



## Cyber Business Interruption

# Payment System Malware Infection

The payment processing system at HomeStores Inc., a large retailer, suffered multiple service degradations during an 18 hour period as a result of a malware infection. The incident commenced at 0600 on a Saturday morning, prior to all stores opening at 0900, and over 100 stores were affected. In this situation, all transactions during the degradation should have been stored off-line and queued until the system was back online. However, HomeStores's system failed to store the majority of the transaction information.

It was estimated that around 37,000 transactions were affected with a total sales value of approximately USD4.4m. The degradation of service caused by malware is a covered cause of loss under Tokio Marine Kiln's Cyber Ctrl policy.

## Coverage

The Tokio Marine Kiln Cyber Ctrl policy provides cover for business interruption losses resulting from this type of incident, indemnifying a policyholder for:

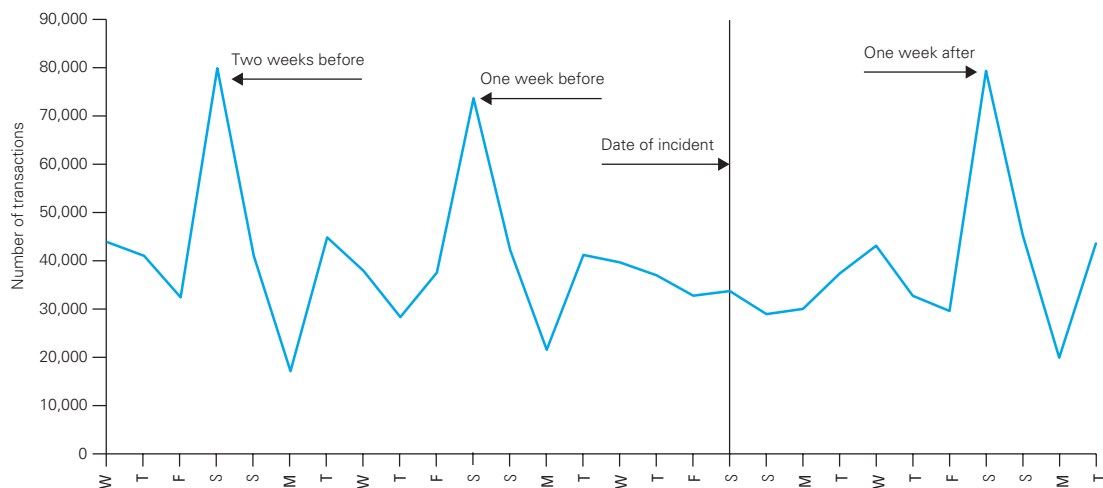
- The loss of Gross Earnings, less all charges and expenses that do not necessarily continue during the suspension of business operations;
- Expenses necessarily incurred for the purpose of reducing the loss of Gross Earnings, and;
- Extra Expenses, defined as reasonable and necessary costs incurred by the Insured to temporarily continue as nearly normal as practicable in the conduct of the Insured's business during the Interruption Period.

For a business such as HomeStores, the policy defines Gross Earnings as net sales less the cost of merchandise sold, materials and supplies consumed in the operations or services rendered by the Insured.

## Establishing the loss of sales

HomeStores has estimated that approximately 37,000 transactions have been lost and this can be reviewed by analysing the daily number of transactions in the period before and after the incident, as illustrated at Figure 1.

Figure 1 – Number of daily transactions

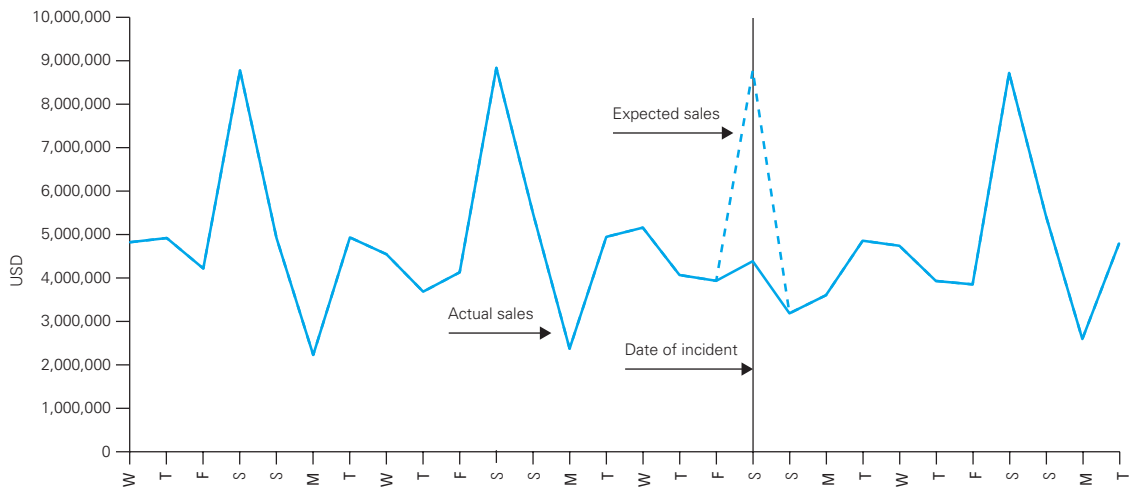


The number of daily transactions on the Saturdays before and after the incident are between 70,000 and 80,000, but have reduced to approximately 35,000 on the date of incident, which supports the estimated number of lost transactions.

The transactions peak on the Saturdays is quite typical for a high street retailer, where sales at a weekend are likely to be higher than on a weekday. Retail sales on a Monday are also traditionally lower than other weekdays.

Understanding these trends in a business and how they apply to the period of interruption is critical in calculating the level of sales that would have occurred but for an incident. As the system degradation occurred on a Saturday, using an average of the daily sales for the week before the incident would understate expected sales.

Figure 2 – Daily sales



The graph at Figure 2 shows that sales are consistent on the Saturdays before and after the incident, such that data for these days could potentially be used as the base period to calculate expected sales. A review of the specific date of the loss and any special events/promotions at HomeStores and its competitors would also be undertaken to ensure that the projected sales are representative of what would have happened but for the incident. Assuming there are no other factors to take into account, then a calculation for loss of sales is set out at Figure 3.

Figure 3 – Calculating loss of sales

| Description   | Total USD        |
|---|------------------|
| Sales   |                  |
| Saturday 2 weeks before the incident                | 8,801,500        |
| Saturday 1 week before the incident                 | 8,857,000        |
| Saturday 1 week after the incident                  | 8,740,000        |
| Average   | 8,799,500        |
| Less: actual sales on date of incident              | (4,400,000)      |
| <b>Loss of sales before applying Waiting Period</b> | <b>4,399,500</b> |

**Waiting Period**

In this instance, the policy has an 8 hour Waiting Period, which represents approximately 44% of the 18 hour period of interruption. The table at Figure 4 shows the hourly sales data and how expected and actual sales accumulate during the day.

**Figure 4 – Calculating loss of sales in the Waiting Period**

| Description                      | Expected hourly sales USD | Actual hourly sales USD | Loss of sales before Waiting Period USD | Waiting Period USD | Loss of sales after Waiting Period USD |
|----------------------------------|---------------------------|-------------------------|---|--------------------|--|
| 0600 to 0700 (stores closed)     | 0                         | 0                       | 0                                       | 0                  | 0                                      |
| 0700 to 0800 (stores closed)     | 0                         | 0                       | 0                                       | 0                  | 0                                      |
| 0800 to 0900 (stores closed)     | 0                         | 0                       | 0                                       | 0                  | 0                                      |
| 0900 to 1000                     | 439,975                   | 220,010                 | 219,965                                 | 219,965            | 0                                      |
| 1000 to 1100                     | 527,970                   | 264,008                 | 263,962                                 | 263,962            | 0                                      |
| 1100 to 1200                     | 615,965                   | 308,005                 | 307,960                                 | 307,960            | 0                                      |
| 1200 to 1300                     | 879,950                   | 439,998                 | 439,952                                 | 439,952            | 0                                      |
| 1300 to 1400                     | 1,231,930                 | 615,988                 | 615,942                                 | 615,942            | 0                                      |
| 1400 to 1500                     | 1,319,925                 | 659,985                 | 659,940                                 | 0                  | 659,940                                |
| 1500 to 1600                     | 1,231,930                 | 615,988                 | 615,942                                 | 0                  | 615,942                                |
| 1600 to 1700                     | 879,950                   | 439,998                 | 439,952                                 | 0                  | 439,952                                |
| 1700 to 1800                     | 703,960                   | 352,003                 | 351,957                                 | 0                  | 351,957                                |
| 1800 to 1900                     | 527,970                   | 264,008                 | 263,962                                 | 0                  | 263,962                                |
| 1900 to 2000                     | 439,975                   | 220,010                 | 219,965                                 | 0                  | 219,965                                |
| 2000 to 2100 (stores closed)     | 0                         | 0                       | 0                                       | 0                  | 0                                      |
| 2100 to 2200 (stores closed)     | 0                         | 0                       | 0                                       | 0                  | 0                                      |
| 2200 to 2300 (stores closed)     | 0                         | 0                       | 0                                       | 0                  | 0                                      |
| 2300 to midnight (stores closed) | 0                         | 0                       | 0                                       | 0                  | 0                                      |
| <b>Total</b>                     | <b>8,799,500</b>          | <b>4,400,000</b>        | <b>4,399,500</b>                        | <b>1,847,781</b>   | <b>2,551,719</b>                       |

As can be seen from the table, the loss of sales during the waiting period is USD1,847,781, which is less than USD1,955,333, which would be achieved by simply prorating the loss of sales by 44%. This hourly approach calculates the correct indemnity for HomeStores.

The degradation of service caused by malware is a covered cause of loss under Tokio Marine Kiln's **Cyber Ctrl** policy

## Identifying the cost savings

After establishing the loss of sales, consideration will then need to be given to those costs that HomeStores has not incurred as a consequence of the incident. Separate consideration will be given to those costs that fall within the definition of Gross Earnings and those that are outside this definition.

### Gross Earnings

In the case of a retailer, the saved costs are typically those associated with the purchase of stock that it has been unable to sell. These costs can be considered to be within the policy definition for Gross Earnings, i.e. the cost of merchandise sold, materials and supplies consumed in the operations or services rendered.

However, in this case, the goods have been sold, in that the customer has been able to leave HomeStore's stores with the goods as they would have understood them to have been paid for. Consequently, in this scenario, there is no saving for cost of goods sold.

While there is no saving in the cost of goods sold, HomeStores will have generated a saving in respect of payment processing costs incurred with the credit and debit card companies, as they will not have processed the lost transactions. These costs are usually in the region of 2% of sales and could be considered within the policy definition for Gross Earnings or, alternatively, as a saving in fixed operating expenses, as discussed further below.

### Other Costs

With regard to fixed operating expenses, such as payroll and property costs, it is unlikely that these will have altered as a consequence of the incident being short in duration. However, if the incident had resulted in a reduction in overheads, then any such savings would also be deducted.

## Business Interruption Calculation

The table at Figure 5 shows how, using the above information, the business interruption loss is calculated at USD2,500,684.

Figure 5 – The business interruption loss

| Description  | Total USD        |
|--|------------------|
| Loss of sales after the waiting period                             | 2,551,719        |
| Rate of gross earnings<br>(after deducting credit card costs only) | 98%              |
| Loss of gross earnings   | 2,500,684        |
| Less: other savings  | 0                |
| <b>Total</b>   | <b>2,500,684</b> |



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