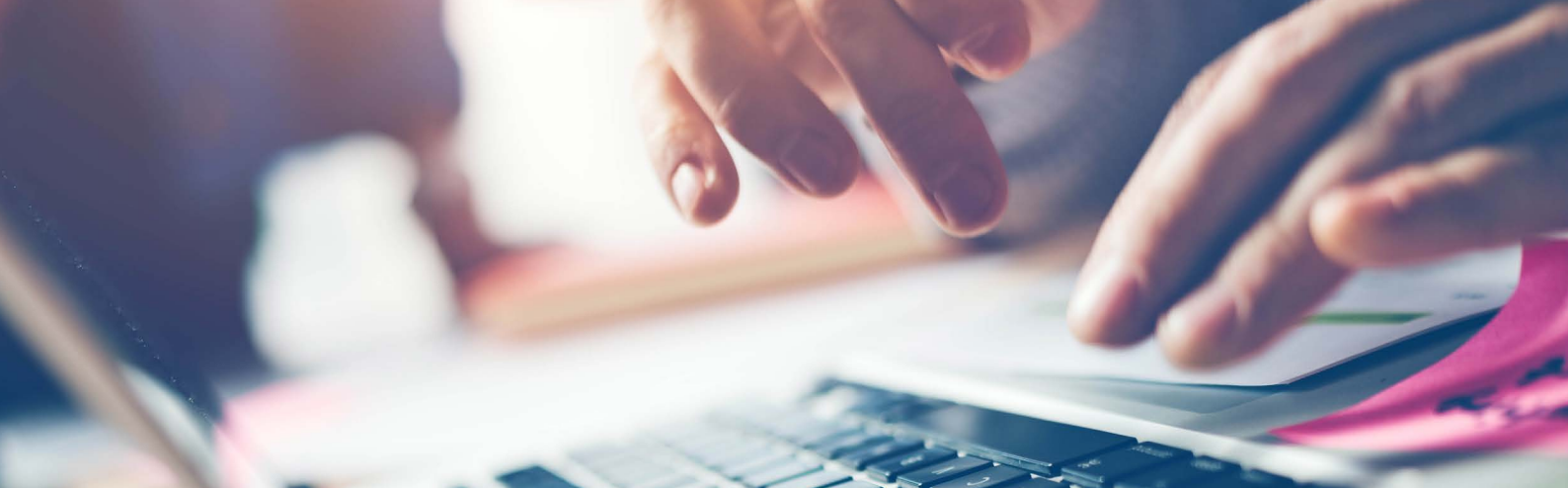
Processes are constantly changing; the quicker you can adjust them, the more competitive you will be. Unfortunately, RPG systems tend to be monolithic, making modifications extremely time-consuming. This comes at the expense of the organization's flexibility and effectiveness. The challenges of the programming language lead many organizations to ignore the code and look for solutions outside the system using other applications.



3. Choosing not to launch web portals and apps with RPG systems

Until the mid-1990s, we used fax, telephone, and regular mail to communicate internally and externally. Nowadays, organizations use web portals to exchange order information with suppliers and communicate with customers via web shops. At a minimum, you need to provide this option as soon as possible to minimize inefficient and error-prone paper flows and phone calls. This is not just about efficiency; current market expectations are key here. These include speed, 24/7 service, and the convenience of self-service solutions. Businesses that fail to meet these needs will rapidly become irrelevant in the B2B and B2C markets.

Companies that still rely on RPG systems created before the age of web portals or web shops cannot rapidly create these environments through RPG programming. This means they will have to purchase, implement, and administer other, newer applications, resulting in a more complex application landscape, additional administration, and higher costs.



4. No integrated control information

When you receive an order, you need to know right away whether you have enough products and order pickers on hand to deliver on time. Will your customers have to wait hours or days for an estimate or will you have to disappoint them with delays? If so, chances are they will never order from you again. This calls for a single dashboard combining real-time control information, financial information, and IoT information. Data-driven solutions allow you to get a grip on your production chain, directly target bottlenecks, and meet your customers' high expectations.

However, RPG systems tend to lack this functionality. For example, warehouse planning is not linked to your sales forecasts. Quotations are prepared outside the system and may not always reflect the full cost of a product or service. When costs are forgotten, profit margins tend to evaporate.

5. Inadequate provision of information to customers

Businesses obviously want to get a grip on their supply chain – however, their B2B and B2C customers also expect transparency. Visitors to the web portal or webshop should immediately be able to see how many products are in stock and when they will be delivered. Customers need to know where their product is and when it will arrive at every step of the ordering and delivery process. If this information is unavailable or incomplete, they will not know what to expect. This ultimately results in dissatisfaction and leads to more work on the customer service side of your organization. After all, your competitors do offer this form of transparency. If you are using an RPG system, you will have to purchase separate tools for this purpose, resulting in additional work, higher costs, and more screens.

6. Complex system integration processes (during mergers and acquisitions)

Organizations make acquisitions in order to achieve synergy benefits; however, this does require processes to be aligned. If the parent company is running an RPG system, aligning the two organizations' processes will require a huge programming effort.

7. Interfaces no longer reflect current requirements

These days, we are used to intuitive, graphical interfaces with icons, touch screens, and mouse support and expect to be able to work on a smartphone or tablet. RPG systems date back to the days of monochrome, text-based systems and have not been updated to meet modern requirements. New generations of employees or new co-workers entering the organization after an acquisition or merger will thus be in for a major culture shock when forced to work on the outdated system. In addition to making organizations unappealing to new staff, this also requires a far longer familiarization period than would be the case with a modern interface. These text-based systems also lack all kinds of information that is essential nowadays. New components such as document preview, management information with graphics or maps with GPS data will all have to be sourced from outside the system.

8. One language, one currency, one channel

The original business has grown over the years and opened several branches at home and abroad. While RPG can handle multiple languages, the original RPG application was never designed to do so. In other words, a German-speaking staff member searching the system for a specific customer will not get anywhere by using the query 'Kunde'. A customer in the US will see all product prices in euros, because the system only supports a single currency. This is obviously far from user-friendly.

The move to online sales has proven especially transformational for retailers and the manufacturing industry. A single showroom was replaced by bulk deliveries to 30 branches. In the case of web shops, the number of buyers and the resulting level of complexity increased exponentially. A typical medium-sized online store now offers a wealth of information, from stock levels for a specific item to background information on product quality. All of these customizations take an enormous amount of time, leaving you dependent on scarce programmers or yet more additional tooling outside of the core system.

9. Ineffective governance and security

A solid governance plan is absolutely essential these days. However, no one had heard of the GDPR when RPG was first introduced; as a result, the system's authorization processes often lack the necessary sophistication. While the system generally allows for authorization, an employee who logs in will then have access to all data within a file rather than the specific data set relevant to their needs. Anonymizing all the system's privacy-sensitive records also tends to require a lot of time-consuming manual labor.

Multi-factor authentication is the current standard; however, RPG applications do not support it by default. This means the functionality will have to be implemented across the full breadth of the application landscape, requiring a serious investment in terms of time and money.

From managing to innovating

You want to be able to use today's technologies and functionalities rather than investing in legacy systems that hold back your growth. Imagine how much you could gain in terms of efficiency and innovation if you got rid of your legacy systems. Which options would help you get ahead?



Option 1 →

A new custom core system

Are you looking for a new, modern, customized system that is seamlessly aligned with your current business process? In addition to being costly, this will involve major investments in terms of time and risks and could lead you straight into another technological prison. By the time your new functionality is ready for use, it may no longer meet the market's latest requirements. Customization will then again be a costly affair.

Option 2 →

Purchase a standard package

Standard solutions are becoming a trend in the core systems market. These one-size-fits-all software packages do not require costly and complex customization. Software suppliers apply the following reasoning: our solution can be applied anywhere because all companies do more or less the same things. In practice, however, this best practice-based template model does not offer a good fit for every business. Organizations tend to adjust their working methods to the package, abandon the implementation or fall back on their old ERP system after having spent millions of euros.

Option 3 →

Low-code solutions

Low-code/no-code solutions are currently gaining in popularity. These solutions are based around graphical models rather than lines of programming code. Hardly any programming is required, so solutions are ready for use in much less time. These often relatively simple mobile apps have user-friendly interfaces that can be added to your existing core system.

There are also low-code core systems, which usually do not turn out to be low-code in practice. In the case of customizations, writing a screen in C# can easily take 10 days – many organizations need anywhere from 1,000 to 5,000 screens.... Once everything is up and running, the customization will often lead to performance issues.

Option 4 →

A low-code solution from Thinkwise

Thinkwise's low-code solution for core systems is designed to cope with complexity and large transaction volumes. Our core system will be up and running up to 20 times faster than C#-based systems. For example, an ERP system can be developed within one year with just 5 FTEs. Our solution continually analyzes your actions to increasingly align user interfaces and workflows with your organization, groups, and individual employees.

The software thus automatically evolves to keep pace with your operational needs.

Thinkwise eliminates four key disadvantages

1. From outdated screens to future-proof interfaces

User-friendly Thinkwise interfaces for desktops, tablets, and smartphones allow your employees to work more efficiently than would ever be possible with monochrome, text-based screens. Our solution continually analyzes your actions to permanently align user interfaces with your organization, groups, and individual employees. This will ensure that the hub of your business operations remains aligned with current business requirements and up to date in terms of technology. The end result: interfaces that are always aligned with your employees' workflow and business operations and allow for uninterrupted, optimal productivity. The Thinkwise platform separates functional operation from technology, allowing you to easily transition to new technologies and avoid getting stuck in a technological prison.

2. Graphical models rather than millions of lines of code

IT investments are generally aimed at keeping an organization's IT up and running. Naturally, you would rather be investing in innovation that will help you stay ahead of the competition than in rewriting and revising lines of code. The Thinkwise platform is based on graphical models, which means you will only need to maintain and update a digital blueprint. This will allow you to model and update comprehensive business applications with minimal technical knowledge in a fraction of the traditional development time.

The use of graphical models offers several major advantages over programming:

- far higher productivity thanks to automated builds;
- higher quality through automation;
- graphical models that can be modified and transferred to other developers more easily;
- reduces reliance on technical knowledge thanks to models;
- accurate and up-to-date documentation at all times.

3. From developer scarcity to less technical maintenance and an extensive pool of potential developers.

You do not want to be dependent on a handful of programmers every time you change or develop your system. The Thinkwise models can easily be adapted to accommodate new developments, insights, and changing legislation by simply repositioning functions in the graphical model. Want to apply more complex business rules? Program your logic with SQL, R Python or other popular programming languages.

Scarcity occurs when:

- you use increasingly outmoded technology;
- you need a lot of FTEs to make adjustments;
- developers must know the code or be very experienced to modify existing applications without errors.

Scarcity can be resolved by:

- using current technology;
- using fewer FTEs to achieve the same functionality; embedding knowledge of the application in graphical models that can be quickly interpreted and easily modified without the need for in-depth technical knowledge or experience.

4. Entirely open architecture with privacy and security by design

Your business needs the latest technology in order to remain competitive. The Thinkwise Indicium Application Tier provides a solution for all your integration challenges. With automated processes and a range of standard connectors, the Thinkwise platform can connect to a wide range of third-party services and applications, including:

- Artificial Intelligence services (bots, virtual assistants, machine learning, image recognition);
- the Internet of Things;
- Office integration (Exchange, Office 365, SharePoint).

In turn, third-party applications and services (e.g., internal user interfaces, financial applications) can connect to Thinkwise applications with minimal effort using the included webhooks and REST API. The Thinkwise Indicium Application Tier API is based on the OData protocol, one of the most widely used standards for RESTful web services.

The Thinkwise platform was designed according to security-by-design principles in order to optimally safeguard the security and integrity of all your business data. Unauthorized access is prevented with support from various authentication protocols, including OpenID and SAML, Single Sign-on, and multi-factor authentication. The Thinkwise Intelligent Application Manager also provides options for role-based access control and entity, row, and field-level authorization.

Finally, the application layer ensures that business rules are always followed, even when importing data or connecting to third-party applications.



Permanent benefits

- **The system that perfectly complements your business process**

Tailored solutions are designed to align with your unique business processes, allowing you to achieve efficiency gains over your competitors and other key benefits. However, your business processes will change over time. What if you had a core system that could automatically adjust to your changing processes and working methods? The Thinkwise platform is like a 3D printer that creates a self-learning core system on the basis of your requirements. The system will always remain technically up to date, because this 3D printer also builds its own successor. Rather than by programming code, it does so by way of a self-learning software factory that renews itself on the basis of models. In addition to keeping the software up to date, this also reduces development times by a factor of ten or more as compared to traditional software development. Don't just take our word for it; these benefits are confirmed by leading software authority QSM.

- **Only import the useful knowledge from your legacy systems**

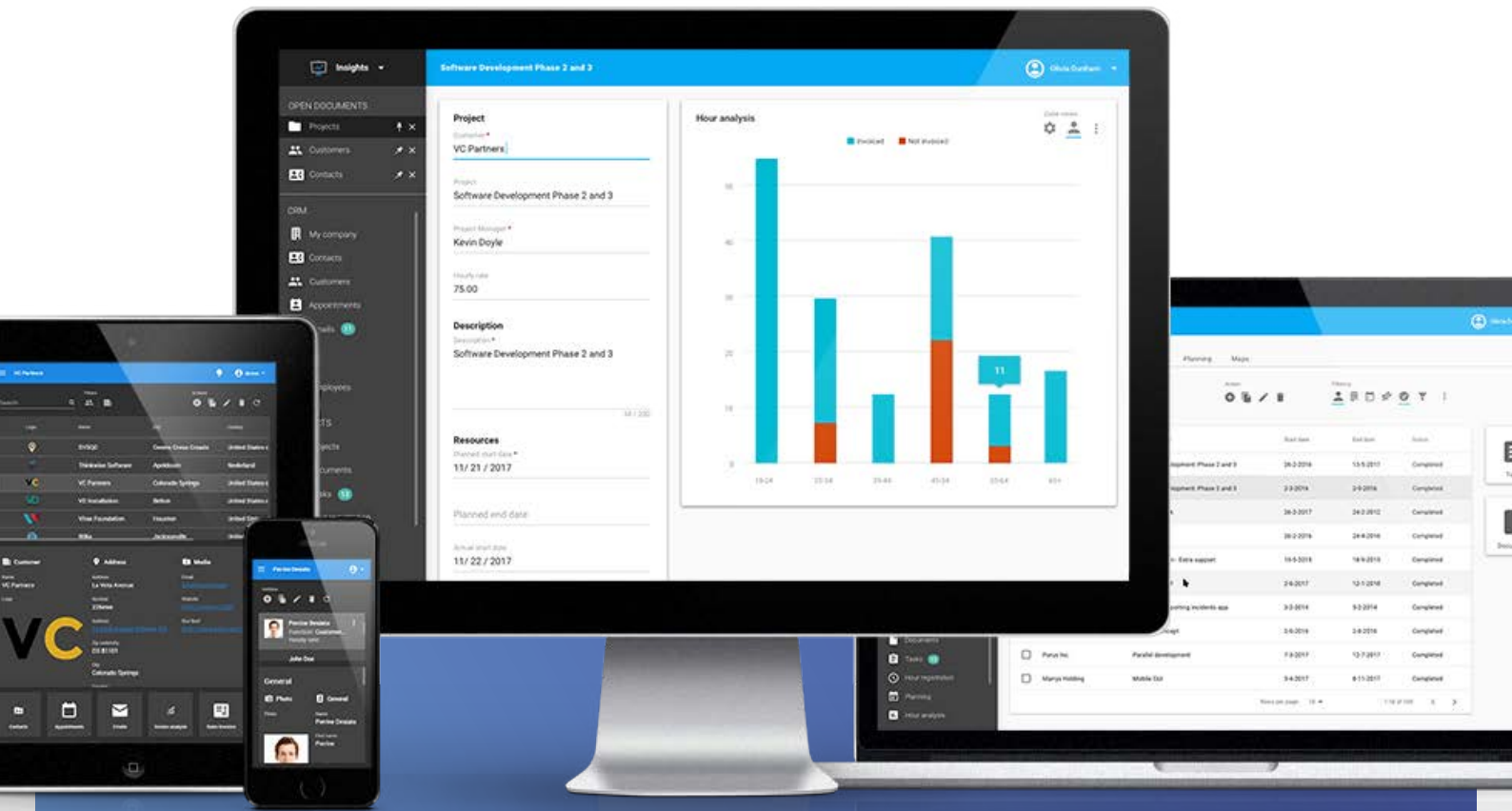
Many organizations still use legacy solutions because they are best equipped to support their business processes. However, they would gladly migrate to a modern solution that offers the same functionality. The Thinkwise Upcycler offers the perfect solution, deriving a model from existing legacy applications that can then be imported. Depending on the technology and available metadata, this derivative model will include tables, columns, domains, controls, references, translations, screen types, and more.

The Upcycler also determines which components of your legacy software will no longer be needed and automatically removes them. The model can furthermore be enriched by analyzing your data against Thinkwise's best practices.

Start from scratch with genuinely future-proof software

Would you like to avoid legacy issues forever, stop relying on scarce RPG programmers, and create a more manageable application landscape? Do you want to tap into new technologies more quickly or introduce changes across your business operations? If so, follow in the footsteps of our [satisfied customers](#). If you are looking for software that will help you stay ahead of the competition, visit thinkwisesoftware.com to find out how our business software can provide optimal support every step of the way.

Experience the power of Thinkwise first-hand?



Did this whitepaper convince you that our enterprise low code platform could also be interesting for your organization? Then request a free Thinkwise test environment. We are happy to provide you with proof that your organisation can innovate more effectively with Thinkwise and without legacy problems.

Want to know more?

Please contact us for a personal introductory meeting to discuss the possibilities.



[Request a trial environment](#)

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