Peter J. Wong
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Informal Working Note 14

YARD COMPUTER SYSTEMS:   PRELIMINARY ASSESSMENT

## Introduction

In this note we shall present a preliminary assessment of yard computer systems.  It will be seen that there exists many diverse approaches to the architecture of such systems.

## Generic Functions

Certain generic information processing functions need to be performed in most modern hump yards.  These may include:

- Control of retarders--measuring velocity of cars in retarders and controlling retardation force to achieve a desired exit velocity.

- Control of switches--based on car's classification and classification track assignment; align switches to properly route car.

- Yard inventory--car/train inventory of what is on receiving/ classification/departure tracks.

- Receive/process/transmit advance consist information.

- Receive/process/transmit accounting/financial information--e.g., weighing,  billing, routing, shipper, consignee, etc.

- Signalling/communication requirements for yard engine movements--e.g., control of power switches in receiving yard, throat, or departure yard.

## Multiple Computer Approach (GRS)

GRS has taken a multiple computer approach to implementing yard computer systems.  In particular, they use 4 or 5 small process control computers with one computer being a "hot-spare."  The hot spare can take over the functions of one of the other computers in the event of a single computer failure.

## Central Computer Approach (WABCO)

WABCO has a single medium-sized computer performing most of the yard functions, with a hot-spare in the event of a failure to the primary computer.

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## Distributed Computing Approach (SP)

SP in its new West Colton yard has divided the yard functions into two parts:

- Process control functions which require constant monitoring/control on an on-line basis.

- Management/inventory functions which are required only on a demand basis.

SP took the position that it wanted to separate the above two categories of functions and put them in separate computers, since they had found from experience that the management/inventory functions many times interfered and/or "clobbered" the process control functions. Furthermore, SP decided to put the process control functions in a computer resident in the yard, but remove the management/inventory functions to their main computer in S.F. headquarters.

## Conclusions

There are a myriad of computer system architectures for yards. There does not exist a systematic treatment of the pros and cons. Coupled with the fact that CPU costs are going down rapidly and that communication costs are likely to be a dominant factor, the problem becomes even more complex.

## Distribution

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