

New Zealand Business Excellence Foundation

How to use Lean and
Six Sigma to improve
business processes



PRAGMATIC
IMPROVEMENT

What is Six Sigma?

Sigma

- is a measurement scale or quality scale upon which improvements can be gauged

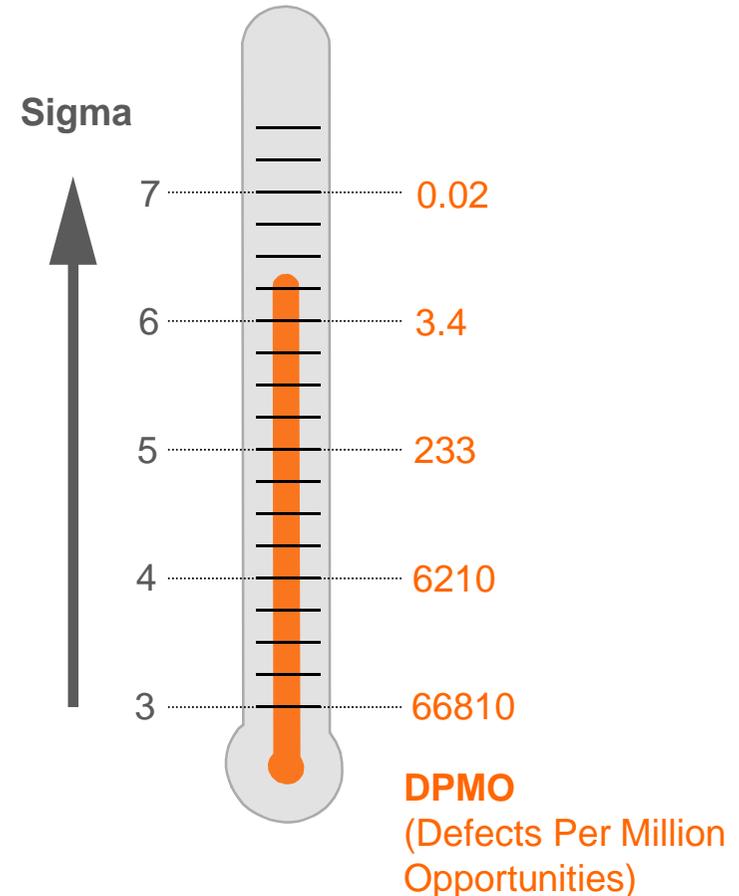
Six Sigma

- Is a structured problem-solving methodology that drives business improvement



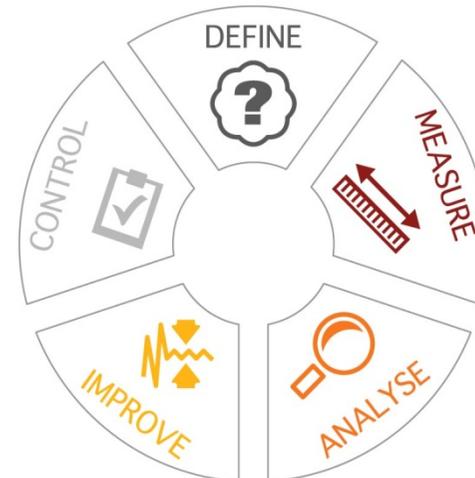
Six Sigma as a measure...

- a measure of “comparative quality” using defects per million opportunities, Z scale and process drift of 1.5 standard deviations
- just a measurement scale
- Six sigma = 3.4 defects per million opportunities



Six Sigma methodology

- A methodology that links process improvement to business strategy
- A proven tool set based on a DMAIC framework for driving and achieving transformational change within an organisation
- A project based improvement process that focuses an organisation on:
 - Customer requirements
 - Defect reduction
 - Variation control
 - Analytical rigor
 - Team work



Lean is.....

- A set of tools and a methodology that originated in manufacturing in post World War II Japan.
- Adopted and expanded upon by US manufacturers to increase competitiveness in the 70's and 80's
- Essentially about reducing waste, managing speed and throughput of “production line” type processes

Lean and non-value added work

There are essentially three types of work

- Value added work
- Business required (but still non value adding work)
- Non-value adding work

The focus of Lean is to eliminate waste and minimise non-value added work



Which tools?

Time issues

- Flow (process speed)
- Cycle time
- Delivery issues/back orders



Predominantly
Lean tools

Defect and Variation Issues

- Customer complaints
- Quality issues
- Rework



Predominantly
Six Sigma tools

The toolbox

- SIPOC
- Communications plan
- Project charter
- Project plan (Gant charting)
- Influence strategy
- Risk analysis
- Brainstorming
- Affinity diagrams
- Comparative rating analysis*
- Conjoint analysis*
- Kano analysis*
- QFD*
- RACI
- Process mapping
- Value stream map*
- Flow diagrams
- Cycle time analysis
- Stakeholder influence strategy*
- Forced paired ranking*
- Benefit effort matrix
- Stratification planning
- Process waste analysis
- Sample sizing
- Defect definition
- Measurement systems analysis
- Attribute agreement analysis*

The toolbox

- Box plots
- Time series charting (run charts)
- Control charts
- Histograms
- Capability analysis
- Linear regression - prediction & confidence intervals
- Correlation coefficients*
- Nonlinear regression*
- Multiple regression*
- Hypothesis testing
- Kanban Systems
- Distribution identification*
- DOE*
- 5 S
- SMED
- Kaizen improvements
- Process balancing
- Batch sizes calculations and adjustments*
- Process yield measurement
- Queue sizing
- Process sequencing
- FMEA
- Systems simulation*

Why both Six Sigma and Lean?

- Both methodologies work well individually
 - Six sigma uses statistical tools in a rigorous framework that focuses on the reduction of defects through the reduction of variation
 - Lean reduces the cycle time of a process and removes waste
- The methodologies combined reduce defects and deliver products and services faster



Six Sigma and Lean can be applied to all processes

- Customer-facing processes
 - Customer service transactions
 - Pricing/quotations
 - Order management
 - Accounts receivable
- Internal business processes
 - End of month financial reporting
 - Resource allocation
- Core production or service processes



Some local examples...

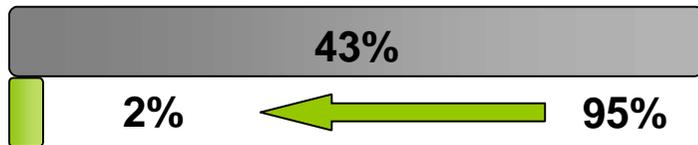
Time to complete processing of customer requests – major call centre



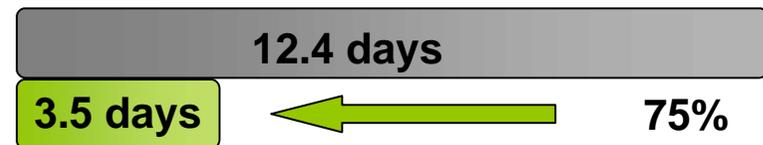
Nurses time spent directly on patient care – Middlemore Hospital



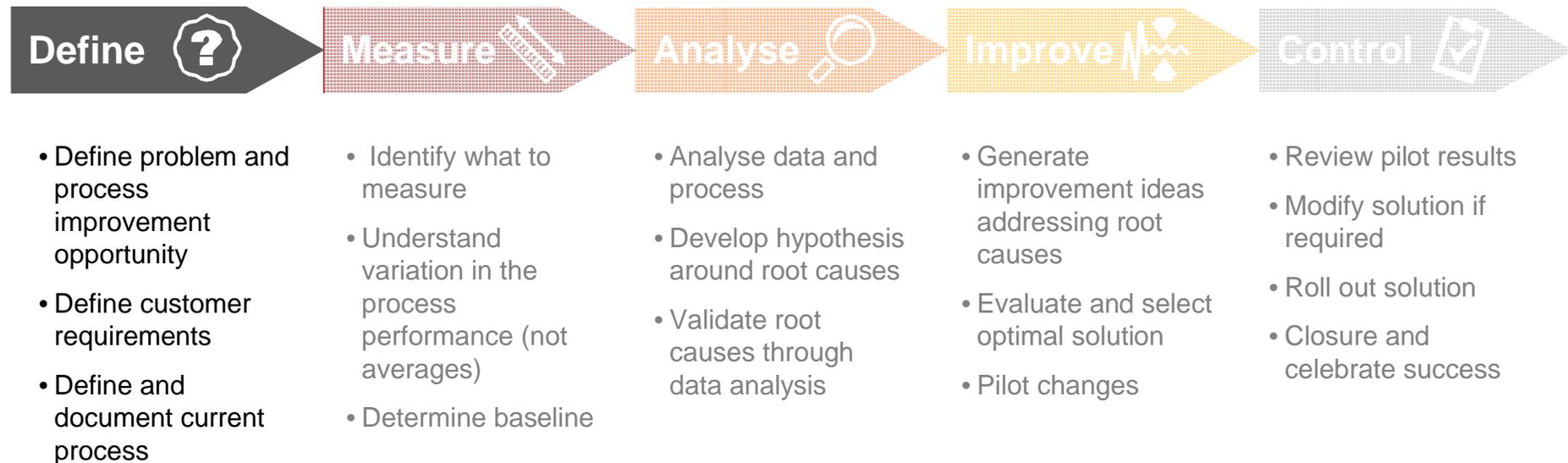
Error rate on establishing Automatic payments – major bank



Cycle time – sale to fulfillment – major Telco



DMAIC stages

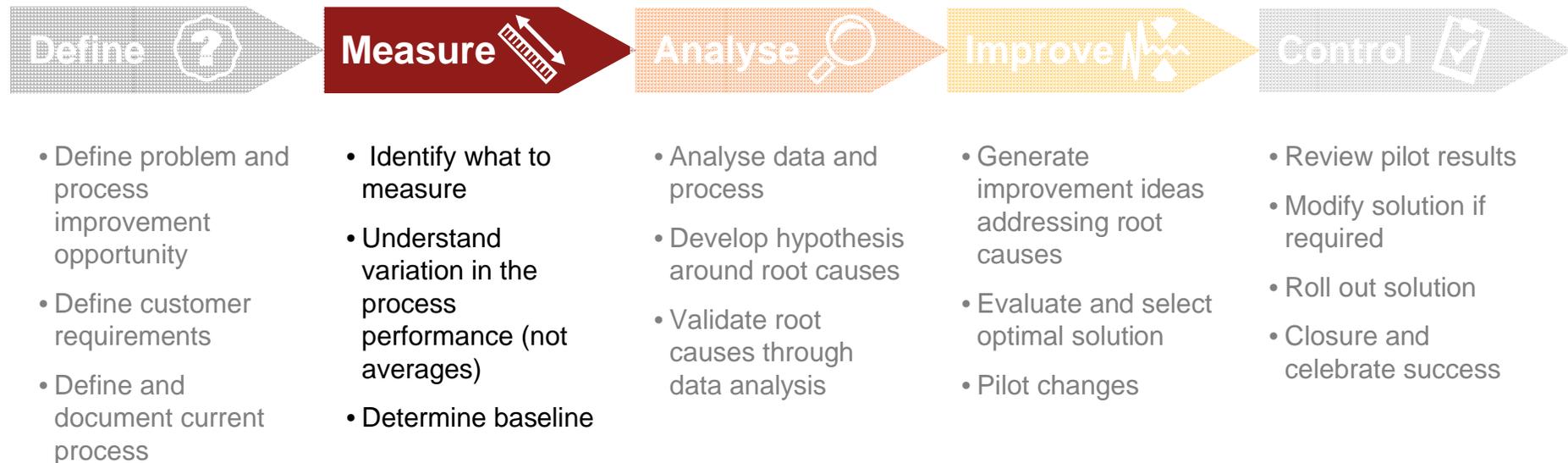


In the Define phase we use tools that will help us to take a top-down look at our processes from a business perspective.

It starts with the customer and focuses on what is important to them.

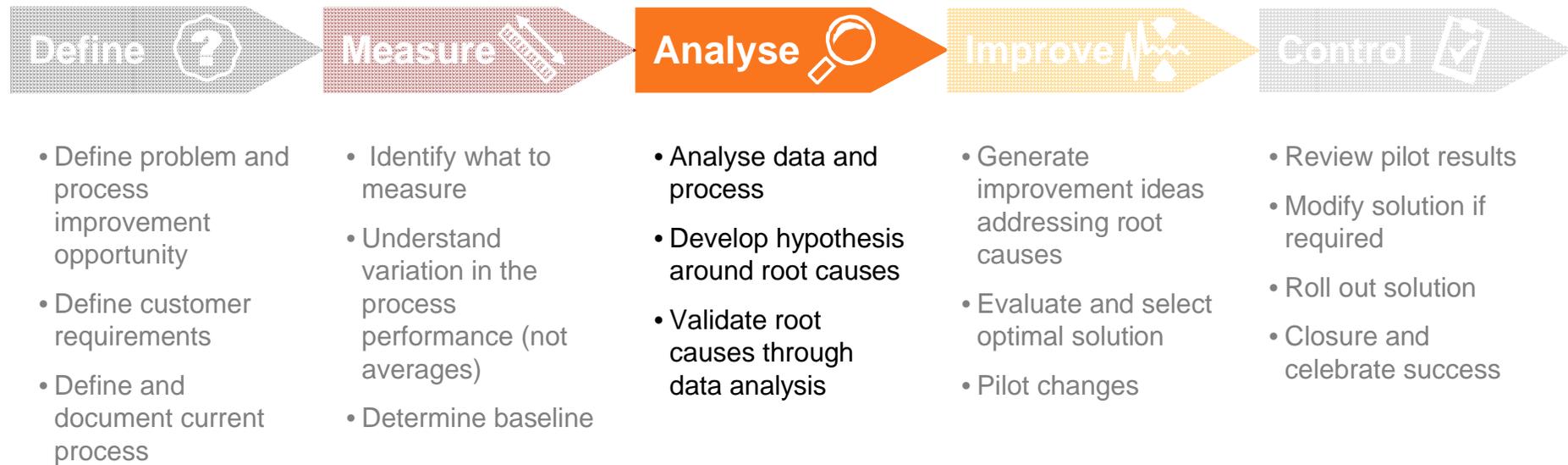
We use all the tools in this phase to help us prioritise and focus on the areas where our greatest opportunities for improvement are. In essence, we define what is important. Our improvement projects should be fairly well defined before leaving this phase.

DMAIC stages



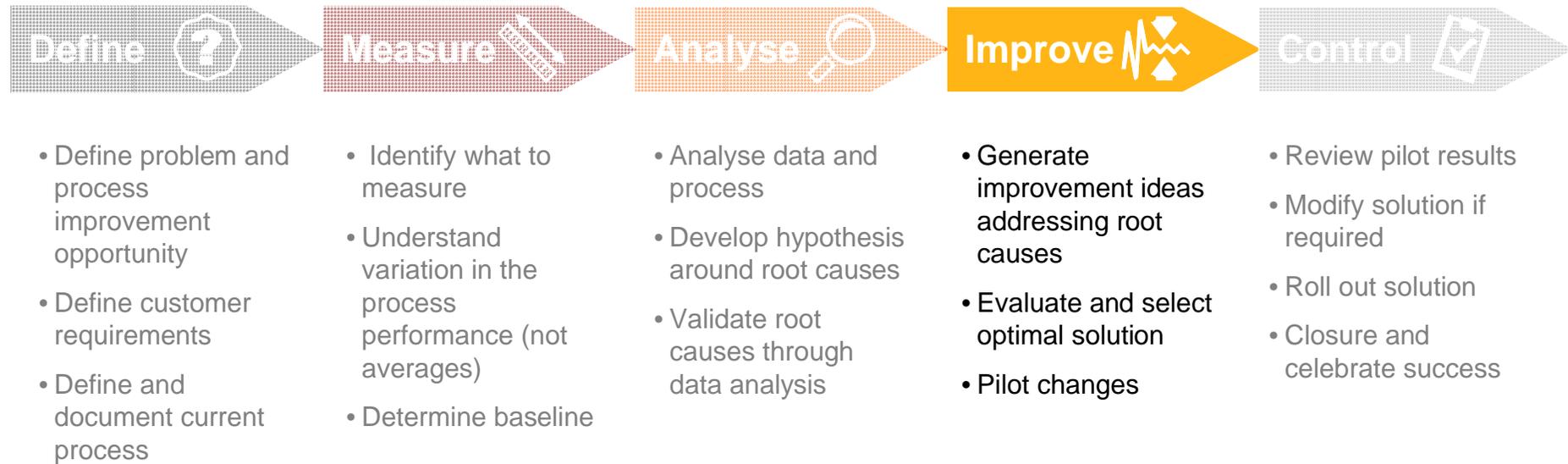
In the Measure phase we assess the current performance. We determine how well we are doing compared to the customer requirements. We don't know what we don't know, and we won't know unless we measure it. Although some measurement may take place in Define, it is not nearly as detailed as the measurement that takes place in this phase. As a result of the more detailed measurements the project normally becomes more defined in this phase, with the focus narrowing to ensure success. We also measure the integrity of the data using measurement system analysis.

DMAIC stages



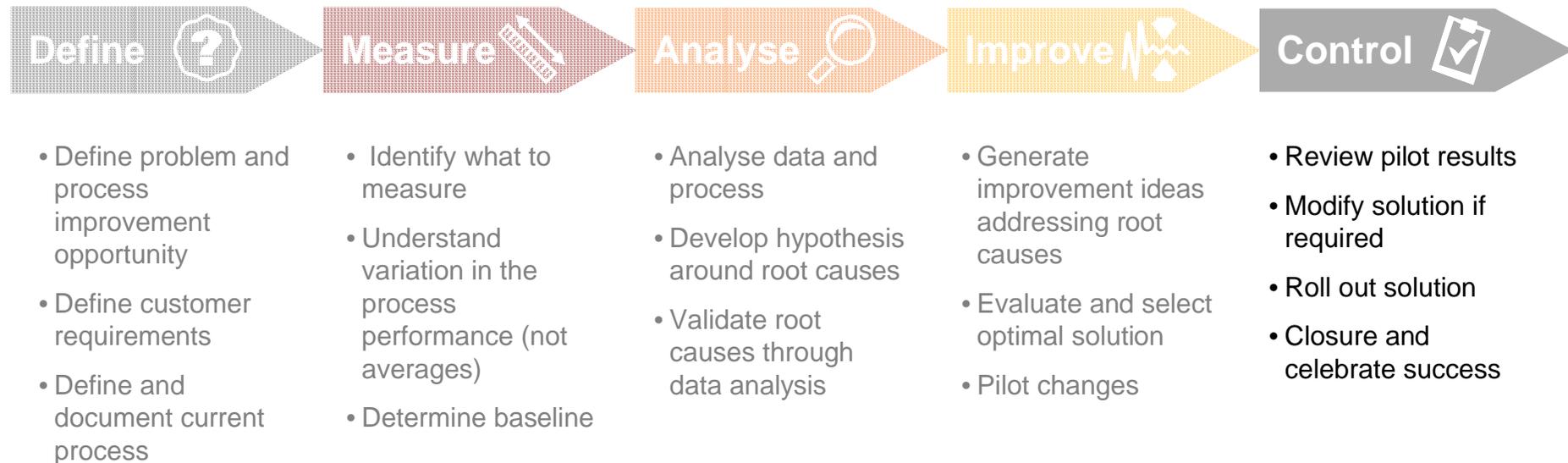
In the Analyse phase we discover why there is a gap between current performance and our goals. Detailed statistical tools are used to determine the root causes of the problem. We try to identify the relationships between variables and what the key process indicators and outputs are. The result of this phase should present us with specific actions with proven relationships for improvement.

DMAIC stages



In the Improve phase we identify and test the proposed solutions to the problem. Often more data is collected in this phase and further analysis completed. We need to select the best possible solution and then predict the new capability of the process and/or value stream. Tools for implementing and validating the improvement are also used in this phase.

DMAIC stages



The Control phase uses tools to monitor the improved process and provide continuous evidence that the gains are being sustained. ‘Control’ means that the process is stable, predictable and meets customer requirements.

Once the improvement has been made and results documented monitoring of performance is maintained. Adjustment of the process is only done when the data clearly indicates that it is required, or when a change in customer requirements necessitates a process change. This is essentially the establishment of process management.

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